MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-R series

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

-RJ72GF15-T2

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly. 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 "General Safety Requirements" in 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.
- 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.

[Design Precautions]

⚠WARNING

- 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.
- Configure safety circuits external to the remote head module to ensure that the entire system operates safely even when a fault occurs in the external power supply or the remote head module. 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 remote head module.
  (2) When the remote head module detects an abnormal condition, outputs are:
    • Held or turned off according to the parameter setting of each module mounted on the main base unit or extension base unit if the self-diagnostic function of the remote head 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 remote head 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 remote head module. For a fail-safe circuit example, refer to "General Safety Requirements" in the MELSEC iQ-R Module Configuration Manual.
- Configure a circuit so that the remote head module 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.
- When connecting an external device with a remote head module to modify data of a running remote head module, configure an interlock circuit in the program of the master station to ensure that the entire system will always operate safely. For other forms of control (such as parameter change, forced output, or operating status change) of a running remote head module, 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 head module is remotely controlled by an external device, immediate action cannot be taken if a problem occurs in the remote head module due to a communication failure. To prevent this, configure an interlock circuit in the program of the master station, and determine corrective actions to be taken between the external device and remote head module in case of a communication failure.

[Design Precautions]

⚠ WARNING

- Do not write any data to the buffer memory in the remote head module. Doing so may cause malfunction of the programmable controller system.
- Do not write any data from the remote head module to the "system area" and "write-protect area" of the buffer memory in each module. Also, do not use any "use prohibited" signals as an output signal from the remote head 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.

[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.
- After the remote head module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration and/or parameter settings. Design circuits so that the entire system will always operate safely, regardless of the time.
- Do not power off or reset the remote head module while the parameters are being written. Doing so may cause malfunction or failure of the module.

[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.
- 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 Precautions]

⚠CAUTION

- 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.
- When connecting an external device with a remote head module to modify data of a running programmable controller, configure an interlock circuit in the program of the master station to ensure that the entire system will always operate safely. For other forms of control (such as parameter change, forced output, or operating status change) of a running remote head module, 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 head module is remotely controlled by an external device, immediate action cannot be taken if a problem occurs in the remote head module due to a communication failure. To prevent this, configure an interlock circuit in the program of the master station, and determine corrective actions to be taken between the external device and remote head module in case of a communication failure.

[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, parameter settings, 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 product

RJ72GF15-T2

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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 Remote Head Module User's Manual (Application) [SH-081616ENG] (this manual)	Functions, parameter settings, and troubleshooting of the CC-Link IE Field Network remote head module
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 CC-Link IE Field Network Remote Head Module User's Manual (Startup) [SH-081614ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of the CC-Link IE Field Network remote head module
GX Works3 Operating Manual [SH-081215ENG]	System configuration, parameter settings, and online operations of GX Works3

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
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 system	A system that controls a redundant system and performs network communications in a redundant system
Cyclic transmission	A function by which data are periodically exchanged among stations on the same network using link devices
Data link	Communications that performed by cyclic transmission and transient transmission
Dedicated instruction	An instruction that simplifies programming for using functions of intelligent function modules
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 input and 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
Local station	A station that performs cyclic transmission and transient transmission with the master station and other local stations
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
New standby system	A system that has switched to standby system from control system after system switching
Redundant power supply system	A system that has two power supply modules on a base unit. Even if one power supply module has failed, operation can be continued with the other power supply module.
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 systems, the other system takes over the control of the entire system. For details, refer to "Redundant system" of the following manual. MELSEC iQ-R Module Configuration Manual
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
Safety program	A program that performs 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 69 Safety Communication Relay Function)
Safety station	A station that performs safety communications and standard communications
SIL2 mode	An operation mode for the I/O module and the intelligent function module that perform the safety input/output in the SIL2 level. For details on the SIL2 mode, refer to the following. Manuals for the I/O module or intelligent function module used
Standard program	A program that performs sequence control (Safety programs are excluded.) (This term is used to distinguish from a safety program.)
Standby system	A backup system in a redundant system
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).

Term	Description
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
Transient transmission	A function of communication with another station, which is used when requested by a dedicated instruction or the engineering tool

GENERIC TERMS AND ABBREVIATIONS

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

Generic term/abbreviation	Description
Base unit	A generic term for main base units, extension base units, and RQ extension base units
CC-Link IE module	A generic term for the CC-Link IE Controller Network-equipped module and CC-Link IE Field Network-equipped master/local module
CPU module	A generic term for the MELSEC iQ-R series, MELSEC-Q series, and MELSEC-L series CPU module
Ethernet device	A generic term for the devices supporting IP communication (such as personal computers)
Ethernet-equipped module	A generic term for the RJ71EN71 (when the Ethernet function is used) and MELSEC iQ-R series 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 RJ71GF11-T2, QJ71GF11-T2, QS0J71GF11-T2, LJ71GF11-T2 CC-Link IE Field Network master/local module and the following modules when the CC-Link IE Field Network function is used: • RJ71EN71 • RnENCPU
Network module	A generic term for the following modules: • Ethernet interface module • CC-Link IE Controller Network module • Module on CC-Link IE Field Network • MELSECNET/H network module • MELSECNET/10 network module • RnENCPU (network part)
Power supply module	An abbreviation for the MELSEC iQ-R series power supply module
RAS	An abbreviation for Reliability, Availability, and Serviceability. This term refers to the overall usability of automated equipment.
Redundant power supply base unit	A generic term for base units used for a redundant configuration of power supplies. This unit is used together with redundant power supply modules, to build a redundant power supply system.
Redundant power supply module	A generic term for power supply modules used for a redundant configuration of power supplies. This module is used together with a redundant power supply base unit, to build a redundant power supply system.
Remote head module	An abbreviation for the RJ72GF15-T2 CC-Link IE Field Network remote head module
Remote register (RWr)	Word data (16-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.)
Remote register (RWw)	Word data (16-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.)
RQ extension base unit	An abbreviation for the MELSEC iQ-R series RQ extension base unit
SIL2 function module	Another name for the R6PSFM This module is used with the SIL2 Process CPU as a pair and performs safety control. The module can only be paired with the SIL2 Process CPU.
SIL2 Process CPU	A generic term for the R08PSFCPU, R16PSFCPU, R32PSFCPU, and R120PSFCPU. 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.

1 FUNCTIONS

1.1 Data Communication

Data communication with the master station

Data is communicated by the following methods between the remote head module and the master station.

- Cyclic transmission (☞ Page 20 Cyclic Transmission)
- Transient transmission (📖 User's manual for the master/local module used)

Data communication with the connected module

The following methods are used for data communication with a module connected to the remote head module.

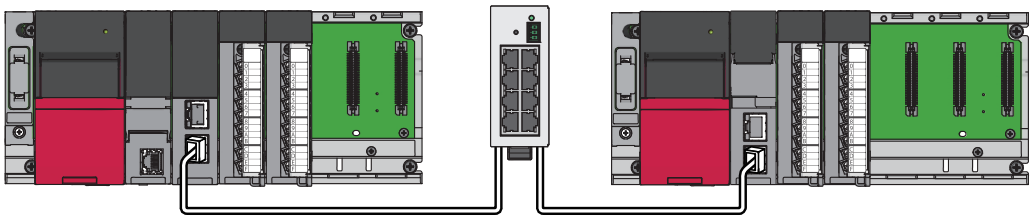
Data communication method		Description	Reference
I/O refresh	Input refresh	Inputs ON/OFF data from the input module, intelligent function module, or network module to the remote head module.	Page 20 Cyclic transmission of bit device data
	Output refresh	Outputs ON/OFF data from the remote head module to the output module, intelligent function module, or network module.	
Intelligent function module refresh		Performs I/O data communication between the buffer memory of the intelligent function module and the remote head module device.	Page 26 Cyclic transmission of word device data
Network module refresh		Performs I/O data communication between link special relay (SB), link special register (SW), as well as link device of the network module and the remote head module device.	📖 User's manual for the network module used

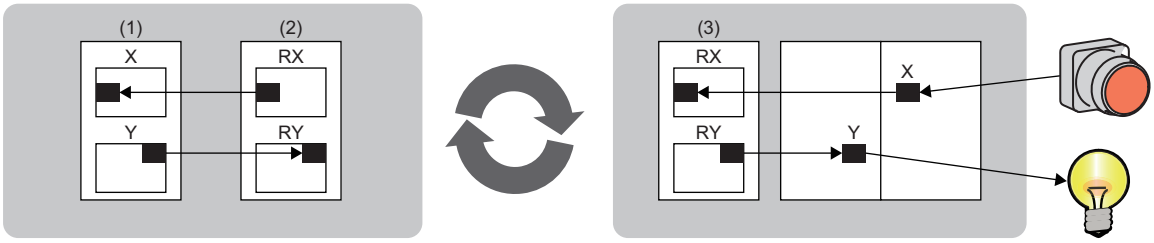
1.2 Cyclic Transmission

This section describes how to perform cyclic transmission of bit and word device data of the remote head module.

Cyclic transmission of bit device data

The CPU module (1) can use the input (X) and output (Y) data from a module connected to the remote head module (3) as if they were the input and output data of the master/local module (2).

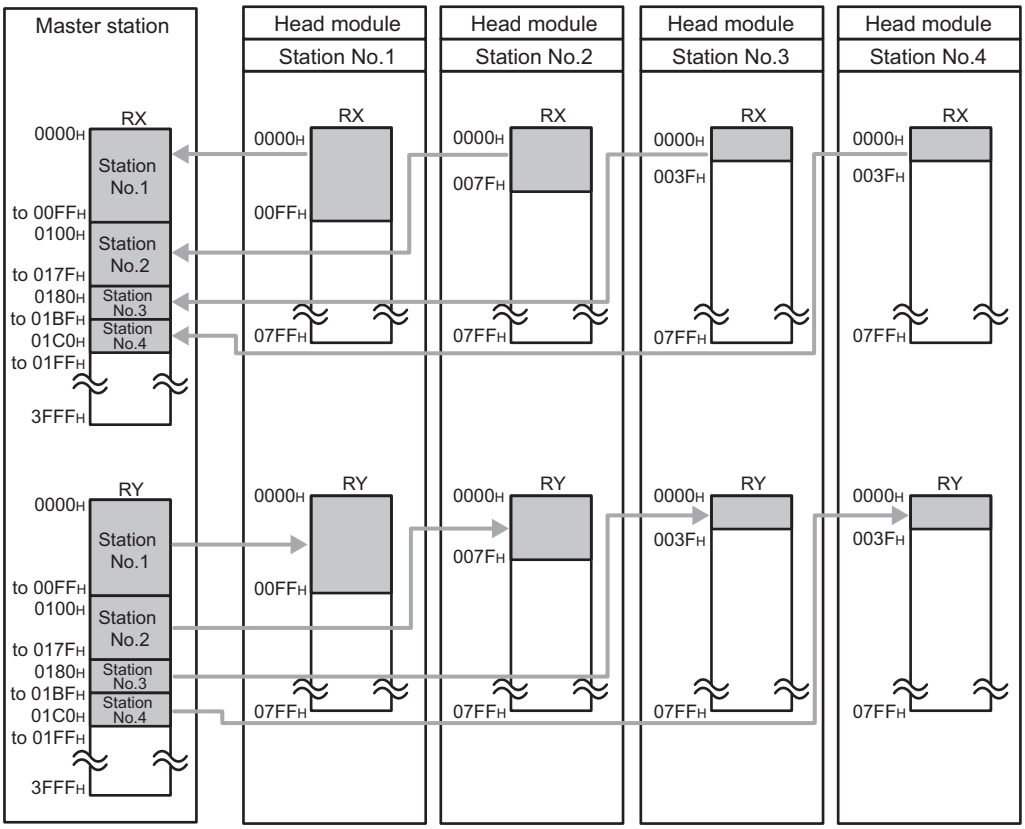




Data flow

This section describes the cyclic transmission data flow of bit device data and the setting for transmission.

- When data is input from an intelligent device station to the master station: The input (X) data from each module connected to the remote head module is input to the remote input (RX) of the master station.
- When data is output from the master station to the intelligent device station: The remote output (RY) data of the master station is output to the output (Y) of each module connected to the remote head module.

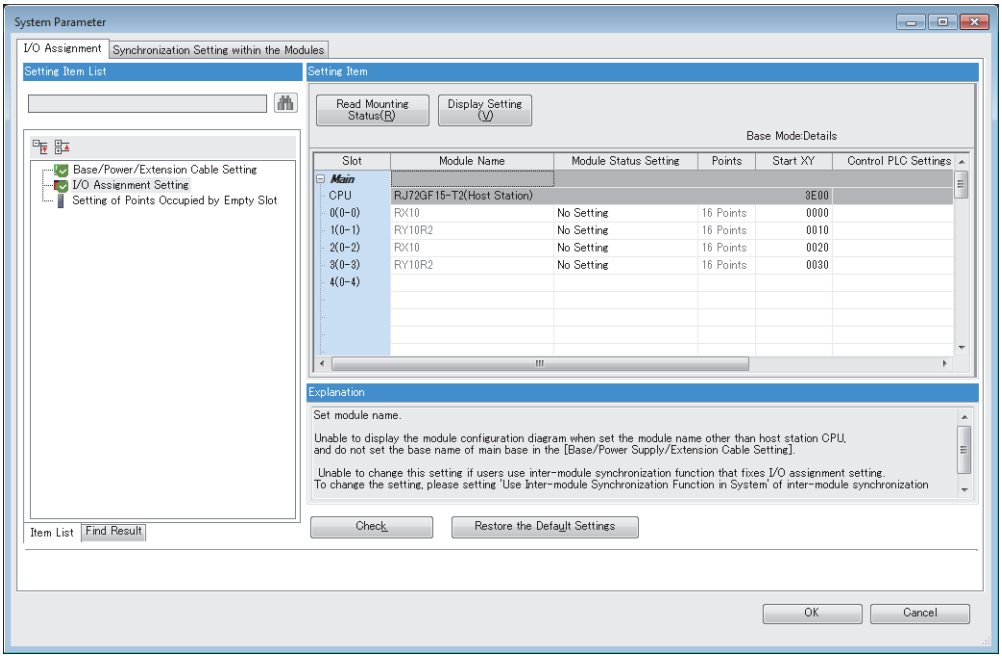


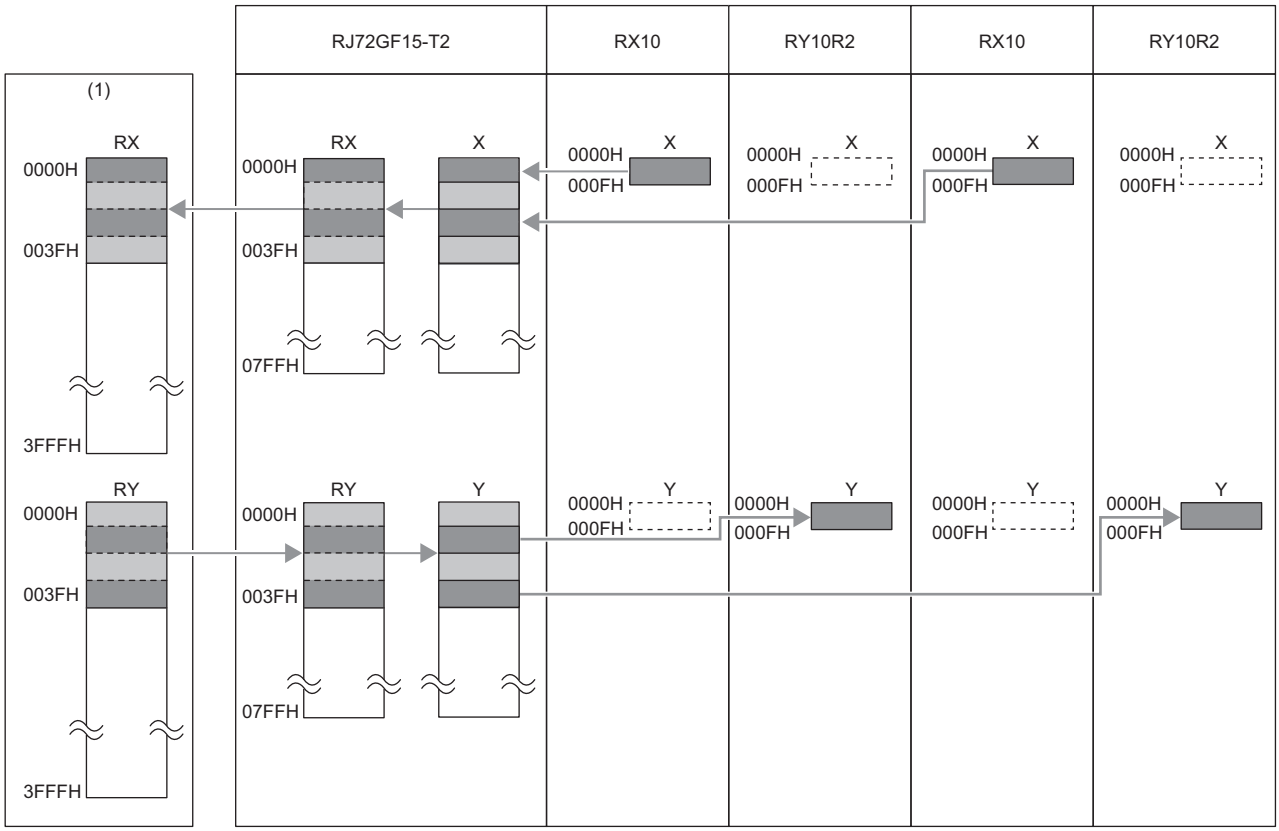
For the flow of data input and output between the master station and the remote head module (station No.1), refer to the following.

☞ Page 22 When the default I/O assignment settings are used,Page 23 When the settings of I/O assignment are changed

■When the default I/O assignment settings are used

This section describes the data flow when 0000H is set to the start I/O number of the RX/RY setting of the master station, and when the I/O assignment setting of the remote head module is not changed from the default.





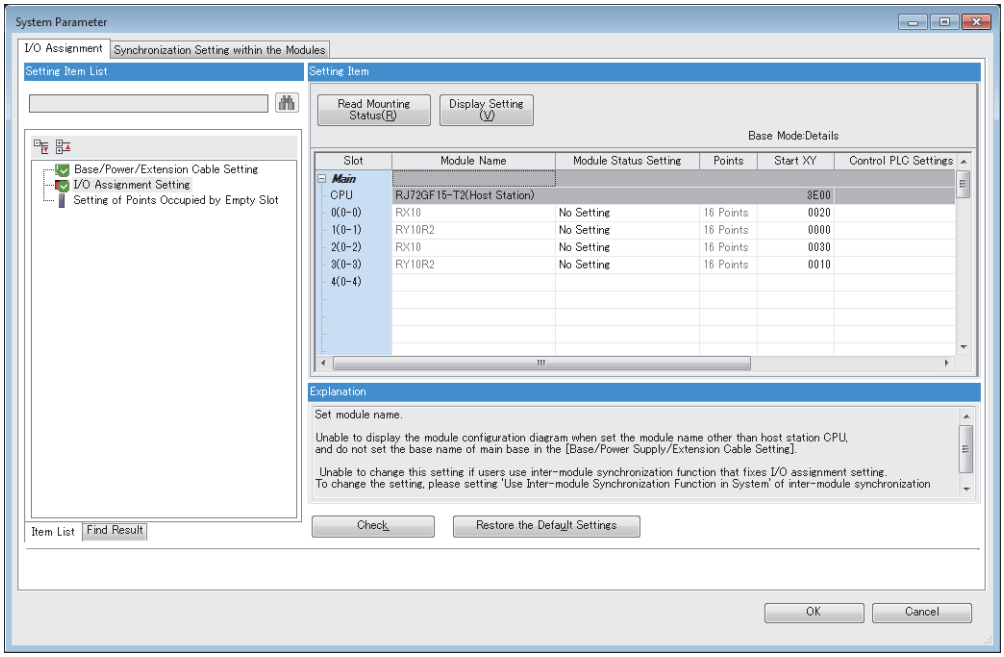
(1) RX/RY ranges of the remote head module (station No.1) which are assigned to the master station

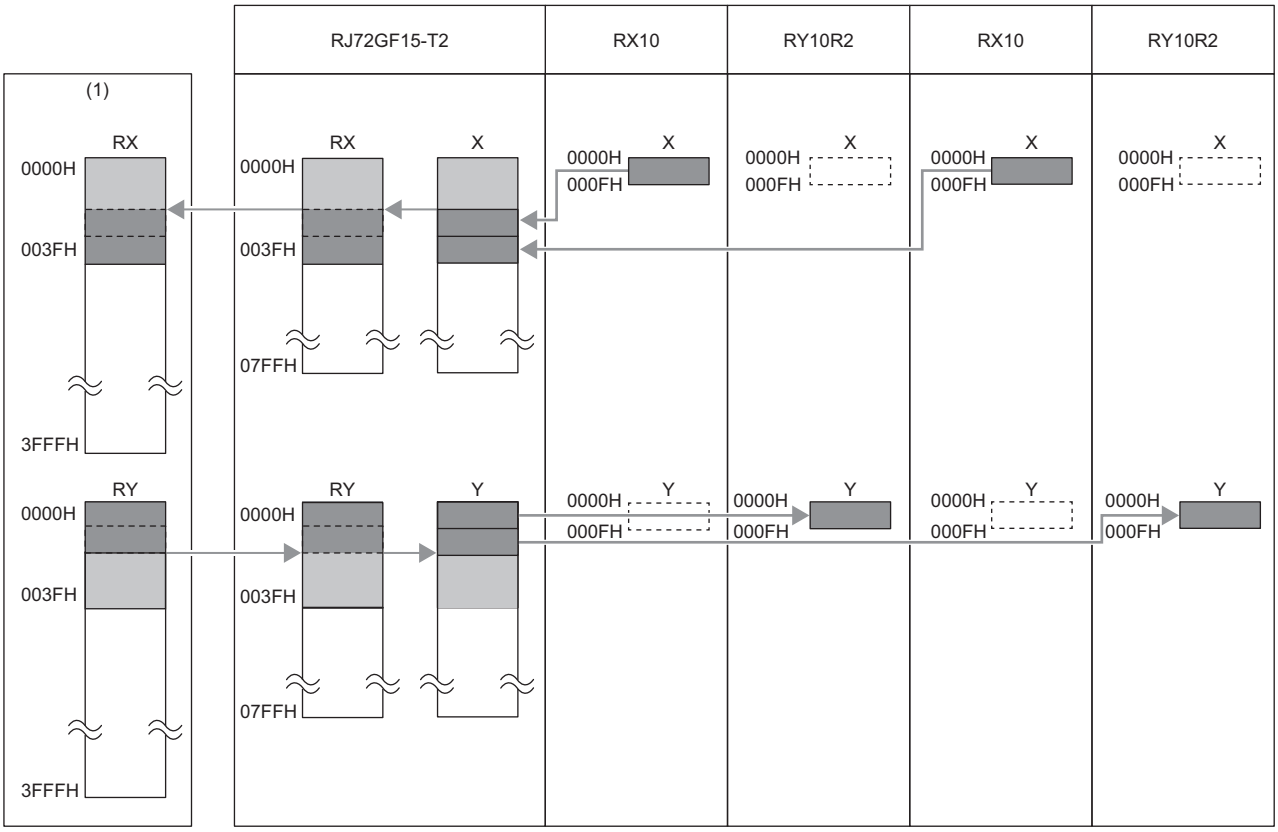
- RX: 0000H to 003FH
- RY: 0000H to 003FH

■When the settings of I/O assignment are changed

This section describes the data flow when 0000H is set to the start I/O number of the RX/RY setting of the master station, and when the I/O assignment setting of the remote head module is changed from the default.

The following shows the assignment when the I/O assignment is set as shown in the following window.



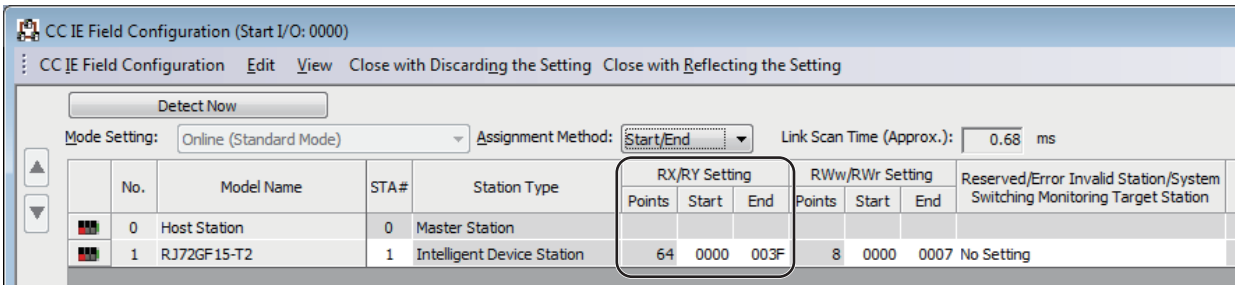


(1) RX/RY ranges of the remote head module (station No.1) which are assigned to the master station

- RX: 0000H to 003FH
- RY: 0000H to 003FH

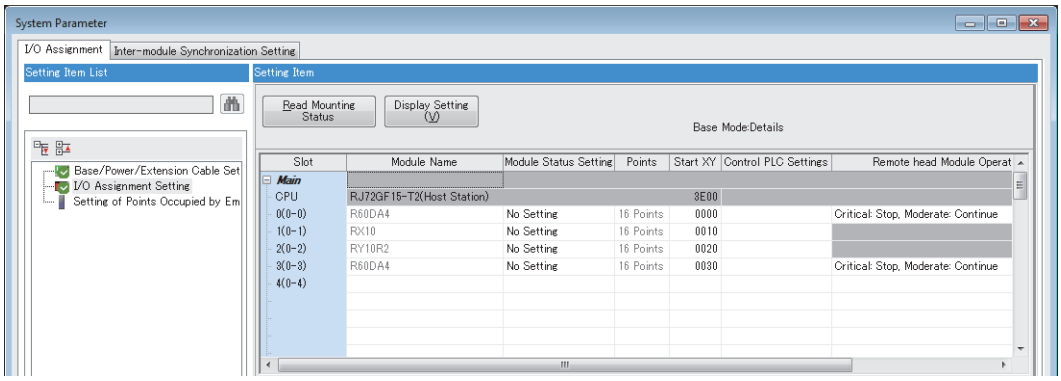
Setting method

In the network configuration setting of the master station, set the total number of I/O points of the modules connected to the remote head module, in 16-point units.



Point

- To set an empty slot on the intelligent device station or to change a start I/O number, change the I/O assignment setting in the remote head module.



- If the number of points will be increased for a system expansion in future, for example, set a large number for the RX/RY setting in the network configuration setting of the master station. Doing so will eliminate the need to change the parameter setting of the master station at the time of the system expansion. However, increasing the number of points also increases the processing time.

Output status for each status

Depending on the status of the data link and remote head module, data may not be able to be output.

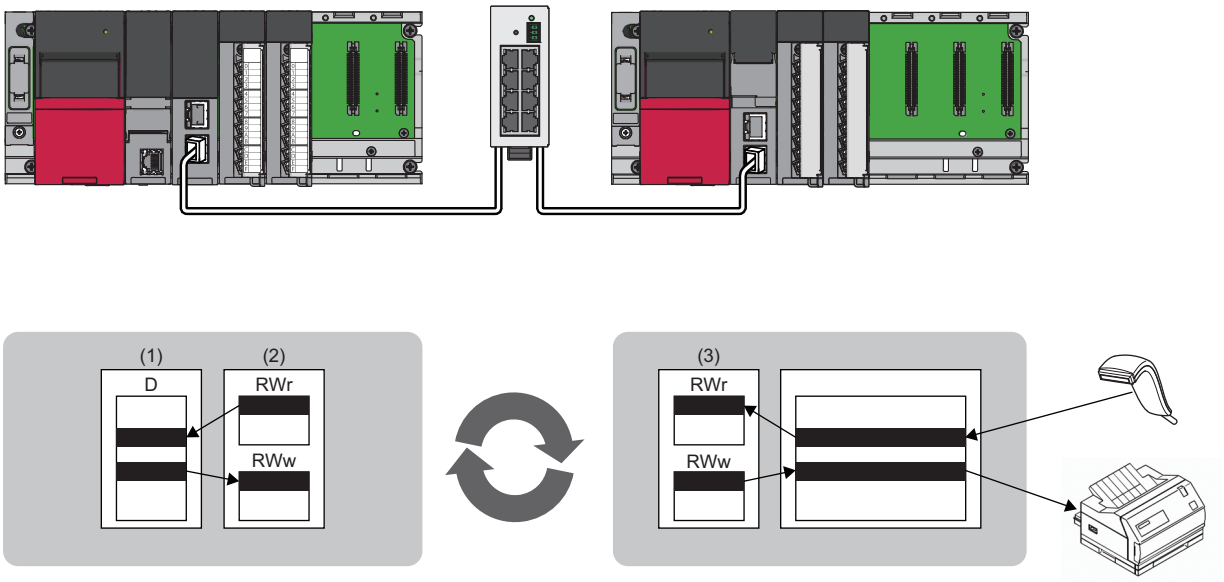
The following table summarizes how the status of the data link and remote head module affects the output status.

—: Not dependent on the status

Switch	Remote head module status	Data link status	Output status
RUN	Operating normally	Cyclic transmission being performed	The output differs depending on the status and setting of the master station. I/O maintenance settings in the 📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application) 📖 User's manual for the master/local module used (1) When the CPU module on the master station is in the stop error state: The output (Y) status is determined by the setting for the output mode upon error in the module parameter. 📖 User's manual for the module used The analog output status from the digital-analog converter module is determined by the setting of the analog output HOLD/CLEAR function. 📖User's manual for digital-analog converter module used When a redundant system of redundant line is configured, the output differs as shown below depending on the firmware version of the master station. • When the firmware version is "57" or earlier, during the period until the systems have been switched after a stop error occurrence, the output (Y) status is determined by the setting for the output mode upon error in the module parameter. • When the firmware version is "58" or later, the systems are switched while the output (Y) is held for 2.1 seconds after a stop error occurrence. If the systems have not been switched within 2.1 seconds, the output (Y) is determined by the setting for the output mode upon error in the module parameter. (2) When the CPU module on the master station is in the STOP state: The output (Y) is determined by the refresh parameters (refresh device of RY for the remote head module) of the master station. • If Y is specified for the device of the CPU module, the output (Y) of the remote head module turns off. • If other than Y (such as M, L) is specified for the device of the CPU module, the output (Y) of the remote head module depends on the output status during CPU STOP setting of the master station. The analog output status from the digital-analog converter module is determined by the setting of the analog output HOLD/CLEAR function. 📖User's manual for digital-analog converter module used
RUN	Operating normally	Cyclic transmission stopped	The output (Y) status is determined by the setting for the output mode upon error in the module parameter. 📖 User's manual for the module used The analog output status from the digital-analog converter module is determined by the setting of the analog output HOLD/CLEAR function. 📖User's manual for digital-analog converter module used
RUN	Operating normally	Disconnected	The output (Y) is held for two seconds after the communication with the master station is terminated due to a problem such as disconnection of the Ethernet cable. When a redundant system of redundant line is configured, the output (Y) is held for the time of "3 second + system switching monitoring time set in the master station". The output (Y) status during disconnection is determined by the setting for the output mode upon error in the module parameter. 📖 User's manual for the module used The analog output status from the digital-analog converter module is determined by the setting of the analog output HOLD/CLEAR function. 📖User's manual for digital-analog converter module used
RUN/STOP	Error	—	The output (Y) status is determined by the setting for the output mode upon error in the module parameter. 📖 User's manual for the module used The analog output status from the digital-analog converter module is determined by the setting of the analog output HOLD/CLEAR function. 📖User's manual for digital-analog converter module used
STOP	Operating normally	—	The output (Y) status of the intelligent function module is determined by the setting for the output mode upon error in the module parameter. 📖 User's manual for the intelligent function module used The analog output status from the digital-analog converter module is determined by the setting of the analog output HOLD/CLEAR function. 📖User's manual for digital-analog converter module used

Cyclic transmission of word device data

The CPU module (1) can use the word data (such as data stored in the buffer memory) of the module connected to the remote head module (3) as if it were the word device of the master/local module (2).

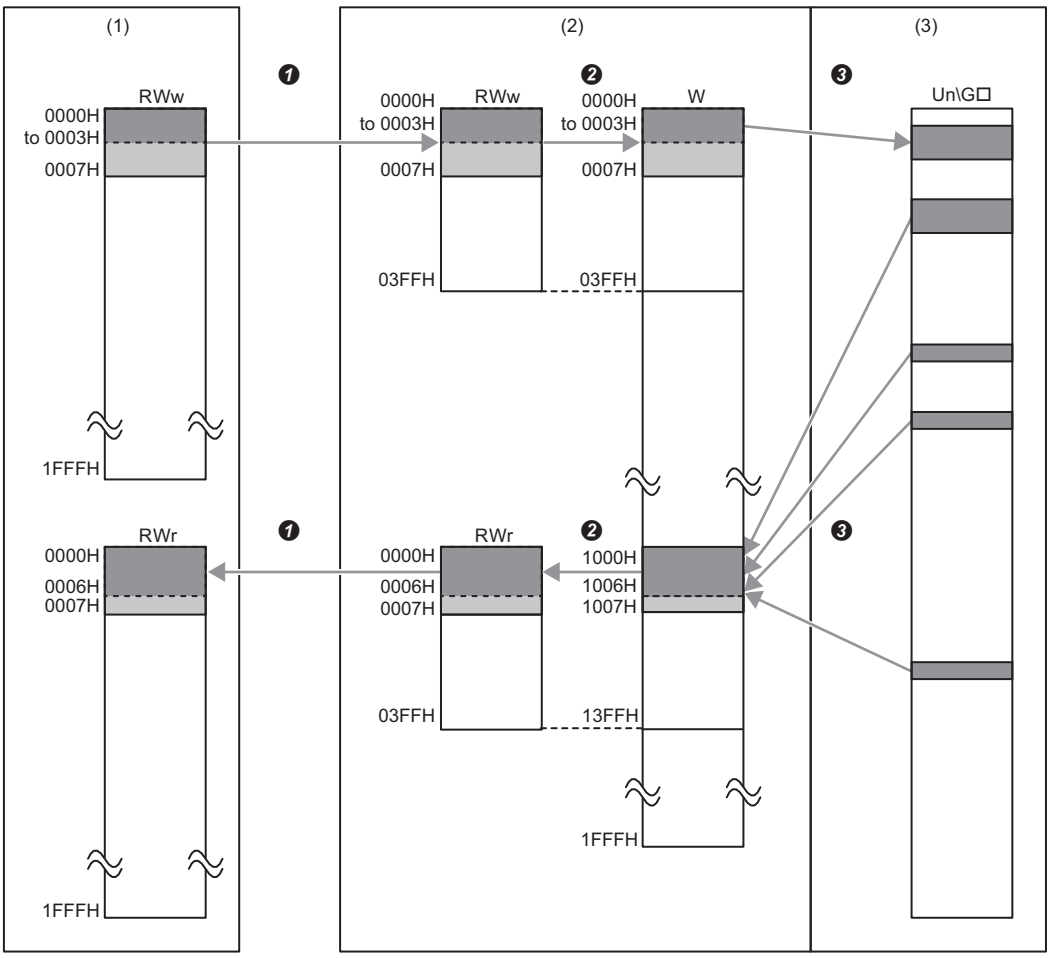


Data flow

This section describes the cyclic transmission data flow of word device data and the setting for transmission.

- When data is transferred from the master station to the intelligent device station: The remote register (RWw) data of the master station is transferred to the buffer memory of the intelligent function module connected to the remote head module.
- When data is transferred from the intelligent device station to the master station: The buffer memory data of the intelligent function module connected to the remote head module is transferred to the remote register (RWr) of the master station.

■When "0000H" is set to the start I/O number of the RWw/RWr setting of the master station



(1) Master station
(2) Remote head module
(3) Intelligent function module

❶ Set RWw/RWr ranges assigned to the remote head module in the network configuration setting of the master station.

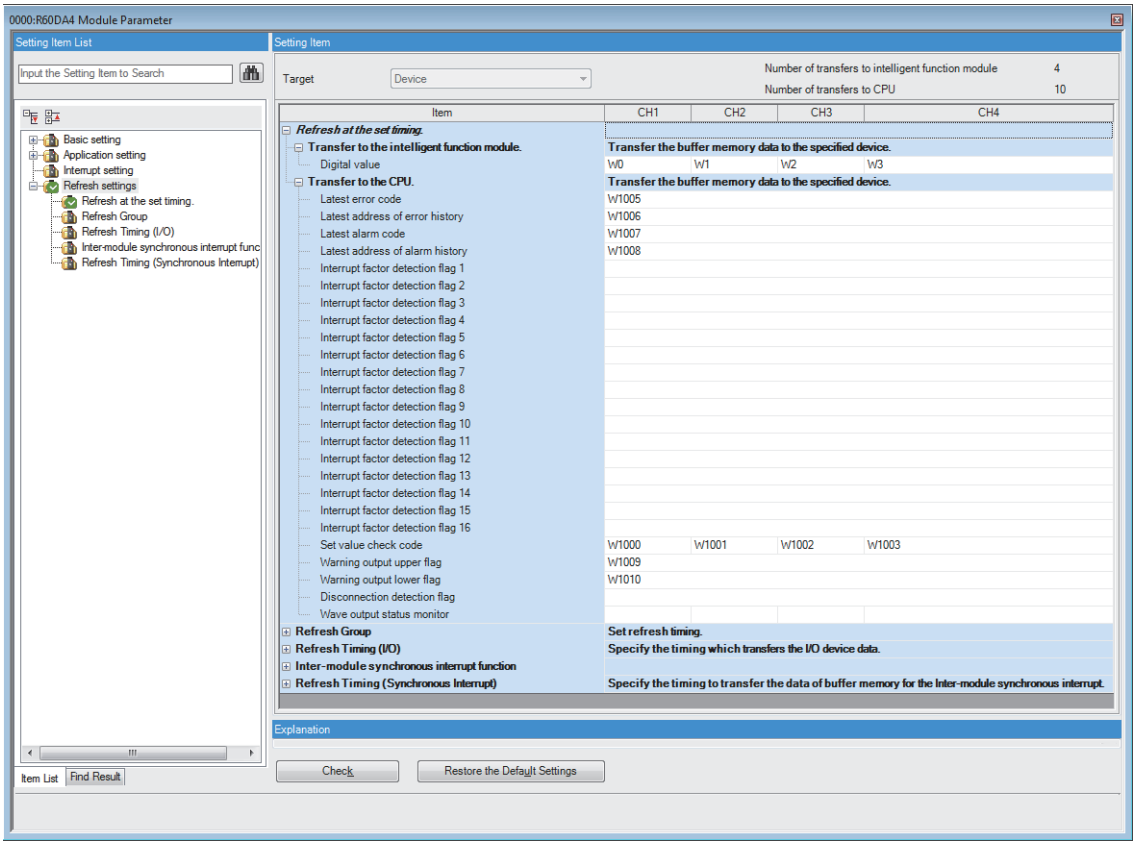
❷ Assign 1024 points (W0 to W3FF) from RWw0.
Assign 1024 points (W1000 to W13FF) from RWr0.

❸ Set the refresh ranges for the remote head module and the buffer memory of the intelligent function module in the refresh settings of the intelligent function module.

Setting method

1. Perform the refresh settings of the intelligent function module connected to the remote head module.

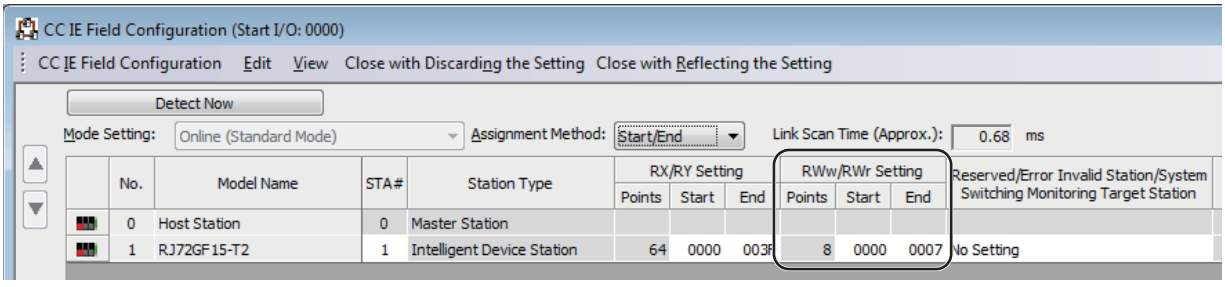
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target Module ⇨ [Refresh settings]



Specify the following devices as the devices to be refreshed.

Item	Setting range of refresh target device
"Transfer to the intelligent function module"	W0 to W3FF
"Transfer to the CPU"	W1000 to W13FF

2. Set RWw/RWr ranges assigned to the remote head module in the network configuration setting of the master station. The number of points should be higher than the number of points set for the refresh settings of the intelligent function module in step 1 above. (Set the number of points whichever is greater between "Transfer to the intelligent function module" and "Transfer to the CPU".)



Point

If the number of points will be increased for a system expansion in future, for example, set a large number for the RWw/RWr setting in the network configuration setting of the master station. Doing so will eliminate the need to change the parameter setting of the master station at the time of the system expansion. However, increasing the number of points also increases the processing time.

Precautions

When the firmware version of the master station of MELSEC iQ-R series is "04" or earlier, network reconnection processing is performed in all stations in the following cases.

- Connecting and disconnecting cables
- Powering off and on

For that reason, a data link error may momentarily occur in all the stations, and the outputs of the connected device stations may turn off.

As needed, specify that the output is to be maintained in the master station and digital-analog converter module. (☞ Page 25 Output status for each status)

1.3 Remote Operation

The operating status of the remote head module can be changed using an engineering tool or dedicated instructions from the module. The following types of remote operation are available:

- Remote RUN/STOP
- Remote RESET

Remote RUN/STOP

This function remotely changes the operating status of the remote head module to RUN or to STOP, keeping the switch of the remote head module at the RUN position. This function is useful to run or stop a remote head module located in an inaccessible place or in the control panel by using external signals.

Point

When the switch of the remote head module is at the STOP position, or when the CPU module on the master station is in the STOP state (including disconnection), even if remote RUN is performed, the remote head module will not enter the RUN state.

Executing method

The following methods are available.

■Using an engineering tool

- From the menu, open the "Remote Operation" window to execute the function. (📖 GX Works3 Operating Manual)

[Online] ⇨ [Remote Operation]

- Execute the function using the CC-Link IE Field Network diagnostics. (☞ Page 100 Remote operation)

■By an external device using SLMP

Execute the function with the SLMP command. (📖 SLMP Reference Manual)

■Using the module dedicated instructions

Execute the function with the dedicated instructions of a network module. (📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions))

Remote RESET

This function remotely resets the remote head module without switch operation when the remote head module is in STOP state (including when either a moderate or major error occurs in the remote head module).

Point

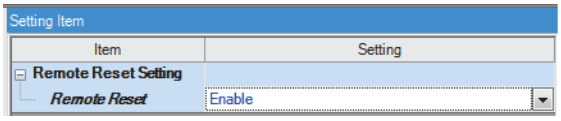
Even when the switch of the remote head module is at the RUN position, this function can reset the module if it is in the STOP state.

Remote RESET setting

Remote reset can be disabled.

[Navigation window] ⇨ [Parameter] ⇨ [RJ72GF15-T2] ⇨ [CPU Parameter] ⇨ [Operation Related Setting] ⇨ [Remote Reset Setting]

Window



Displayed items

Item	Description	Setting range
Remote Reset	Set when externally resetting the remote head module.	• Disable • Enable (Default: Enable*1)

*1 The default differs from that of the CPU module. Care should be taken when performing remote set through all stations specification.

Executing method

The following methods are available.

■Using an engineering tool

• From the menu, open the "Remote Operation" window to execute the function. (📖 GX Works3 Operating Manual)

[Online] ⇨ [Remote Operation]

• Execute the function using the CC-Link IE Field Network diagnostics. (☞ Page 100 Remote operation)

■By an external device using SLMP

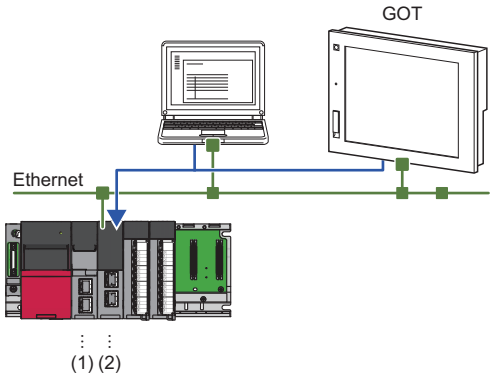
Execute the function with the SLMP command. (📖 SLMP Reference Manual)

1.4 Label Access Setting from External Device

This setting enables external devices to communicate with the remote head module through GOT, SLMP, or other method by specifying global label names.

Communication by specifying global label names includes the following:

- Communication from external devices (such as a monitoring device and personal computer) using label names
- Specification of label names for GOT (engineering tool for GOT) objects and figures



(1) Remote head module
(2) Ethernet-equipped module

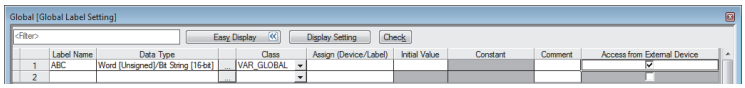
Restriction

The local label and module label cannot be accessed from external devices

Setting procedure

This section describes the setting procedure to enable access from external devices by specifying the global label name.

Operating procedure



1. Set the label in "Global [Global Label Setting]" and select the "Access from External Device" checkbox.

[Navigation window] ⇨ [Label] ⇨ [Global Label] ⇨ [Global]

2. Check the capacity of the label communication data.

[Online] ⇨ [CPU Memory Operation]

GX Works3 Operating Manual

3. Write the parameters, global label setting, and global label assignment information files to the remote head module.

File operation

The label communication data can be written from an engineering tool. Reading and deleting*1 are not possible.

*1 Deleting an entire folder is possible.

1.5 RAS Function

Self-diagnostic function

This function diagnoses the remote head module to see whether an error exists or not.

Timing of self-diagnostics

If an error occurs when the remote head module is powered on or while it is in the RUN/STOP state, the remote head module detects and displays the error. However, depending on the error occurrence status, the remote head module may not be able to detect an error. Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even in such a case.

Check method of error

This section describes the check methods when error occurs.

■Using the special relay and special register

If the remote head module detects an error, 'Latest self-diagnostic error' (SM0) and 'Latest self-diagnostic error' (SM1) turns on, and the error code corresponding to the error definition is stored in 'Latest self-diagnostic error code' (SD0). If multiple errors are detected, the latest error code is stored in 'Latest self-diagnostic error code' (SD0). Configure interlocking for either the remote head module or the machine system using 'Latest self-diagnostic error' (SM0), 'Latest self-diagnostic error' (SM1), and 'Latest self-diagnostic error code' (SD0) on the master station program. Also, a maximum of 16 error codes for the error definitions of the errors currently occurring will be stored into 'Self-diagnostic error number 1' (SD10) to 'Self-diagnostic error number 16' (SD25). (The error codes of the 17th error and later are not stored.)

■Using LED

The error occurrence can be checked through the status of the ERR LED. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup))

■Using the engineering tool

The error status for the overall system, error or event history currently being generated can be checked in the module diagnostics. (📖 GX Works3 Operating Manual)

- Currently occurring errors: Maximum 16 errors (error definition) currently occurring in the remote head module can be displayed.*1 However, even when an additional error occurs after a moderate or major error, the error information is not refreshed.

*1 Maximum number of errors can be displayed differs depending on the error type. (Minor error: 15, Moderate error: 1, Major error: 1) When 15 minor errors are displayed and a new minor error occurs, description of the new error is not displayed. Also, when an error with the same code has already been displayed, the date and time of occurrence and detailed information of the relevant error are not updated.

- Error history: Occurred errors are logged in the event history. (☞ Page 37 RAS Function)

Operation setting at error detection

Configure each operation setting when an error is detected.

■Mode when an error is detected

The operation when an error is detected by self-diagnostics differs depending on the module parameter of the data link or the connected module. (☞ Page 25 Output status for each status)

■Error detection setting

Set whether or not to detect errors in "Error Detections Setting" of "RAS Setting" in "CPU Parameter". (☞ Page 83 RAS Setting)

■Remote head module operation setting at error detection

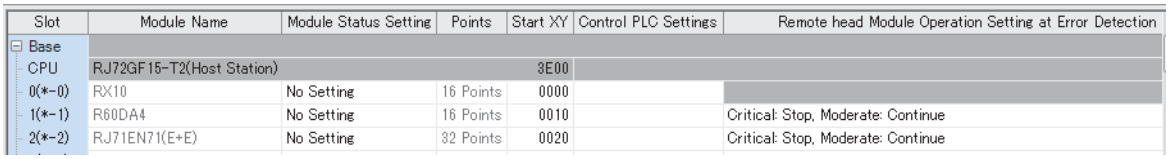
Set the operation of the remote head module when an error is detected, in "Remote head Module Operation Setting at Error Detection" of "RAS Setting" in "CPU Parameter". (☞ Page 83 RAS Setting)

■Remote head module operation setting

Set the operation of the remote head module when an error occurs in each intelligent function module.

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

Window



Slot	Module Name	Module Status Setting	Points	Start XY	Control PLC Settings	Remote head Module Operation Setting at Error Detection
Base						
CPU	RJ72GF15-T2(Host Station)			3E00		
0(*-0)	RX10	No Setting	16 Points	0000		
1(*-1)	R60DA4	No Setting	16 Points	0010		Critical: Stop, Moderate: Continue
2(*-2)	RJ71EN71(E+E)	No Setting	32 Points	0020		Critical: Stop, Moderate: Continue

Displayed items

Item	Description	Setting range	Default
Remote head Module Operation Setting at Error Detection	Set whether to stop or continue the operation of the remote head module when the major or moderate error is detected in the configured module. When "Stop" is set, the operating status of the remote head module is set to the STOP state and the cyclic transmission is stopped. When "Continue" is set, the operating status of the remote head module is maintained. When the remote head module is in the STOP state, the operation is as follows. • The transfer from the link device (RX, RY, RWr, RWw) of the remote head module to the user device (X, Y, W) is as follows. The transfer from RY to Y stops. The transfer from RWw to W stops. The transfer from X to RX continues. The transfer from W to RWr continues. • The data transfer between the devices in the remote head module stops. All outputs (Y) of the remote head module are turned off.	Critical: Stop, Moderate: Continue Critical: Stop, Moderate: Stop Critical: Continue, Moderate: Continue	Critical: Stop, Moderate: Continue

Error clear function

This function clears all the existing errors at once.

Error clear of only specific remote head module

Operate the specific remote head module and clear the errors of the specific remote head module.

■How to clear errors

Errors can be cleared in the following way.

- Using the engineering tool: Clear errors with module diagnostics of GX Works3. (GX Works3 Operating Manual)

Point

The event history of error clear using the engineering tool is stored in the connected remote head module.

- Using SM/SD: Clear errors by operating SM/SD.

1. Check the detected error with 'Latest self-diagnostic error code' (SD0).
2. Eliminate the cause of the detected error.
3. Turn off and on 'Error reset' (SM50).

■Precautions

Note the following precautions when using the error clear function.

- Since the function clears all of the currently detected errors at once, errors that should not yet be cleared may be cleared.
- Executing this function does not remove the cleared errors from the event history.
- For an error which occurred by a module other than the target remote head module of error clear, the error cause cannot be eliminated even though the error is cleared using this function. For example, when "Module verification error" (error code: 2400H) or "Module major error" (error code: 2450H) occurred, the error cause cannot be eliminated even though the error is cleared in the remote head module using this function. To eliminate the error cause, clear the error of the target module and reset the remote head module.

Error clear of all remote head modules

Operate the master station and clear the errors in all the connected remote head modules.
This operation clears all the currently occurring errors at once so that none of them can be detected.

■How to clear errors

Errors are cleared in the following way using the master station program or the engineering tool.

1. Eliminate the causes of the errors in the remote head modules.
2. Check that the bit corresponding to each remote head module is 0, using 'Baton pass status of each station' (SW00A0 to SW00A7) of the master station.
3. Turn on 'Error clear' (SB000F) of remote head module from the master station. When 'Error clear' (SB000F) is turned on, each remote head module clears the errors and the errors will not be detected.
4. Turn off 'Error clear' (SB000F) of remote head module from the master station. When 'Error clear' (SB000F) is turned off, each remote head module becomes able to detect the error.

■Precautions

- After the errors are cleared, always turn off 'Error clear' (SB000F).
- Since the function clears all of the currently detected errors at once, errors that should not yet be cleared may be cleared.
- Executing this function does not remove the cleared errors from the event history.
- For an error which occurred by a module other than the target remote head module of error clear, the error cause cannot be eliminated even though the error is cleared using this function. For example, when "Module verification error" (error code: 2400H) or "Module major error" (error code: 2450H) occurred, the error cause cannot be eliminated even though the error is cleared in the remote head module using this function. To eliminate the error cause, clear the error of the target module and reset the remote head module.

Event history function

This function collects the event information from each module, such as errors detected by the module and operation performed to the module, and stores them in the remote head module.*1 Once errors and operations are stored, they can be checked chronologically.

Using this function enables the following.

- Investigating the cause of defects in the equipment/device
- Checking the control data update status of the own remote head module and the module being managed by the own remote head module
- Detecting unauthorized access to the own remote head module and the module being managed by the own remote head module

*1 If the remote head module is operated online using the engineering tool, processing performed automatically by the system may be stored as an event history.

Point

- The event history is constantly collected regardless of the operating state of the remote head module. There are occasions, however, when the event history information cannot be collected due to such an error as a major error in a module and base unit error.
- The remote head module periodically receives clock data from the master station. If the master station is not connected to the remote head module, the clock data will not be corrected.
- If the remote head module is powered off and on, the clock will restart from the time of the power-off. (The clock pauses during power-off) Therefore, the time and date of the event that occurred during initial processing may be different from the actual time and date. Also, the time and date of event occurrence already saved in the event history cannot be corrected even if clock data is received from the master station.
- If the remote head module is powered off when the event history is being written to the flash ROM, the time when the power was turned off may not be correctly written to the flash ROM. When the module is powered on, if the time when the power was turned off does not exist in the flash ROM, the time is retrieved from the occurrence date of the final event stored in the event history. If the time could not be retrieved from the event history, the clock will restart from the initial value (2000/01/01 00:00:00).
- In a redundant system, the clock of the remote head module in the standby system automatically synchronizes with that of the remote head module in the control system.

Precautions

Before system operation, check the event history acquisition status to see whether an event has occurred frequently and continuously.

If so, "ROM write count error" (error code: 1080H) may occur in a short time.

For example, if an error is cleared without eliminating the error cause in the intelligent function module, the events of the error detection and error clearing may be repeated frequently and continuously.

Storing the event history

This section describes storing of the event history.

■Modules from which event history information is collected

Event history information is collected from the remote head module and other modules installed on the same base unit (the main base unit and extension base units). In the case of the Q series module mounted on the RQ extension base unit, only an event history with the event type being "System" and the classification being "Warning" is stored.

Restriction

Events that have occurred in equipment on the network are not collected as event history.

■Events stored in the remote head module

Information stored in the event history includes operation initiator and other detailed information for troubleshooting purposes. For events that are stored in the event history on the remote head module, refer to the event list. (☞ Page 134 Event List)

■Event history file

- Storage destination memory: Data memory
- File size: The storage size of an event history file is 128K bytes. If the size exceeds 128K bytes, records are deleted from the oldest one to store the latest one. An event history file size is obtained from the following calculation formula.

Event history file size = File header size + Event history management information size + (Number of records × Size per event history record)

Element	Size
File header size	20 bytes
Event history management information size	12 bytes
Size per event history record	40 bytes minimum*1

*1 Because the contents of detailed information may differ depending on the event to be stored or the detailed information may include a variable-length file name, the size per event history record is variable.

The number of events to be saved in the event history file differs depending on the event type to be stored. 3276 events can be registered for the RUN, STOP, and switch operation of the remote head module. (The size of an event such as changing the operating status to RUN or STOP is 40 bytes.)

[Calculation formula]

128 bytes × 1024 = 131072 bytes

131072 bytes - (20 bytes + 12 bytes) = 131040 bytes

131040 bytes ÷ 40 bytes = 3276 events

- File creation timing: File is created when power is turned off and on (when there is no event history file), at the time of reset (when there is no event history file), and at the time of parameter writing (when there is no event history file).

Point

When a new event history file is created, that operation is logged into the event file as an event history.

The following table shows how the event history is treated depending on operation.

Operation	Operation for the event history
Memory initialization	When this event occurs, the event history is stored into the data memory. If the maximum number of event history files storable into the data memory is exceeded, all subsequent event histories will be lost. (☞ Page 38 Storing the event history)
Event history creation	The event history stored in the data memory before the creation of the event history file is saved in the data memory. (If any event was lost, it is logged as "*HST LOSS*").

■Loss of event history information

If events are detected frequently, or the power is turned off or reset immediately after event detection, some event histories may be lost without being collected. When event history loss occurs, "*HST LOSS*" is displayed in the "Event Code" field of the engineering tool.

Event history logging restriction

When the number of minor events from the remote head module or intelligent function module such as link-up and link-down is equal to or larger than the upper limit value, event history logging is restricted (stopped).*1

The events of moderate and major errors are stored in the event history even when logging is restricted.*2

Item	Condition
Upper limit value	600 events/minute
Lower limit value	300 events/minute

*1 For firmware versions that support the event history logging restriction, refer to the following.
☞ Page 172 New or Revised Functions

*2 The events of major errors from MELSEC-Q series modules are not stored when event history logging is restricted.

■Logging restriction status

The remote head module counts the number of events according to the categories shown below.

- Error
- Information, warning

When the number of events per minute is equal to or larger than the upper limit value, event history logging becomes restricted, and SM1464 (Event history logging restriction status) turns on.

Modules on which event history logging is restricted can be identified in SD1464 to SD1467 (Module information on event history logging restriction). (☞ Page 163 Event history)

If the remote head module is under logging restrictions, the following special relay turns on.

Event category	Special relay
Error (minor error)	SM1466 (Event history logging restriction status of remote head module (minor error))
Information, warning	SM1467 (Event history logging restriction status of remote head module (information, warning))

■Lifting logging restrictions

When the number of events from the module under logging restrictions becomes below the lower limit value, event history logging is restarted.

Note that SM1464, SM1466, and SM1467 remain on even after event history logging is restarted.

Viewing the event history

The event history can be viewed using the menu of the engineering tool. For operating procedures and how to interpret the displayed information, refer to the following:

📖 GX Works3 Operating Manual

Clearing the event history

The event history can be cleared in the event history window. Once the event history is cleared, all the event histories in the data memory are deleted. For operating procedures and other details, refer to the following:

📖 GX Works3 Operating Manual

Redundant power supply system diagnostic function

This function diagnoses the redundant power supply system where the power supply module is redundant using the redundant power supply base unit.

For the redundant power supply system, refer to the following.

📖 MELSEC iQ-R Module Configuration Manual

Redundant power supply system diagnostics

■Description

When a redundant power supply is configured, this function checks the following. When an error is detected, a self-diagnostic error occurs. (☞ Page 110 Self-diagnostic error code of the remote head module (1000H to 3FFFH))

- The input power supply voltage of power supply module 1 and power supply module 2 is not dropped or is not turned off.
- There is no failure in the power supply module 1 or power supply module 2.

■Diagnostics conditions

Diagnostics is performed only when all the following conditions are satisfied.

- A redundant power supply base unit is used.
- "Detect" is set for "Redundant Power Supply System Error" in "Error Detections Setting" of "RAS Setting" in "CPU Parameter".

Setting method

Error detection of redundant power supply system is set in "Redundant Power Supply System Error". (☞ Page 83 RAS Setting)

[CPU Parameter] ⇨ [RAS Setting] ⇨ [Error Detections Setting] ⇨ [Redundant Power Supply System Error]

Point

When "Not Detected" is set for "Redundant Power Supply System Error", the diagnostics of the redundant power supply system is not performed. Therefore, even if there is an error on one of the power supply modules when the redundant power supply base unit is used, the error cannot be detected if the other power supply module is operating normally.

Method for checking information related to the function

The status of the redundant power supply module can be checked with special relay (SM) and special register (SD).

■Special relay

SM number	Name
SM150	Power-off/power supply voltage drop detection
SM151	Power supply module failure detection
SM152	Momentary power failure detection (power supply module 1)
SM153	Momentary power failure detection (power supply module 2)
SM154	Invalid power supply module

For details on the special relay (SM), refer to the following.

☞ Page 146 Redundant power supply system

■Special register

SD number	Name
SD150	Power-off/power supply voltage drop detection status
SD151	Power supply failure detection status
SD152	Momentary power failure detection count (power supply module 1)
SD153	Momentary power failure detection count (power supply module 2)
SD154	Details of the invalid power supply module

For details on the special register (SD), refer to the following.

☞ Page 158 Redundant power supply system

Replacement of the redundant power supply module

This section describes the procedure for replacing the redundant power supply module in the redundant power supply system configuration.

■Preventing detection of error in redundant power supply module

1. Set "Not Detected" in the following.

[CPU Parameter] ⇨ [RAS Setting] ⇨ [Error Detections Setting] ⇨ [Redundant Power Supply System Error]

2. Replace the redundant power supply module.

📖 MELSEC iQ-R Module Configuration Manual

Since an error is not detected in the redundant power supply system when the redundant power supply module is replaced, the error in the redundant power supply system do not need to be cleared.

■Detecting error in redundant power supply module

1. Set "Detect" in the following.

[CPU Parameter] ⇨ [RAS Setting] ⇨ [Error Detections Setting] ⇨ [Redundant Power Supply System Error]

2. Replace the redundant power supply module.

📖 MELSEC iQ-R Module Configuration Manual

3. Clear the error in the redundant power supply system by turning on either 'Error clear' (SM50) of the remote head module or 'Error clear' (SB000F) of the master station.

■Detecting error in redundant power supply module and preventing detection of error in normal redundant power supply module

1. Set "Detect" in the following.

[CPU Parameter] ⇨ [RAS Setting] ⇨ [Error Detections Setting] ⇨ [Redundant Power Supply System Error]

2. Turn on 'Error clear' (SB000F) of the master station.

When 'Error clear' (SB000F) of the master station is on, the remote head module does not detect an error in the redundant power supply module.

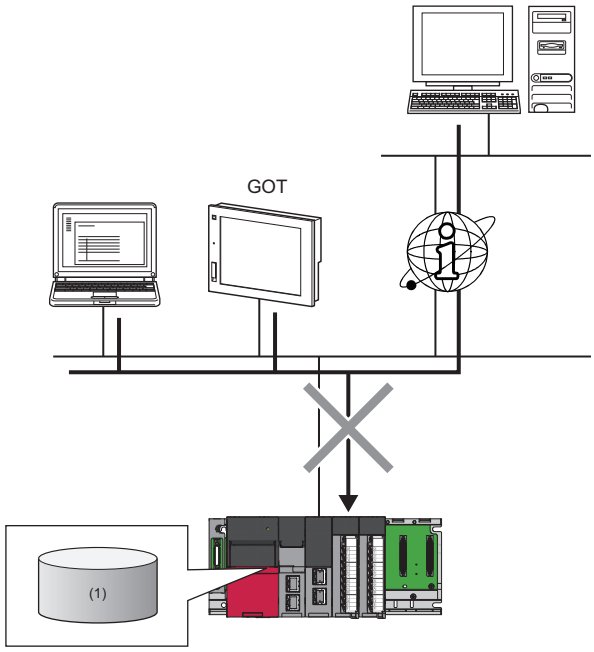
3. Replace the redundant power supply module.

📖 MELSEC iQ-R Module Configuration Manual

4. Turn off 'Error clear' (SB000F) of the master station.

1.6 Security Function

This function protects the user property (1) stored inside remote head modules in the MELSEC iQ-R series system from unauthorized access (including access via the Internet or an intranet), theft, alteration, and faulty operation.



Data to be protected	Purpose	Function	Reference
Remote head module	To prevent unauthorized read and write of files (A password is used.)	File password function	• GX Works3 Operating Manual • MELSEC iQ-R Ethernet User's Manual (Application) • SLMP Reference Manual • MELSEC iQ-R Serial Communication Module User's Manual (Application)
	To limit access to access from a specific communication path via the Ethernet equipped module or serial communication module (A password is used.)	Remote password function	• MELSEC iQ-R Ethernet User's Manual (Application) • MELSEC iQ-R Serial Communication Module User's Manual (Application)

1.7 Monitor Function (Current Value Change)

This function changes the value of the remote head module device or the buffer memory of the intelligent function module mounted on the remote head module.
When the CPU module on the master station is in the STOP state, the value of device (Y) on the remote head module side can be set as on.
The following table lists the output depending on the current value change of device (Y) and operating status of each module.

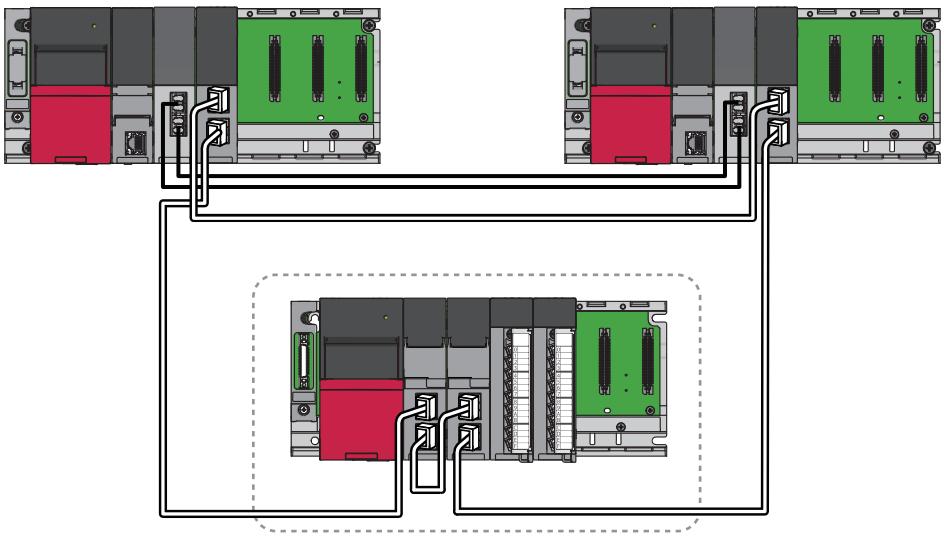
Point

For the method of current value change, refer to the following.
GX Works3 Operating Manual

Remote head module status	Status of the CPU module on the master station	Current value change of device (Y)	Output status
RUN	RUN	ON	ON
	RUN	OFF	OFF (When the master station is performing transmission so that the output status of device (Y) of the remote head module is turned on, the output status of device (Y) will not become off even if current value change is performed from the remote head module.)
STOP	RUN	ON	ON
	STOP		
	RUN	OFF	OFF
	STOP		OFF (If the CPU module of the master station goes into the STOP state, the remote head module will also go into the STOP state. At this time, if the master station is performing transmission so that the output status of device (Y) of the remote head module is turned on, the output status of device (Y) will not become off even if current value change is performed from the remote head module. When the link refresh source of RY of the master station is set to Y, the master station will not send ON because it will be cleared even if "Hold" is set for the output status setting for CPU STOP.)
RUN (when disconnected)	—	ON	ON
		OFF	OFF
STOP (when disconnected)	—	ON	ON
		OFF	OFF

1.8 Redundant Function

This function improves system reliability by making the remote head module redundant so that the remote head module can continue control even if an error occurs in either of the remote head modules.

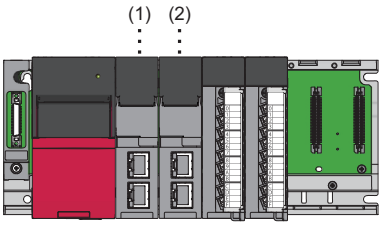


Point

In the redundant system described in this manual, continuous operation of the system is not always guaranteed as this would depend on the failure status.
Also, when the systems are switched because of an error in a module on the base unit in which the remote head module is mounted, the same error is detected also in the standby system, and the remote head modules of both systems stop.
Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even in such a case.

System configuration

This section describes the redundant system configuration of the remote head module.
The remote head modules are mounted in the CPU slot and slot No.0 of the main base unit.
The remote head module mounted in the CPU slot is remote head No.1 (1) and the remote head module mounted in the slot No.0 is remote head No.2 (2).



When a redundant system is configured, to specify the mounted remote head module, an I/O number is also assigned to the remote head module. I/O numbers fixed to remote head numbers are assigned as follows:

Remote head number	Start I/O number of remote head module
Remote head No.1	3E00H
Remote head No.2	3E10H

Restriction

- When the remote head module of remote head No.1 is not mounted or has failed, the redundant system will not start.
- When the remote head module of remote head No.1 has failed and systems have been switched, replace the remote head module immediately. (☞ Page 103 Replacing the Remote Head Module) The redundant system does not start even if the system is powered off and on or reset while remote head No.1 is in the state of failure.

Single line

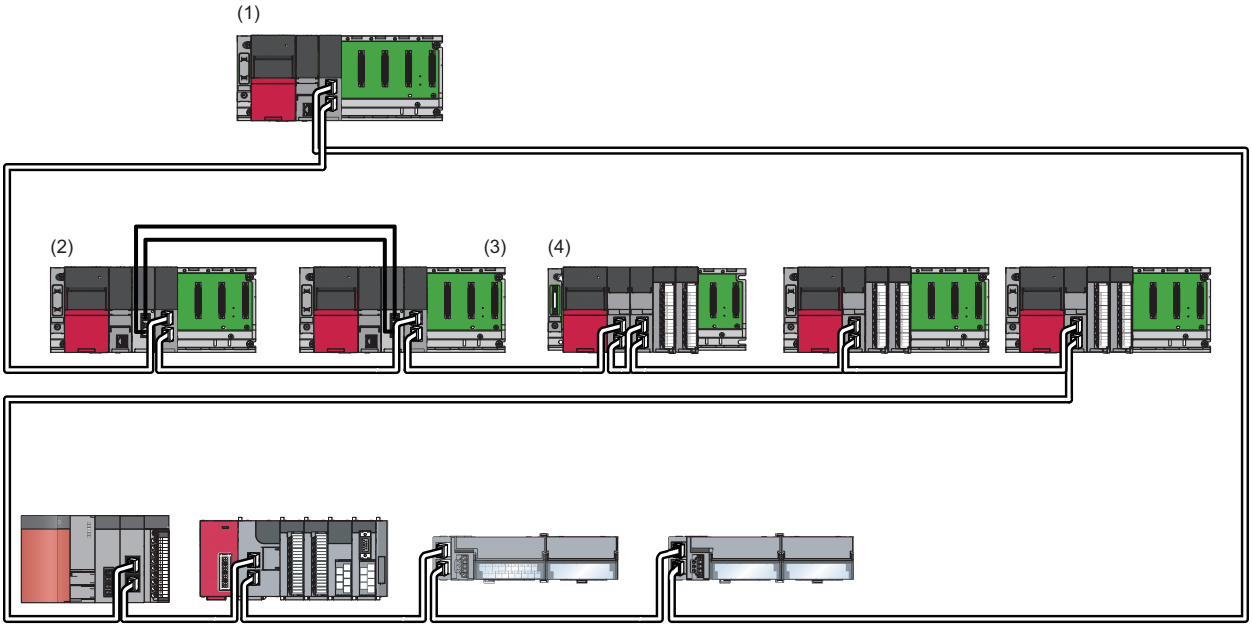
In single line, all the stations are connected to a single network line. Two types of single line are available: redundant master station and redundant device station.

For the redundant master station, refer to the following.

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

■Redundant device station

For the redundant device station, the two remote head modules are connected as redundant remote head module. When an error occurs in the remote head module of the control system, the control switches to the remote head module of the standby system to control the device station and continue the data link.



(1) Master station
(2) Local station (control system)
(3) Local station (standby system)
(4) Intelligent device station (The remote head module is redundant with remote head No.1 being the control system and remote head No.2 being the standby system.)

Redundant line

In redundant line, two network lines are prepared and the remote head module is connected to each network line.

When an error occurs in the network of the control system, the control switches to the network of the standby system to control the redundant system and continue the data link.

Ensure that the configuration of the network of both systems is the same. For details, refer to the following.

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

Procedures before operation

This section describes the points that must be kept in mind about the operation procedure when a redundant system is configured.

Mounting modules and connecting cables

- Mount the remote head module into the CPU slot and slot No.0 of the main base unit.
- In redundant line, connect the Ethernet cable of system A to remote head No.1 and the Ethernet cable of system B to remote head No.2.

Setting parameters

Write the same parameters to remote head No.1 and remote head No.2.
When the parameters are written to remote head No.1 only, the parameters are automatically copied to remote head No.2 by the memory copy function, however, starting up the remote head module takes some time.
Also, according to the line type set in remote head No.1, the network number and station number of remote head No.2 are automatically set as follows.

Line type	Network number	Station number
Single line	Same as remote head No.1	Station number of remote head No.1 + 1 Error occurs in the engineering tool when the station number of remote head No.1 is 120 (maximum value).
Redundant line	Same as remote head No.1	Same as remote head No.1

Point

- If the model set in a project is different from the model set in the actual remote head module, the actual system configuration cannot be read for the module configuration of the engineering tool. Write the parameters to the remote head module, reset or power off and on the module, set the same model to the project and actual remote head module, and read the configuration again.
- CPU parameters can be set only in remote head No.1. The CPU parameters of remote head No.2 are automatically set based on the CPU parameters set in remote head No.1. Therefore, CPU parameters do not need to be written to remote head No.2 using the engineering tool.

Resetting the remote head module

When the remote head module is redundant with redundant device station, power on the remote head module before powering on the master station.
If the master station is powered on before the remote head module is powered on, the actual network configuration and the network map of the CC-Link IE Field Network diagnostics may be a mismatch.

Network diagnostics

Check the communication status of the remote head modules of both systems for CC-Link IE Field Network diagnostics.
In redundant line, even if the CC-Link IE Field Network diagnostics was performed from the control system master station, only the communication status of the remote head module of the control system can be displayed. To the communication status of the remote head module of the standby system, change the connection of the engineering tool to the master station of the standby system and perform the CC-Link IE Field Network diagnostics.

System switching operation

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

- The own station send range of the link devices (RY, RWw) of both systems is the same due to pairing.
- The remote head module of the control system sends and receives cyclic data.
- The remote head module of the standby system only receives cyclic data.

When an error occurs in the control system, the control switches to the standby system to continue the system operations.

This section describes the system switching operation of the remote head module for the redundant device station with single line.

For the system switching operation when the remote head module is redundant with single line and redundant master station, or with redundant line, refer to the following.

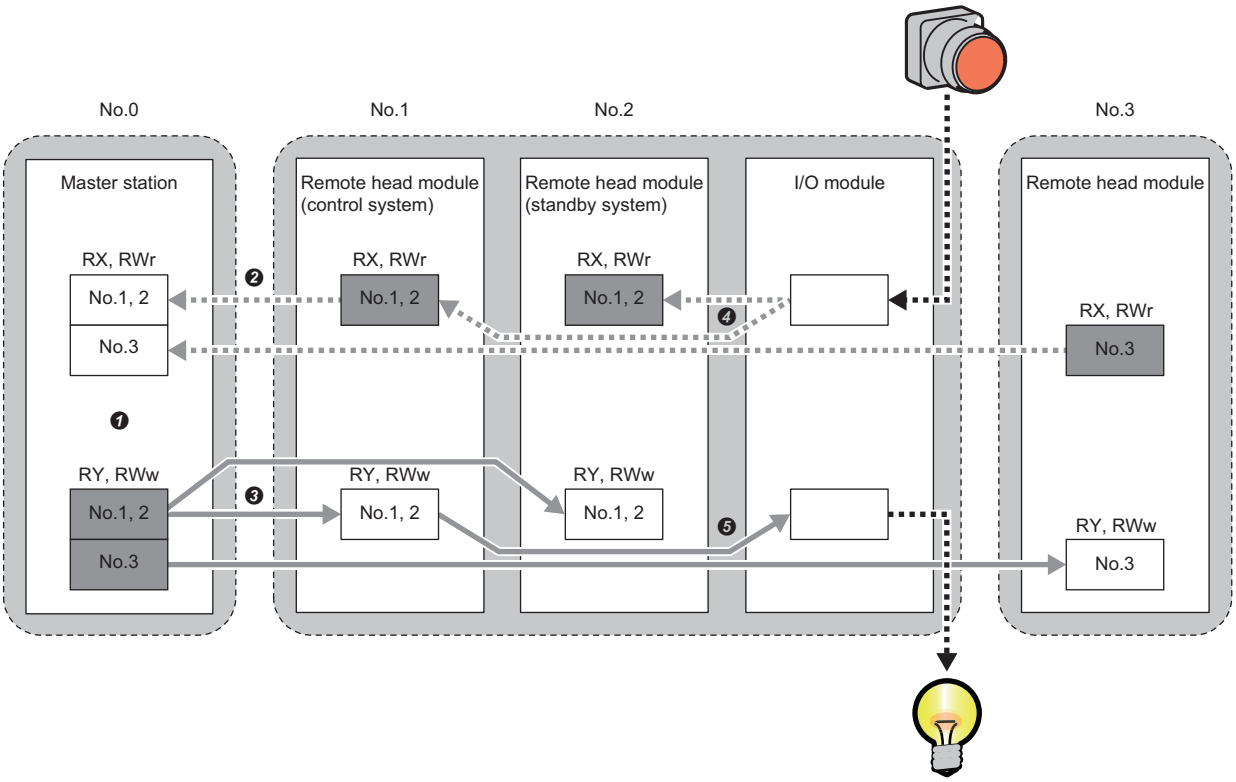
MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

Before system switching operation

The remote head module of the control system performs I/O refresh with the module on the base unit.

The remote head module of the standby system receives data from the master station and inputs from the module on the base unit. However, it does not send data to the master station and does not output to a module on the base unit.

Each number in the figure, from No.0 to No.3, represents a station number.



: Send range of station No.☐

: Send data from the master station

: Send data from the device station

: Send and receive data of external device

❶ The redundant remote head modules have serialized station numbers. Based on the pairing setting of the master station, the devices (RX, RY, RWr, RWw) of both stations are set as identical.

❷ Only the control system sends data to the master station.

❸ Both the control system and the standby system receive data from the master station.

❹ Both the control system and standby system perform input from the I/O module.

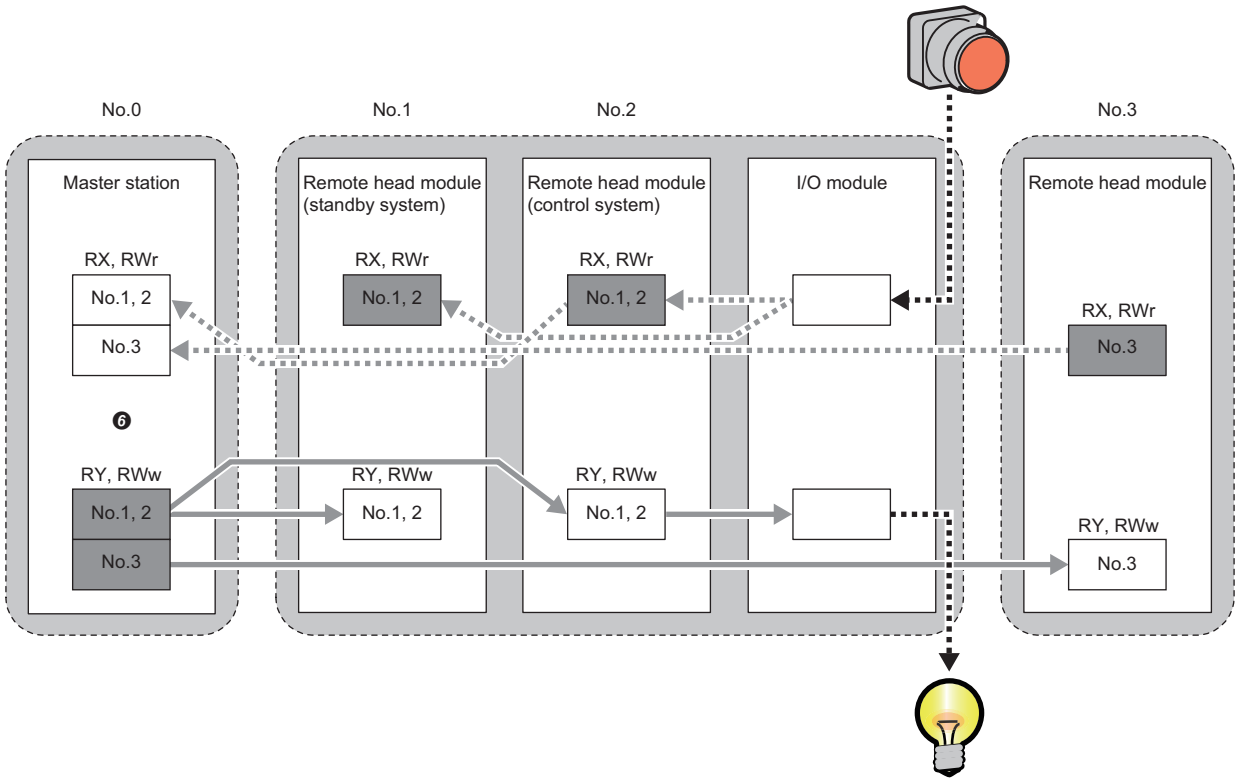
❺ Only the control system performs output to the I/O module.

After system switching operation

The new control system performs I/O refresh with a module on the base unit.

Send data is passed to the new control system when systems are switched to continue cyclic transmission.

Each number in the figure, from No.0 to No.3, represents a station number.



: Send range of station No.☐

: Send data from the master station

: Send data from the device station

: Send and receive data of external device

❻ The devices (RX, RY, RWr, RWw) of both stations in the master station are set as identical even after systems are switched.

Determining control system and standby system

The control system and standby system of the remote head modules are determined either in order of system power supply startup or remote head module reset clear.

Single line

This section describes the system determination for when the remote head module is redundant with single line and redundant device station.

After the system starts, the CTRL LED of the remote head module of the control system and the SBY LED of the remote head module of the standby system turn on.

■When the system starts by turning the power on

Remote head No.1 will be the control system and remote head No.2 will be the standby system.

Point

- When remote head No.2 is the control system and the power is turned off and on, remote head No.1 switches to the control system and remote head No.2 switches to the standby system.
- When only remote head No.1 is mounted or remote head No.2 has failed, remote head No.1 will be the control system.
- When only remote head No.2 is mounted or remote head No.1 has failed, the system does not start. To start the system, remote head No.1 must be replaced, or remote head No.2 must be mounted in the CPU slot.

■When the system starts by resetting the remote head module of the control system

Only the remote head module of the control system is reset, and system switching occurs.

After reset clear, the reset remote head module will be the standby system.

Point

- When only remote head No.1 is mounted or remote head No.2 has failed, the entire system is reset.
- When remote head No.2 is reset and remote head No.1 has failed, the entire system is reset. However, after reset clear, the system does not start. To start the system, remote head No.1 must be replaced, or remote head No.2 must be mounted in the CPU slot.

■When the system starts by resetting the remote head module of the standby system

Only the remote head module of the standby system is reset.

After reset clear, the reset remote head module will be the standby system.

■When the system starts by simultaneously resetting the remote head modules of both systems or by performing remote reset operation

The entire system is reset.

After reset clear, remote head No.1 will be the control system, and remote head No.2 will be the standby system.

Point

Remote reset operation can be performed only on the remote head module of the control system.

■When the system starts after the remote head module of the standby system is replaced

The replaced remote head module will be the standby system.

The remote head module of the control system will remain as the control system.

Point

Replacement of the remote head module can be performed only on the remote head module of the standby system.

For the replacement procedure, refer to the following.

☞ Page 104 For the standby system in a redundant system configuration

Redundant line

In redundant line configuration, the control system and standby system of the remote head module are determined by tracking the master station.

■When the system starts by turning the power on

The control system and standby system are determined by tracking the master station.

Point

- In the interval after the system starts by power-on till the control system and standby system are determined by tracking the system status of the master station, remote head No.1 will be the control system and remote head No.2 will be standby system.
- If the remote head modules are not connected with the master station, the control system and the standby system are determined by tracking the system status of the master station when the modules are connected with the master station.
- If the files of both systems are mismatch, memory copy operation is performed for remote head No.2 (standby system) from remote head No.1 (control system). After memory copy operation completes, the control system and the standby system are determined by tracking the system status of the master station.
- When only remote head No.2 is mounted or remote head No.1 has failed, the system does not start. To start the system, remote head No.1 must be replaced, or remote head No.2 must be mounted in the CPU slot.

■When the system starts by resetting the remote head module of the control system

Only the remote head module of the control system is reset.

The redundant master station system detects a reset of the remote head module of the control system, and systems are switched.

By tracking the system switching of the redundant master station system, the remote head module of the standby system will become the control system.

After reset clear, the reset remote head module will be the standby system by tracking the system status of the master station.

Point

- When only remote head No.1 is mounted or remote head No.2 has failed, the entire system is reset. After reset clear, the reset remote head module will be the control system by tracking the system status of the master station.
- When remote head No.2 is reset and remote head No.1 has failed, the entire system is reset. However, after reset clear, the system does not start. To start the system, remote head No.1 must be replaced, or remote head No.2 must be mounted in the CPU slot.

■When the system starts by resetting the remote head module of the standby system

Only the remote head module of the standby system is reset.

After reset clear, the reset remote head module will be the standby system by tracking the system status of the master station.

Point

- When only remote head No.1 is mounted or remote head No.2 has failed, the entire system is reset. After reset clear, the reset remote head module will be the standby system by tracking the system status of the master station.
- When remote head No.2 is reset and remote head No.1 has failed, the entire system is reset. However, after reset clear, the system does not start. To start the system, remote head No.1 must be replaced, or remote head No.2 must be mounted in the CPU slot.

■When the system starts by simultaneously resetting the remote head modules of both systems or by performing remote reset operation

The entire system is reset.

After reset clear, the control system and standby system are determined by tracking the master station.

Point

Remote reset operation can be performed only on the remote head module of the control system.

■When the system starts after the remote head module of the standby system is replaced

The replaced remote head module will be the standby system by tracking the system status of the master station.

Point

Replacement of the remote head module can be performed only on the remote head module of the standby system.

For the replacement procedure, refer to the following.

☞ Page 104 For the standby system in a redundant system configuration

System consistency check and operations when an error occurs

When the redundant function is used, for control of the system to continue when systems are switched, the files and operating statuses of the remote head modules of the control system and standby system must be the same.
The system consistency check checks whether the files and operating status of the remote head module of the standby system are the same as those of the control system.

Check item

The following table lists the check items for the system consistency check.

Check item	Description
File	The parameters and device initial values are checked.
Operating status	The operating status (RUN state/STOP state) of the remote head module is checked.

Execution conditions

The following table lists the execution conditions for the system consistency check.
○: Executed, ×: Not executed

Execution condition*1			Check item	
Execution timing	Operating status of the standby system	Operating status of the control system	File*2	Operating status
Power-on	—	—	○	×
When reset is cleared in the control system or the standby system	—	—	○	×
When the standby system is connected	—	—	○	×
When operating status changes	RUN	RUN	○*3	○
		STOP	×	○
	STOP	RUN or STOP	×	○
	STOP → RUN	RUN	○	○
		STOP	×	○
	Reset clear	RUN	○	○
		STOP	×	○

*1 This function is not executed on a condition not mentioned in the table.
*2 Depending on the execution timing, some file types are not treated as system consistency check targets. (☞ Page 55 Target file)
*3 Only at the time of system switching, the system consistency check is executed.

System consistency check of files

The files for operating the redundant system are checked.

■Target file

The following is a list of files to be checked for system consistency.

Target file
CPU parameter
System parameter
Module parameter
Module extension parameter*1
Device comment*2
Global label setting file
Initial global label value file
Remote password

*1 Only the parameter files of the mounted modules are checked. A module for which "Module Status Setting (Empty)" is selected in the "Module Configuration" window of the engineering tool is not treated as a check target.

*2 Only files with the name COMMENT.DCM are checked for system consistency.

■Operations when a mismatch is occurred

When the module detects a file mismatch, the remote head module of the standby system detects "System consistency check error (file)" (error code: 3714H). In addition, the memory copy is executed from the control system to the standby system, then the standby system is automatically reset and restarted.

For the execution timing of the memory copy, refer to the following.

☞ Page 62 Execution method of memory copy

System consistency check of operating status

Because the same operations cannot continue after system switching if the operating statuses of the remote head modules of both systems are not the same, whether the operating statuses (RUN state/STOP state) match is checked.

■Description

Whether the operating statuses of the remote head modules (RUN state/STOP state) are the same is checked.

■Operations when a mismatch is occurred

When the operating statuses (RUN state/STOP state) do not match, system switching is not be possible.

The CTRL LED of the remote head module flashes because system switching is not possible.

Match the operating statuses of both systems (RUN state/STOP state). (☞ Page 95 When the CTRL LED is flashing)

System switching function

This section describes how to switch systems when a redundant system is operating, whether or not the system switching can be executed, operations after the cause of failure to switch systems is eliminated, and how to check information on system switching.

For calculation method of the time required for system switching, refer to the following.

☞ Page 171 System switching time

System switching method

Two types of system switching of the remote head module are available: Automatic system switching (switching automatically performed by the redundant system) and manual system switching (switching that can be arbitrarily performed).

Line type	System switching method	System switching cause	Order of priority	
Single line	Automatic system switching	Reset or hardware failure	High ↑ ↓ Low	1
		Moderate error or major error		2
		Data link error		3
	Manual system switching	System switching operation using the engineering tool		4
Redundant line	Automatic system switching	Tracking of system switching of redundant master station system	—	

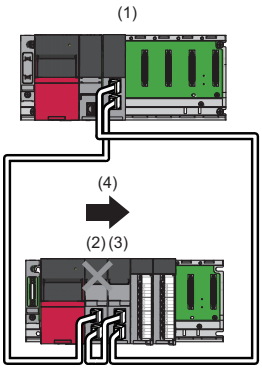
When multiple simultaneous system switching requests occur, system switching is performed in descending order of priority of switching causes.

In single line

■System switching due to reset or hardware failure

If the remote head module of the control system is in any of the following state and the redundant system goes out of control, the remote head module of the standby system switches to the control system to continue the control of the redundant system.

- The remote head module is reset.
- Hardware failure has occurred

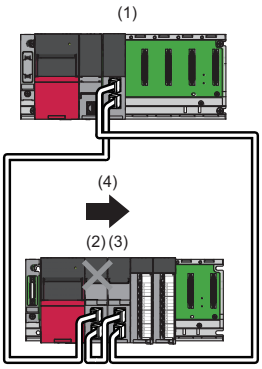


(1) Master station
(2) Control system → New standby system
(3) Standby system → New control system
(4) System switching (Resetting of control system or hardware failure has occurred.)

■System switching due to moderate error or major error

When either a moderate or major error occurs in the remote head module of the control system, the remote head module of the standby system switches to the control system. The remote head module of the control system where the moderate or major error has occurred switches to the standby system.

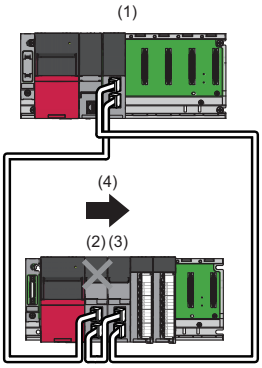
However, depending on the content of the major error, the remote head module of the control system may not switch to the standby system.



(1) Master station
(2) Control system → New standby system
(3) Standby system → New control system
(4) System switching (A moderate or major error has occurred in the control system.)

■System switching due to data link error

When the data link of the remote head module of the control system continues to be in an error state (D LINK LED is either off or flashes) for the system switching monitoring time set in the master station or longer, the remote head module of the standby system switches to the control system. The remote head module of the control system where the data link error has occurred switches to the standby system.



(1) Master station
(2) Control system → New standby system
(3) Standby system → New control system
(4) System switching (The data link continues to be in an error state for the system switching monitoring time or longer.)

Point

System switching does not occur if a data link error occurs due to any of following at power-on.

- No Ethernet cable is connected to the remote head module of the control system.
- An Ethernet cable connected to the remote head module of the control system is disconnected.

■System switching operation from the engineering tool

For how to operate engineering tools, refer to the following.

GX Works3 Operating Manual

The system switching operation using the engineering tool can be performed only from the remote head module of the control system.

Also, to perform system switching operation using the engineering tool, 'System switching by a user' (SM1646) must be kept on (permitting manual switching) beforehand.

In redundant line

■Tracking of system switching of the master station

By tracking the system switching of the master station, systems of the remote head module are switched.

For system switching of the master station, refer to the following.

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

Conditions of system switching

The following table lists the conditions of system switching.

○: System switching enabled, ×: System switching disabled

System switching condition	Single line				Redundant line
	Automatic system switching			Manual system switching	Automatic system switching
	Reset or hardware failure	Moderate error or major error	Data link error	System switching operation using the engineering tool	System switching of redundant master station system
Normal or minor error (standby system)	○	○	○	○	○ (Always tracks the system state of the master station.)
Moderate error or major error (standby system)*1	○	×	×	×	
Error detected in network (standby system)*1	○	○	×	×	
Memory copy being executed from the control system to the standby system*1	○	×	×	×	
Mismatch between operating statuses of both systems*1	○	○	×	×	
System switching being executed*1	○	○	○	×	

*1 When system switching is not possible, the CTRL LED of the remote head module of the control system flashes.

Point

- When even one of the conditions for system switching disabled is satisfied, system switching is not executed.
- In case an operation or phenomenon not mentioned in the table occurs, system switching is not performed.

Operations after the cause of failure to switch systems is eliminated

In a single line configuration, after systems have failed to be switched, if the cause of failure in the system switching of the remote head module of the standby system is eliminated, systems may be switched.

■Standby system is reset or hardware failure

The following table lists cases in which systems fail to be switched because the standby system is reset or a hardware failure occurs.

System switching method	System switching cause of control system	System status before and after the system switching cause occurs	Status after resetting remote head No.2 after eliminating the cause of failure to switch systems
Automatic system switching	Moderate error or major error*1	Remote head No.1: Control system → Control system Remote head No.2: Standby system → —	Remote head No.1: Control system Remote head No.2: Standby system Since remote head No.1 is the control system, remote head No.2 starts as the standby system.
	Reset or hardware failure	Remote head No.1: Control system → — Remote head No.2: Standby system → —	Remote head No.1: — Remote head No.2: — Systems do not start.
	Data link error	Remote head No.1: Control system → Control system Remote head No.2: Standby system → —	Remote head No.1: Control system Remote head No.2: Standby system Since remote head No.1 is normal, remote head No.2 starts as the standby system.
Manual system switching	System switching operation using the engineering tool	Remote head No.1: Control system → Control system Remote head No.2: Standby system → —	Remote head No.1: Control system Remote head No.2: Standby system Since remote head No.1 is normal, remote head No.2 starts as the standby system.

*1 Depending on the content of the major error, the remote head module of the control system may not switch to the standby system.

■Moderate error or major error in the standby system

The following table lists cases in which systems fail to be switched due to a moderate or major error in the standby system.

System switching method	System switching cause of control system	System status before and after the system switching cause occurs	Status after powering off and on remote head No.2 after eliminating the cause of failure to switch systems
Automatic system switching	Moderate error or major error*1	Remote head No.1: Control system → Control system Remote head No.2: Standby system → Standby system	Remote head No.1: Control system Remote head No.2: Standby system Since remote head No.1 is the control system, remote head No.2 starts as the standby system.
	Reset or hardware failure	Remote head No.1: Control system → — Remote head No.2: Standby system → Control system	Remote head No.1: — Remote head No.2: — Systems do not start.
	Data link error	Remote head No.1: Control system → Control system Remote head No.2: Standby system → Standby system	Remote head No.1: Control system Remote head No.2: Standby system Since remote head No.1 is normal, remote head No.2 starts as the standby system.
Manual system switching	System switching operation using the engineering tool	Remote head No.1: Control system → Control system Remote head No.2: Standby system → Standby system	Remote head No.1: Control system Remote head No.2: Standby system Since remote head No.1 is normal, remote head No.2 starts as the standby system.

*1 Depending on the content of the major error, the remote head module of the control system may not switch to the standby system.

■Data link error of the standby system

The following table lists cases in which systems fail to be switched due to a data link error in the standby system.

System switching method	System switching cause of control system	System status before and after the system switching cause occurs	Status after powering off and on remote head No.2 after eliminating the cause of failure to switch systems
Automatic system switching	Moderate error or major error*1	Remote head No.1: Control system → Standby system Remote head No.2: Standby system → Control system	Remote head No.1: — Remote head No.2: Control system Since remote head No.1 is faulty, remote head No.2 starts as the control system.
	Reset or hardware failure	Remote head No.1: Control system → — Remote head No.2: Standby system → Control system	Remote head No.1: — Remote head No.2: — Systems do not start.
	Data link error	Remote head No.1: Control system → Control system Remote head No.2: Standby system → Standby system	Remote head No.1: Control system Remote head No.2: Standby system Since remote head No.1 is normal, remote head No.2 starts as the standby system.
Manual system switching	System switching operation using the engineering tool	Remote head No.1: Control system → Control system Remote head No.2: Standby system → Standby system	Remote head No.1: Control system Remote head No.2: Standby system Since remote head No.1 is normal, remote head No.2 starts as the standby system.

*1 Depending on the content of the major error, the remote head module of the control system may not switch to the standby system.

Check method of information on system switching

This section describes how to check information on system switching when systems are switched.
When automatic system switching or manual system switching is performed, information on the system switching event can be checked in the following ways.

Check method	Information
Special register (SD)	Result of system switching and detailed information on system switching
CTRL LED and SBY LED of the remote head module	Result of system switching
Event history	Result and cause of system switching, transition state of the systems

■Special register

The result of system switching and detailed information on system switching can be checked using the special register.

- Whether systems have been switched can be checked by checking 'System switching cause (when the systems are successfully switched)' (SD1649). When system switching occurs, the system switching cause is stored in 'System switching cause (when the systems are successfully switched)' (SD1649) of the control system and standby system each.
- When systems fail to be switched even though the system switching cause has occurred, the cause of failure in system switching is stored in 'Cause of system switching failure' (SD1644).

The following table lists the special register related to system switching and whether to set or not each register in the remote head module of new control system and new standby system each.
○: Set, ×: Not set

SD number	Name	Whether to set or not at the time of system switching	
		New control system	New standby system
SD1643	System switching cause	×	○
SD1644	Cause of system switching failure	○	×
SD1648	Cause of the other system monitoring error	○	○
SD1649	System switching cause (when the systems are successfully switched)	○	○
SD1681	Latest self-diagnostic error code (the other system)	○	×

For details on the special register (SD), refer to the following.
☞ Page 153 List of Special Register (SD) Areas

■CTRL LED and SBY LED of the remote head module

The following table lists the LED indication when system switching is completed successfully by a system switching cause.

Item	When system switched from the control system to the standby system	When system switched from the standby system to the control system
CTRL LED	On → Off	Off → On (When system switching is enabled in standby system) Off → Flashing (When system switching is disabled in standby system)
SBY LED	Off → On	On → Off

The following table lists the LED indication when system switching is not completed successfully by a cause of system switching failure

Item	Control system	Standby system
CTRL LED	On or flashes*1	Off
SBY LED	Off	On

*1 This LED flashes when system switching is disabled in the standby system.

■Event history

Information on the system switching cause, the result of system switching, and the transition state of the systems (control system and standby system) can be checked in the event history of the engineering tool.
The following items are stored in the event histories of both systems when systems are switched.

- When systems are switched due to automatic system switching: "System switching (system)" (event code: 00F00H)
- When systems are switched due to manual system switching: "System switching (user)" (event code: 2B000H)

For details on the event history, refer to the following.
☞ Page 134 Event List

Memory copy function from control system to standby system

This function transfers data such as parameters of the remote head module of control system to the remote head module of standby system to match the remote head module of the control system.
Memory copy is not executed from the standby system to the control system. Also, when memory copy is completed successfully, the event history is stored in the remote head module.

Files copied by the memory copy function

The memory copy function copies files required for starting a redundant system.
The following table lists the files to be copied by the memory copy function.
○: Memory copy possible, ×: Memory copy not possible, —: Storage not possible

File type		Copy	
		Remote head module built-in memory	
		Device/label memory	Data memory
CPU parameter		—	○
System parameter		—	○
Module parameter		—	○
Module extension parameter		—	○
Device comment		—	○
Global label setting file		—	○
Initial label value file	Initial global label value file	—	○
Event history		—	×
Device data storage file		—	×
General-purpose data		—	×
Remote password		—	○

Point

When the memory copy is executed, files are copied after the memory of the remote head module of the standby system that has differences is initialized.
The memory copy cannot be executed to the files such as event history and those files are deleted from the memory of the standby system remote head module. Back up the files before executing the memory copy as required.

Execution method of memory copy

When a file mismatch is detected by system consistency check in any of the following timings, memory copy is automatically executed.

- Power-on (Irrespective of the system status when the system started previously, memory copy from remote head No.1 to remote head No.2 is performed.)
- Reset clear of remote head module of the control system or standby system
- Replacement of remote head module of the standby system

Execution conditions of memory copy

The memory copy function can be executed irrespective of the operating status of the remote head module of the control system and standby system.
However, memory copy is not executed in the following cases.

- When memory is being formatted
- When data is being written to the remote head module of control system

Operations when memory copy is executed

The operations when memory copy is executed is explained using an example when power is turned off and on.

1. Powering off and on the system.
2. When a file mismatch is detected by system consistency check, the ERR LED of the standby system flashes. Also, the CTRL LED of the control system flashes to indicate the system switching disable state.
3. The SBY LED of the standby system flashes, and memory copy automatically starts.
4. After the memory copy operation is completed successfully, the standby system is automatically reset.

When the memory copy operation fails, the standby system will not be reset.
The SBY LED of the standby system turns off to indicate that the memory copy operation has been completed with an error.
Also, the CTRL LED of the control system flashes to indicate the system switching disable state.

5. After the standby system restarts, the CTRL LED of the control system and the SBY LED of the standby system turn on.

Precautions

When an error occurs while memory copy is being executed, the remote head module of the standby system will not perform memory copy correctly, and that leads to a moderate error.
While memory copy is being executed, the following operations cannot be performed from the engineering tool for the remote head module of the control system or the standby system.

- CPU memory operation
- Writing data to the programmable controller
- Deleting data from the programmable controller
- System switching

Functions restricted in a redundant system

The following table lists the functions restricted when using the remote head module in a redundant system.

Function		Restrictions
Remote operation	Remote RESET	Only when this operation is performed on the remote head module of the control system, the entire system is reset. However, depending on the status of the remote head module, remote RESET may not be performed. ■When there is an error in remote head No.1 or remote head No.2 • When only remote head No.2 is mounted: The system is not reset. • When a major error occurs in remote head No.1 or remote head No.2, the system on both of remote head No.1 and remote head No.2 is not reset. (When only remote head No.1 is mounted, the system is reset.) ■When the remote head modules of both systems are not in the STOP state When the remote head module of the control system is in the STOP state and the remote head module of the standby system is in the RUN state, the remote head module of the control system and the standby system cannot be reset by performing the remote RESET operation on the remote head module of the control system. Perform the remote RESET operation after setting the remote head modules of both systems to the STOP state. ■When a remote operation is performed on the remote head modules of both systems via different routes When a remote operation is performed on the remote head module of the control system and the standby system via different routes, the remote head module of the control system and the standby system cannot be reset by performing the remote RESET operation on the remote head module of the control system. To perform a remote RESET operation on the remote head module of the control system, cancel the remote operation on the remote head module of the standby system before performing the remote RESET operation.
RAS function	Event history function	Events related to system switching are stored in the remote head modules of both systems, but events that have occurred in one of the remote head modules are stored only in that remote head module. Also, events that have occurred in a module on the base unit are stored only in the remote head module of the control system. Only the events stored in individual remote head modules can be cleared/displayed.
Monitor function	Device/buffer memory batch monitor	The execution result of the current value change executed in the control system for the devices of remote head module is not reflected in the new control system even if systems are switched. Connect the engineering tool to the new control system and re-execute the current value change.
Synchronization function	CC-Link IE Field Network synchronous communication function	Cannot be used.
	Inter-module synchronization function	
SLMP communication function		• When systems are switched during communication, since neither the remote head module of the control system prior to system switching nor that of the new control system can send a response and a response wait timeout occurs, a retry from the communication equipment is required. However, for the RJ71C24, depending on the response monitoring time setting, a response wait timeout may not occur. • In SLMP (MC protocol) communications using the remote head module, when performing communications to the other system in a state where the other system cannot respond (such as reset and disconnection of Ethernet cables), a timeout error may occur.
MC protocol communications function		

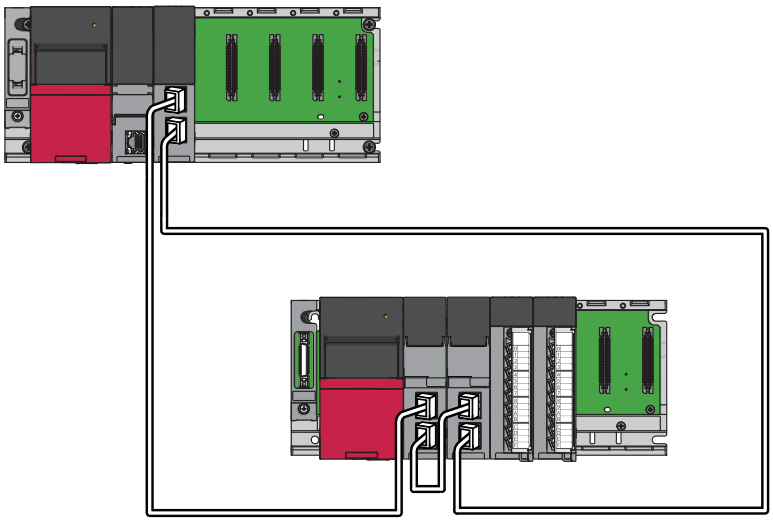
Setting example

This section describes the settings for when the remote head module is redundant with single line and redundant device station.

For the setting examples of redundant master station and redundant local station with single line, and the setting example of redundant line, refer to the following.

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

System configuration example

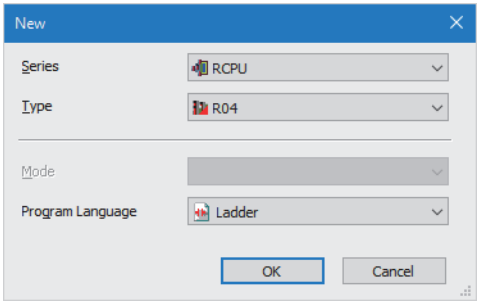


Setting in the master station

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

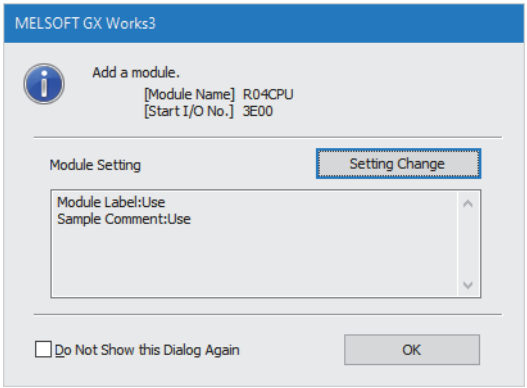
1. Set the CPU module as follows.

[Project] ⇨ [New]



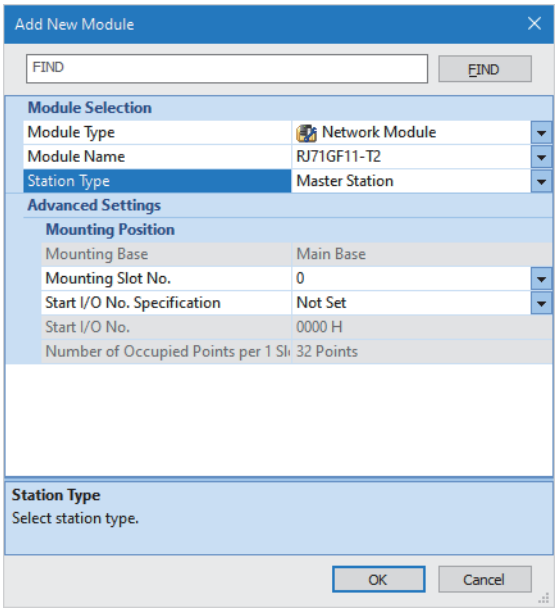
2. Click the [Setting Change] button to use module labels.

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



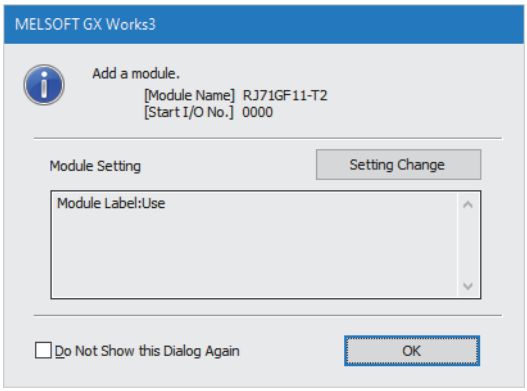
4. Set the master/local module for slot No.0 in the I/O assignment setting.

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



5. Click the [Setting Change] button to use module labels.

6. Click the [OK] button to add the module labels of the master/local module.



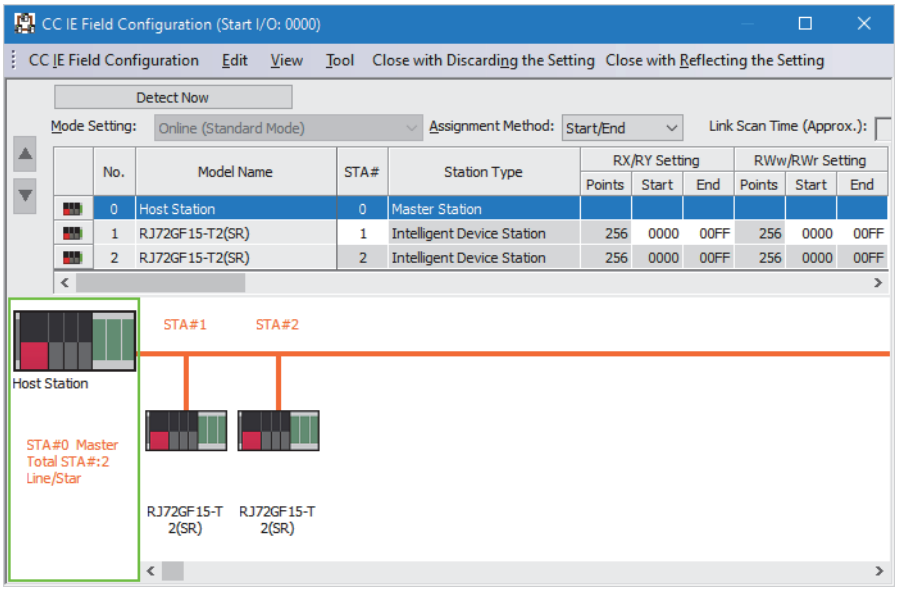
7. Set the network topology as follows.

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



8. Set the network configuration as follows.

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



9. 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										

10. 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 parameters, refer to the following.

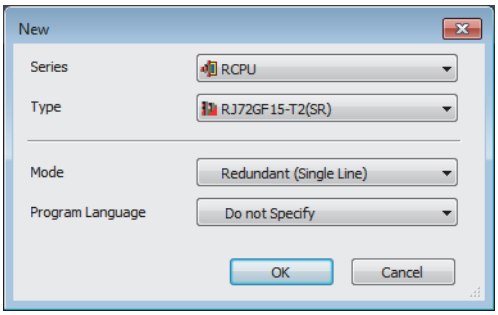
MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

Settings in the device station

Connect the engineering tool to the remote head module of remote head No.1 and set parameters.
In a redundant system, also write the same parameters to remote head No.2.

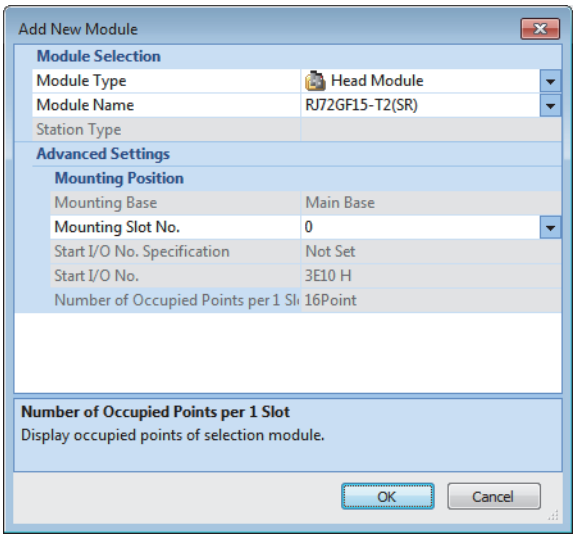
1. Set the remote head module as follows.

[Project] ⇨ [New]



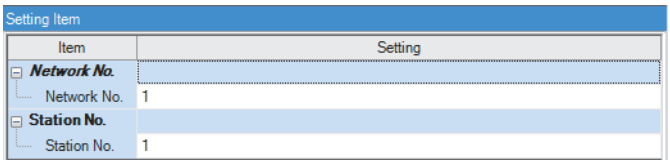
2. Set the remote head No.2 remote head module for slot No.0 in the I/O assignment setting.

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



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

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



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

5. Write the set parameters to the remote head No.1 and remote head No.2 remote head modules, and reset or powering off and on the remote head No.1 and remote head No.2 remote head modules.

[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 following. (☞ Page 80 PARAMETER SETTINGS)

1.9 Safety Communication Relay Function

This function relays safety communications between the SIL2 Process CPU included in the master station and the module set to the SIL2 mode included in the remote head module.

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.
The safety protocol version must match that of the communication destination.
For details, refer to the 📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application) and the manual for the communication destination. The firmware versions of remote head modules that support each safety protocol version are shown below.

Safety protocol version	Applicable safety communication standard: Year of issue	Firmware version of the remote head module
1	IEC 61784-3:2010	"05" or later
2	IEC 61784-3:2021	"14" or later

Point

If the module must be compatible with IEC 61784-3:2021, use safety protocol version 2. In that case, the CPU module, remote head module, master/local module, or external device to be connected must be supported by safety protocol version 2.

Restriction

- When configuring an intelligent device station with multiple modules set to SIL2 mode, configure the system with the modules set to SIL2 mode supported by the same safety protocol version only. If different safety protocol versions exist, an error may occur in either the remote head module or the module set to SIL2 mode.
- When replacing the remote head module of the standby system while power is on, replace the module with a new module whose firmware version supports a safety protocol version for a module set to SIL2 mode. Otherwise, an error occurs in the remote head module of the control system at replacement and safety communications cannot be continued after system switching.
- When a module set to SIL2 mode supported by safety protocol version 2 is mounted with the remote head module, up to 16 modules set to SIL2 mode Main can be mounted. If a module set to SIL2 mode supported by safety protocol version 2 is mounted and 17 or more modules set to SIL2 mode Main are mounted, an error occurs in the remote head module.

System configuration

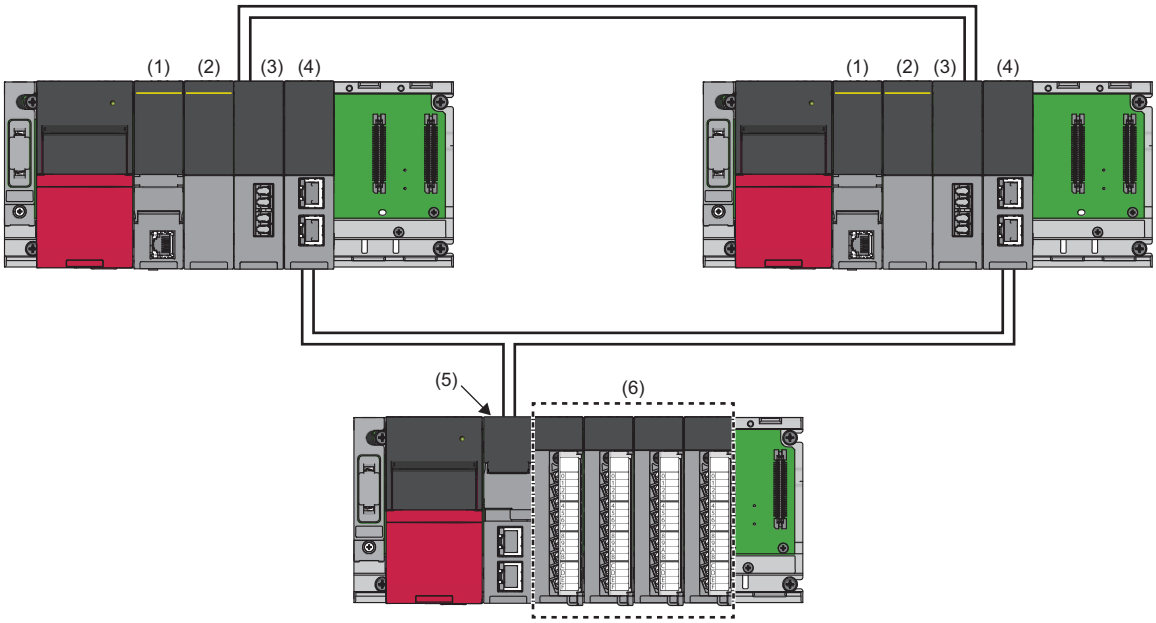
This section describes the system configuration of the safety communication relay function.

The system of the safety communication relay function 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 line redundant.

Redundant master station

The system of the redundant master station is configured as shown below.



(1)SIL2 Process CPU
(2)SIL2 function module
(3)Redundant function module
(4)RJ71GF11-T2
(5)Remote head module
(6)Module set to SIL2 mode

For the redundant master station, refer to the following.

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

■Communication availability in combination with the versions

The following table lists communication availability based on the combination of the firmware version of the remote head module and a module set to SIL2 mode to be mounted.

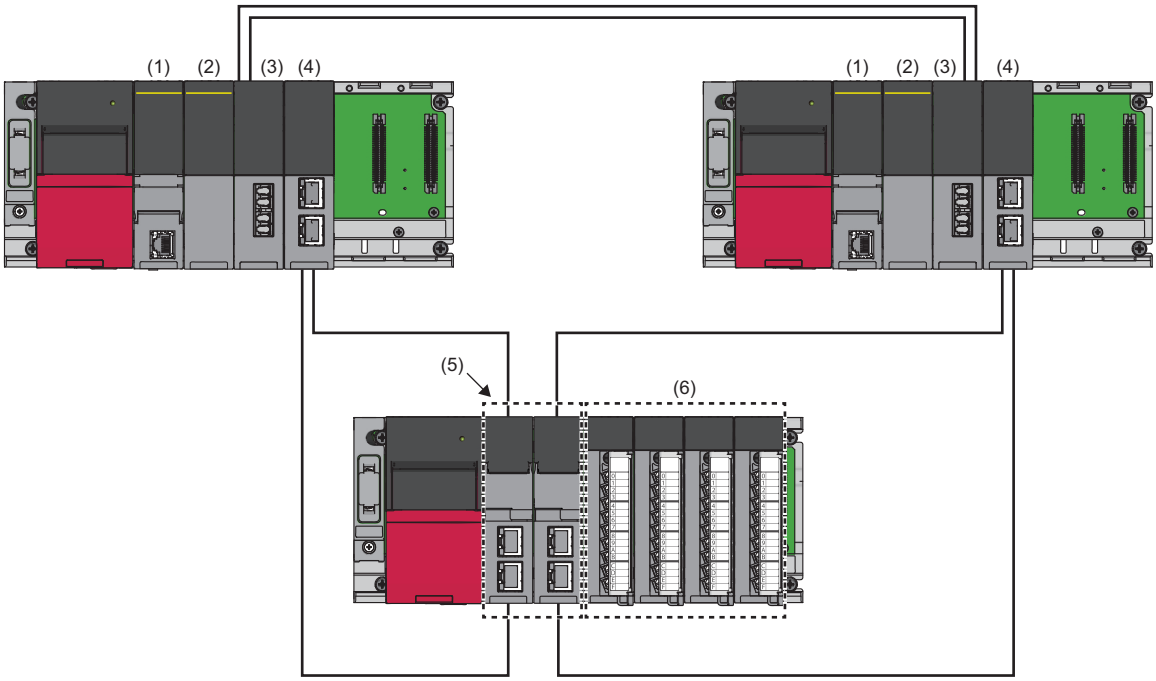
Firmware version of the remote head module	Safety protocol version that supports a module set to SIL2 mode*1	Communication availability
"5" to "13"	1	Communications with safety protocol version 1 are possible.
	2	Communications are not possible.*2
"14" or later	1	Communications with safety protocol version 1 are possible.
	2	Communications with safety protocol version 2 are possible.

*1 Configure the system with the modules supported by the same safety protocol version only.

*2 A project in which the module supported by safety protocol version 2 is mounted cannot be written to the remote head module with the firmware version "13" or earlier by the engineering tool.

Redundant line

The system of the redundant line is configured as shown below.



(1)SIL2 Process CPU
(2)SIL2 function module
(3)Redundant function module
(4)RJ71GF11-T2
(5)Remote head module (No.1, No.2)
(6)Module set to SIL2 mode

For the redundant line, refer to the following.

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

■Communication availability in combination with the versions

The following table lists communication availability based on the combination of the firmware version of the remote head module and a module set to SIL2 mode to be mounted.

Firmware version of the remote head module		Safety protocol version that supports a module set to SIL2 mode*1	Communication availability
Remote head No.1	Remote head No.2		
"5" to "13"	"5" to "13"	1	Communications with safety protocol version 1 are possible.
		2	Communications are not possible.*2
	"14" or later	1	Communications with safety protocol version 1 are possible.
		2	Communications are not possible.*2
"14" or later	"5" to "13"	1	Communications with safety protocol version 1 are possible.
		2	Communications are not possible.*3
	"14" or later	1	Communications with safety protocol version 1 are possible.
		2	Communications with safety protocol version 2 are possible.

*1 Configure the system with the modules supported by the same safety protocol version only.
*2 If the firmware version of the remote head No.1 is "13" or earlier, a project in which the module supported by safety protocol version 2 is mounted cannot be written by the engineering tool.
*3 An error occurs in the module set to SIL2 mode.

Procedures before operation

This section describes the procedures to configure the system of the safety communication relay function before operation.

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

During access to the SD memory card, do not turn off the power, reset, or remove 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, 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. (MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))

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

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

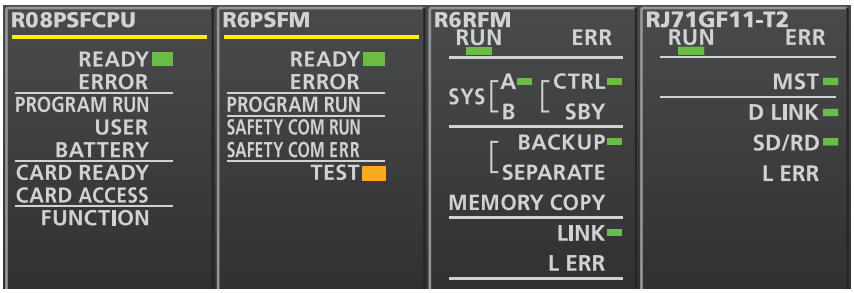
Restart both systems by either of the following methods.

- Turning off and on the power.
- Reset of the SIL2 Process CPU

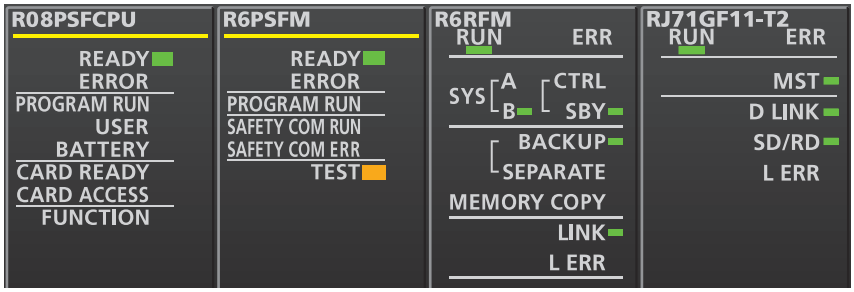
12. Check of the LED on the SIL2 Process CPU

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 "Safety Module Operation" of the engineering tool. (📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))

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 remote head module of both systems to the RUN position, and turn on the power.

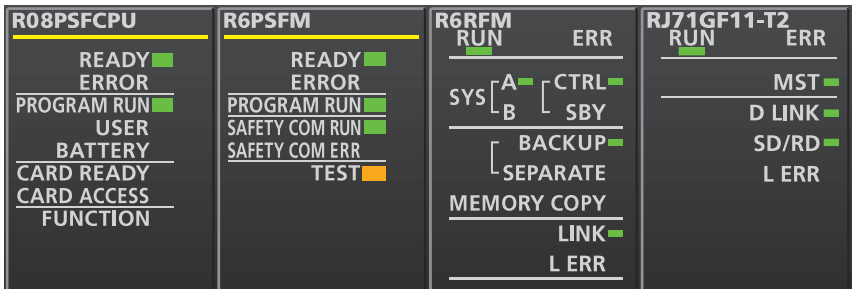
Procedures for operation check

1. Various check

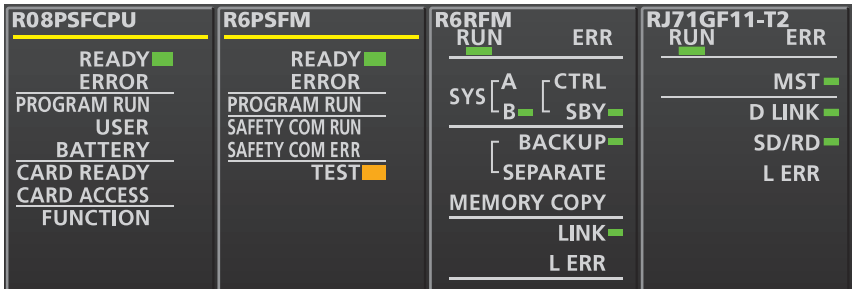
Check the status of the modules and the operation of the programs used in the system.

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

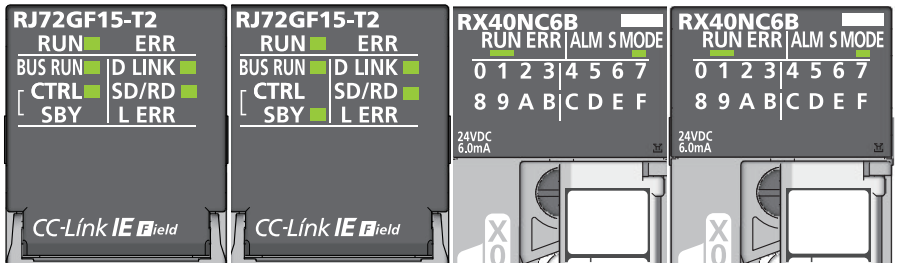
• Control system



• 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? (MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))
- 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 CPU module 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 remote head module of both systems. Then, set the RUN/STOP/RESET switch on the SIL2 Process CPU and remote head module of both systems to the RUN position, and turn on the power. Check that the PROGRAM RUN LED on the CPU module in the control system 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.

Restricted functions

The following table lists the functions restricted when the remote head module is used in a system of the safety communication relay function.

Function		Restrictions
Remote operation	Remote RESET	Only when this operation is performed on the remote head module of the control system, the entire system is reset. However, depending on the status of the remote head module, remote RESET may not be performed. ■When there is an error in remote head No.1 or remote head No.2 • When only remote head No.2 is mounted: The system is not reset. • When a major error occurs in remote head No.1 or remote head No.2, the system on both of remote head No.1 and remote head No.2 is not reset. (When only remote head No.1 is mounted, the system is reset.) ■When the remote head modules of both systems are not in the STOP state When the remote head module of the control system is in the STOP state and the remote head module of the standby system is in the RUN state, the remote head module of the control system and the standby system cannot be reset by performing the remote RESET operation on the remote head module of the control system. Perform the remote RESET operation after setting the remote head modules of both systems to the STOP state. ■When a remote operation is performed on the remote head modules of both systems via different routes When a remote operation is performed on the remote head module of the control system and the standby system via different routes, the remote head module of the control system and the standby system cannot be reset by performing the remote RESET operation on the remote head module of the control system. To perform a remote RESET operation on the remote head module of the control system, cancel the remote operation on the remote head module of the standby system before performing the remote RESET operation.
RAS function	Event history function	Events related to system switching are stored in the remote head modules of both systems, but events that have occurred in one of the remote head modules are stored only in that remote head module. Also, events that have occurred in a module on the base unit are stored only in the remote head module of the control system. Only the events stored in individual remote head modules can be cleared/displayed.
Monitor function	Device/buffer memory batch monitor	The execution result of the current value change executed in the control system for the devices of remote head module is not reflected in the new control system even if systems are switched. Connect the engineering tool to the new control system and re-execute the current value change.
Synchronization function	CC-Link IE Field Network synchronous communication function	Cannot be used.
	Inter-module synchronization function	
SLMP communication function		• When systems are switched during communication, since neither the remote head module of the control system prior to system switching nor that of the new control system can send a response and a response wait timeout occurs, a retry from the communication equipment is required. • In SLMP (MC protocol) communications using the remote head module, when communication is made to the other system while the other system cannot respond (because of being reset, disconnection of Ethernet cables, or other causes), a timeout error may occur.
MC protocol communications function		

Setting example

For a setting example, refer to the following.

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

Precautions

When the momentary power failure occurs

When the momentary power failure occurs, safety communications may stop since the safety communication relay function is discontinued and an error is detected.

The function restarts when the momentary power failure is cleared.

Take any of the following actions.

Action
Take measures for momentary power failure. (MELSEC iQ-R Module Configuration Manual)
For transmission interval monitoring time, satisfy the following calculation formula.*1 ■Transmission interval monitoring time of the master station (safety station) TM > (S2cyc × 2) + (LS × 6) + (PT × 2) + 110 ■Transmission interval monitoring time of the module set to SIL2 mode Main TM > (SCmst × 2) + (LS × 6) + (PT × 2) + 110

*1 The meanings of the variables in the equation are as follows.

Variable	Meaning
TM	Transmission interval monitoring time [ms]
S2cyc	Control cycle time of the module set to SIL2 mode Main [ms]
SCmst	Safety cycle time of the master station [ms]
LS	Link scan time [ms]
PT	Allowable momentary power failure time of the power supply module with the remote head module [ms]

When the ring topology is configured

Satisfy the following calculation formula for the transmission interval monitoring time of the module set to SIL2 mode Main.*1

If the calculation formula is not satisfied, the safety communications may stop due to the loopback or clearing it.

- TM≥(SCmst×2)+(LS×10)+24

*1 The meanings of the variables in the equation are as follows.

Variable	Meaning
TM	Transmission interval monitoring time [ms]
SCmst	Safety cycle time of the master station [ms]
LS	Link scan time [ms]

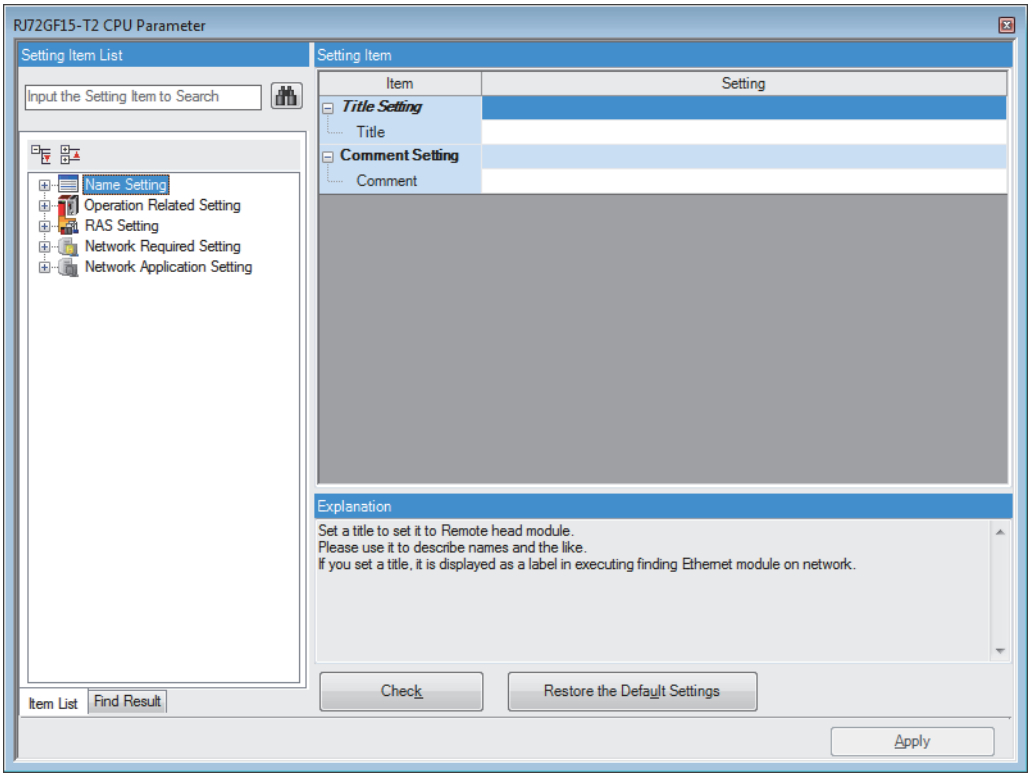
2 PARAMETER SETTINGS

This chapter describes CPU parameters of the remote head module and module parameters of the module mounted on the remote head module.

2.1 CPU Parameters

This section describes details on CPU parameters together with their setting windows.

[Navigation window] ⇨ [Parameter] ⇨ [RJ72GF15-T2] ⇨ [CPU Parameter]



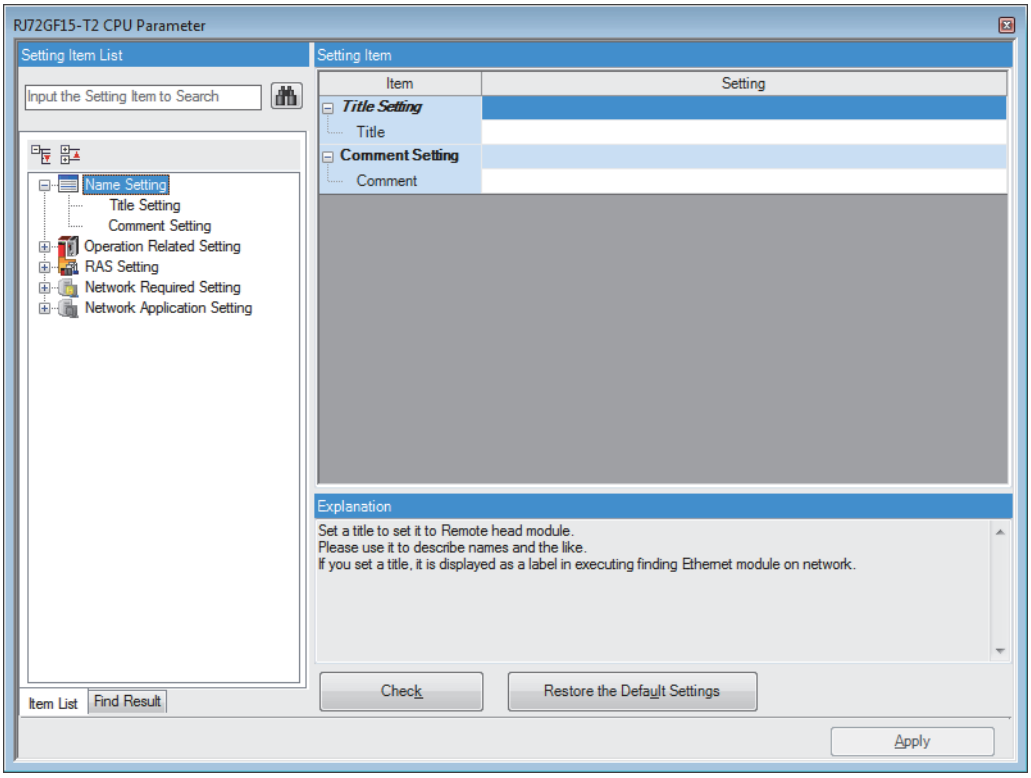
Item	Description	Reference
Name Setting	Set titles and comments for the remote head module.	Page 81 Name Setting
Operation Related Setting	Set remote reset for the remote head module.	Page 82 Operation Related Setting
RAS Setting	Set parameters for the RAS function.	Page 83 RAS Setting
Network Required Setting	Set network numbers and station numbers for the remote head module.	Page 84 Network Required Setting
Network Application Setting	Set module operation mode, transfer between devices, and redundancy for the remote head module.	Page 85 Network Application Setting

Point

- The remote head module does not employ static routing. However, it supports dynamic routing.
- Use a master station for the routing setting to communicate with other network by using static routing. The remote head module communicates based on the routing setting of the master station.

Name Setting

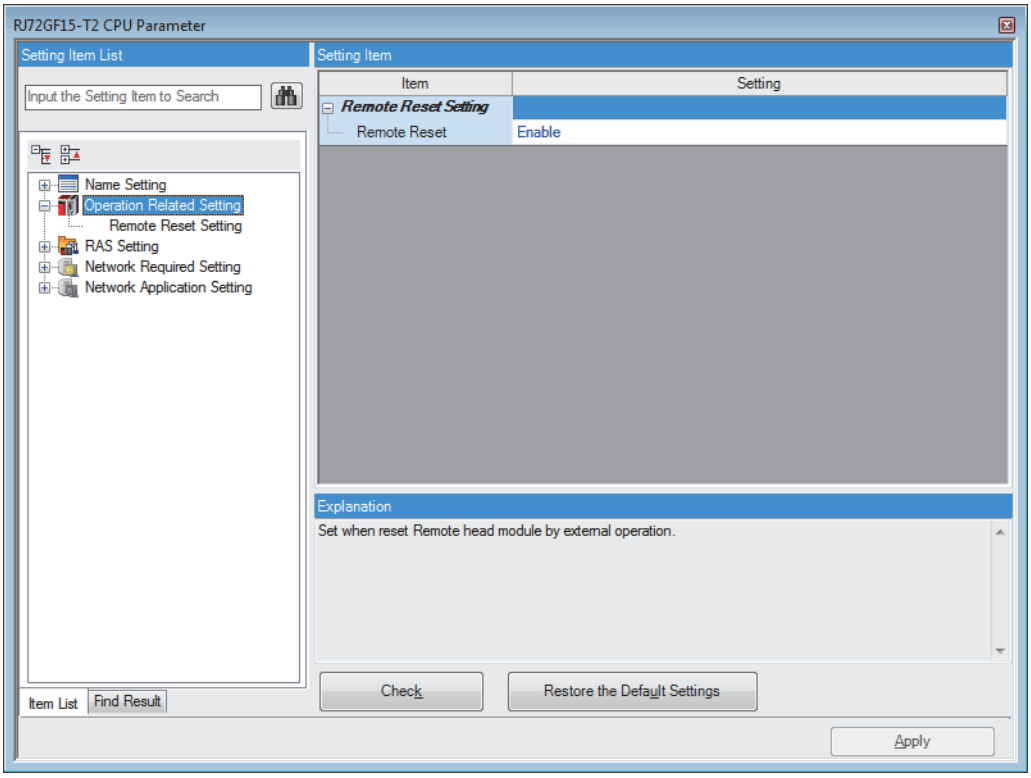
Set titles and comments for the remote head module.



Item		Description	Setting Range
Title Setting	Title	Set titles (name or application) for the remote head module.	Up to 32 one-byte characters (Default: Blank)
Comment Setting	Comment	Set a comment for title for the remote head module.	Up to 256 one-byte characters (Default: Blank)

Operation Related Setting

Set remote reset for the remote head module.

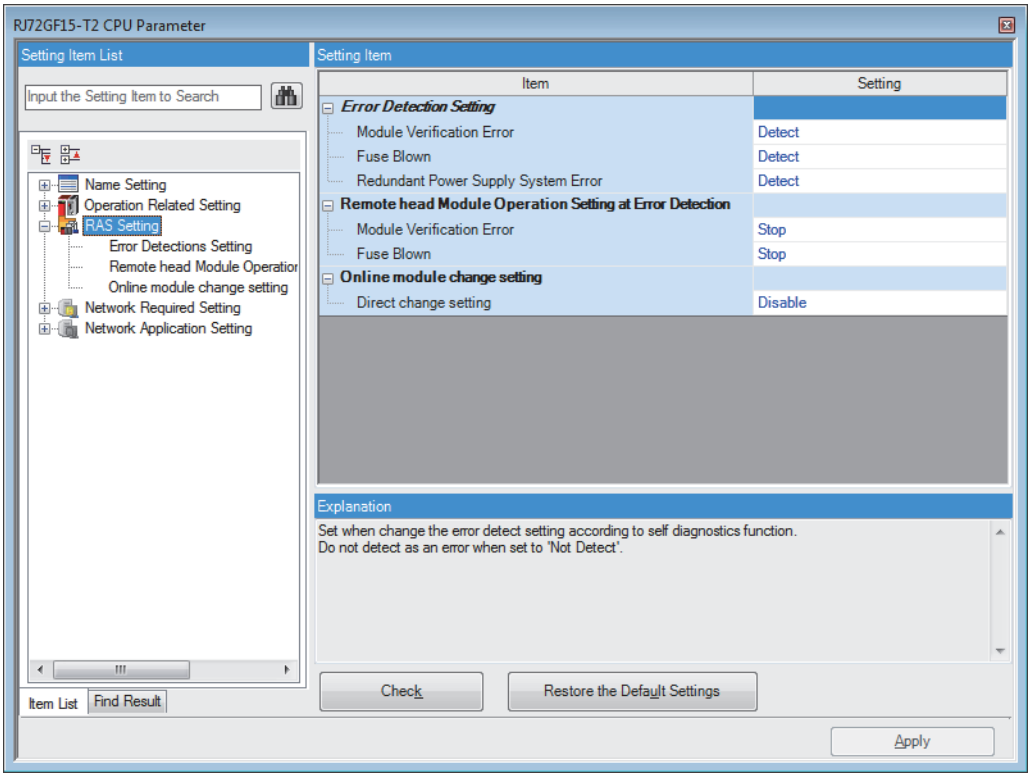


Item		Description	Setting Range
Remote Reset Setting	Remote Reset	Set whether to permit reset with an external remote operation for the remote head module.	• Disable • Enable (Default: Enable*1)

*1 The default differs from that of the CPU module. Caution is required when reset is performed with all stations specification.

RAS Setting

Set parameters for the RAS function.



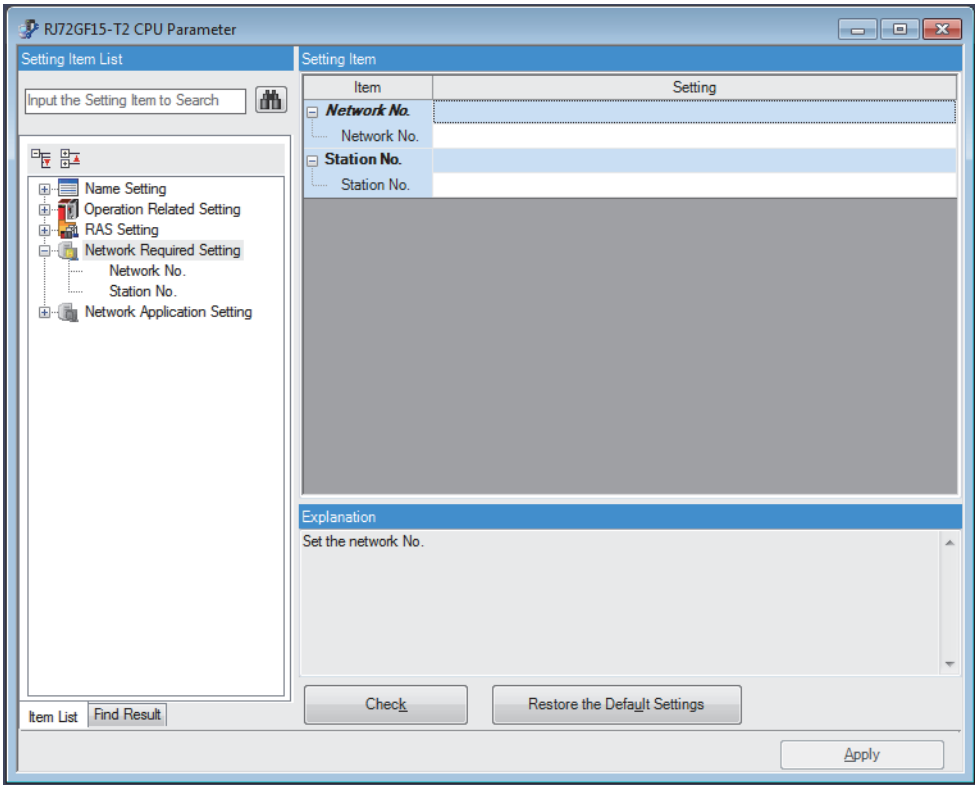
Item		Description	Setting Range
Error Detection Setting	Module Verification Error*1	Set whether or not to detect the module verification error.	• Detect • Not detect (Default: Detect)
	Fuse Blown	Set whether or not to detect a fuse blown of the module mounted on the remote head module.	
	Redundant Power Supply System Error	Set whether or not to detect an error of the power supply module at the redundant power supply system configuration.	
Remote head Module Operation Setting at Error Detection*2	Module Verification Error	Set the remote head module operation at a module verification error.	• Stop • Continue (Default: Stop)
	Fuse Blown	Set the remote head module operation at a fuse blown of the module mounted on the remote head module.	
Online module change setting	Direct change setting	Set "Enable" or "Disable" to "Direct change setting". [Precautions] When the direct change is enabled, a minor error occurs by the direct change. Therefore, the operating status of the remote head module does not change to the STOP state even if the "Module Verification Error" of "Remote head Module Operation Setting at Error Detection" is set to "Stop".	• Disable • Enable (Default: Disable)

*1 When "Not detect" is enabled and the operating remote head module is removed, a module verification error is not detected, but an error may occur if an program tries to access the removed module. Also, the removed CPU module will not be accessible even when it is re-installed. Therefore, if access is tried to the re-installed CPU module through the STOP and RUN operations, it may result in an error.

*2 Set the operation of the remote head module when an error is detected by the self-diagnostic function.
When "Stop" is set, the operating status of the remote head module is set to the STOP state and the cyclic transmission is stopped.
When "Continue" is set, the operating status of the remote head module is maintained.
When the remote head module is in the STOP state, the operation is as follows.
· The transfer from the link device (RX, RY, RWr, RWw) of the remote head module to the user device (X, Y, W) is as follows.
The transfer from RY to Y stops.
The transfer from RWw to W stops.
The transfer from X to RX continues.
The transfer from W to RWr continues.
· The data transfer between the devices in the remote head module stops.
· All outputs (Y) of the remote head module are turned off.

Network Required Setting

Set network numbers and station numbers for the remote head module.



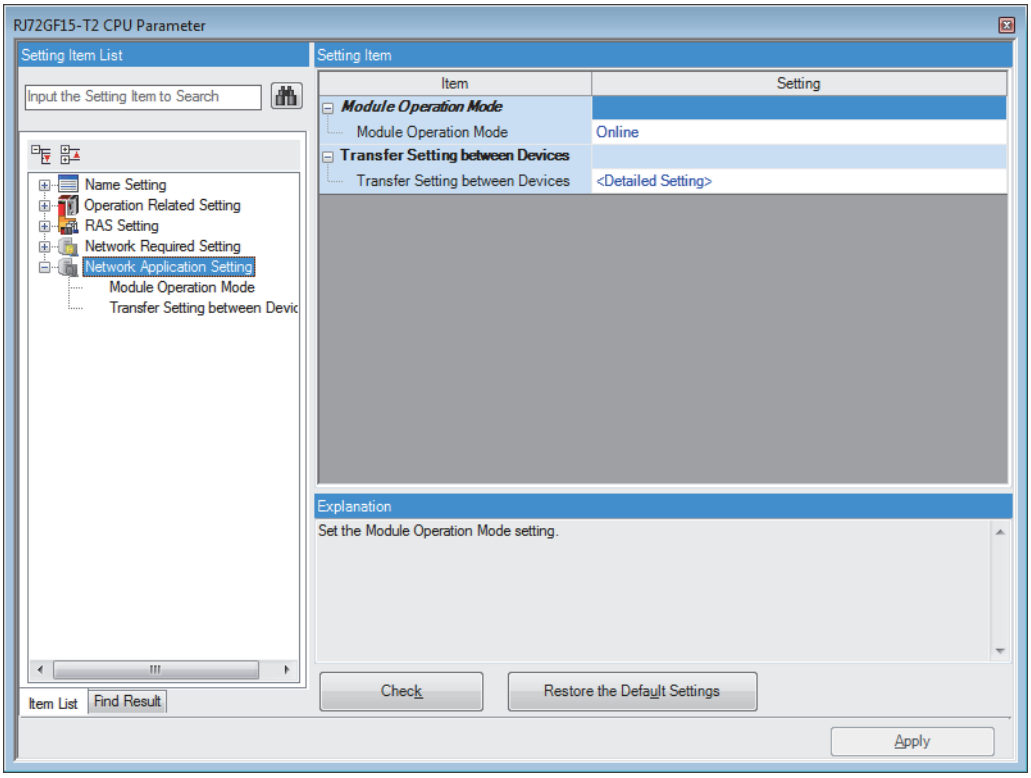
Item		Description	Setting Range*1*2
Network No.	Network No.	Set the network number of the remote head module.	• Blank • 1 to 239 (Default: Blank)
Station No.	Station No.	Set the station number of the remote head module.	• Blank • 1 to 120 (Default: Blank)

*1 When the "Network No." and "Station No." fields are left empty in the online mode, the head module will operate with the station number set by the CC-Link IE Field Network diagnostics for the master station. For details, refer to the following.
☞ Page 100 Station number setting of the remote head module

*2 To include the module set to the SIL2 mode in the system configuration, do not leave the "Network No." and "Station No." fields empty.

Network Application Setting

Set module operation mode, transfer between devices, and redundancy for the remote head module.

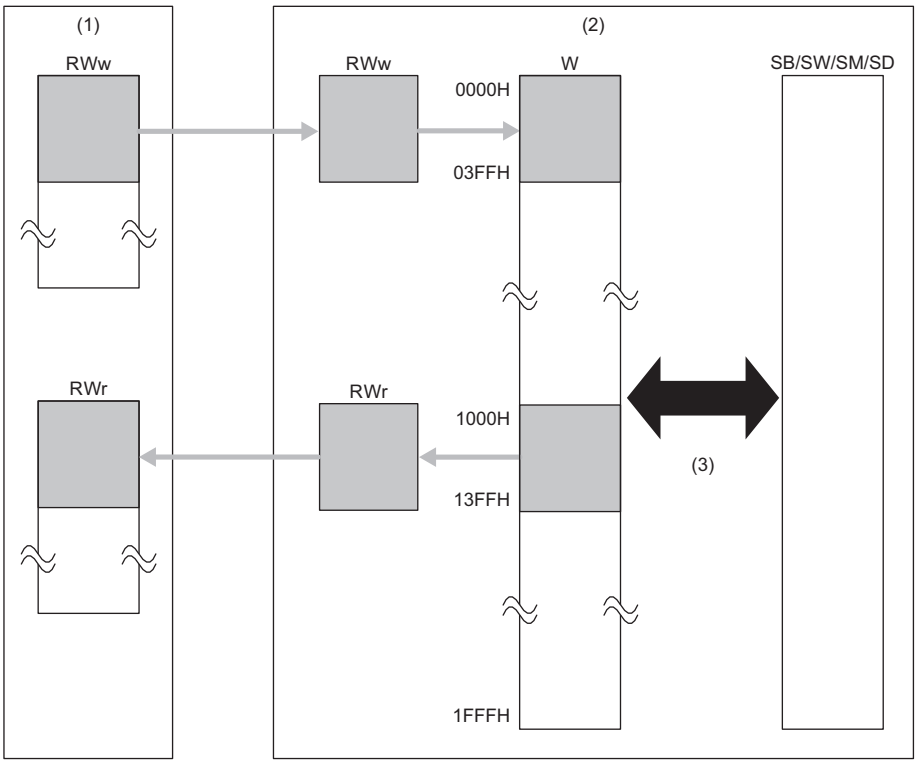


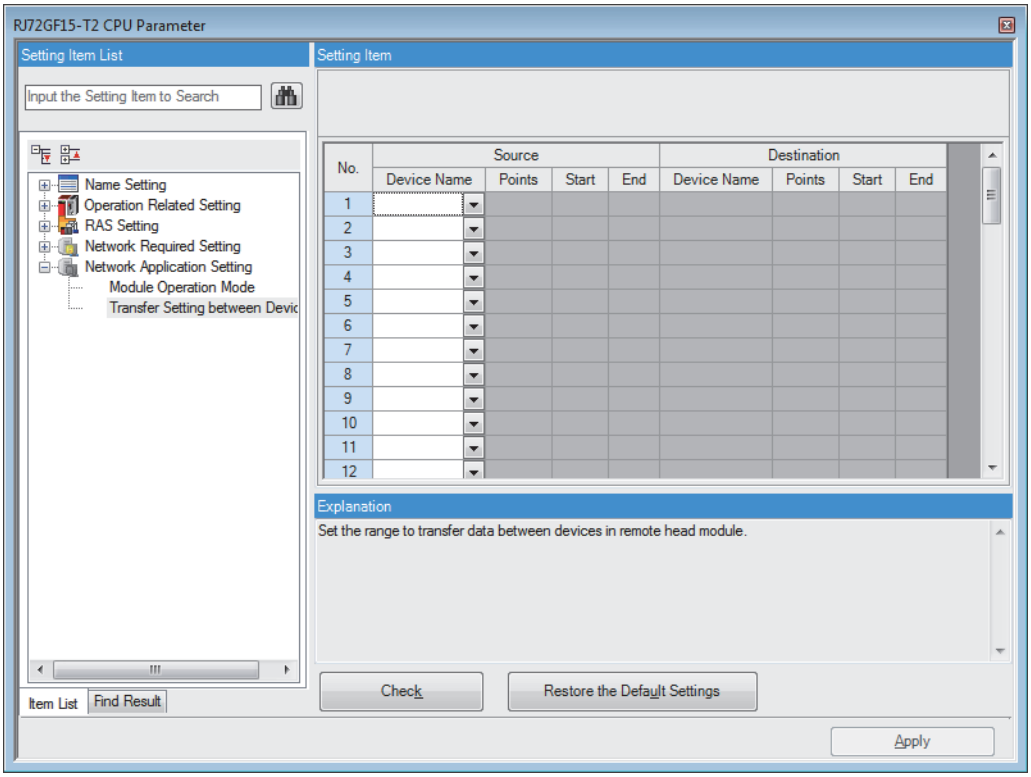
Item		Description	Setting Range
Module Operation Mode	Module Operation Mode	Online mode • Select this mode to connect the remote head module to the network for performing data link with other stations. Offline mode • Select this mode to disconnect the remote head module from the network for stopping data link with other stations.	• Online • Offline (Default: Online)
Transfer Setting between Devices	Transfer Setting between Devices	Set parameters to transfer devices of the remote head module as cyclic data.	☞ Page 86 Transfer Setting between Devices
Redundant System Settings	Line Type	Displays a type of the line to use the remote head module as a redundant system.	• Single Line • Redundant Line

Transfer Setting between Devices

Set the settings for transfer between devices (3) to transfer the following devices of the remote head module (2) to the master station (1) as cyclic data.

- Link special relay (SB)
- Link special register (SW)
- Special relay (SM)
- Special register (SD)
- Link register (W)





Item	Description	Setting Range
Setting Method	Right-click in the "Transfer Setting between Devices" window and select a device setting method from the "Setting Method" menu. • Start/End: Enter the start and end numbers of devices. • Points/Start: Enter the points and start numbers of devices.	• Start/End • Points/Start (Default: Start/End)
Device Name	Set a transfer source device and transfer destination device. Set W device for either the transfer source device or transfer destination device.	• SB • SW • SM • SD • W (Default: Blank)
Points	Set the number of points of the device to be transferred.	• SB: 16 to 8192*1 • SW: 1 to 8192 • SM: 16 to 2048*1 • SD: 1 to 2048 • W: 1 to 8192 (Default: Blank)
Start	Set the start number of the device to be transferred.	Source • SB: 00000H to 01FF0H*1 • SW: 00000H to 01FFFH • SM: 0 to 2032*1 • SD: 0 to 2047 • W: 00000H to 01FFFH (Default: Blank) Destination • SB: 00000H to 01FF0H*1 • SW: 00000H to 01FFFH • SM: 0 to 2032*1 • SD: 0 to 2047 • W: 01000H to 01FFFH (Default: Blank)
End	Set the end number of the device to be transferred.	Source • SB: 0000FH to 01FFFH*1 • SW: 00000H to 01FFFH • SM: 15 to 2047*1 • SD: 0 to 2047 • W: 00000H to 01FFFH (Default: Blank) Destination The number is automatically set according to the setting of the transfer source.

*1 For bit devices, specify a device number in 16-point units to make possible to use in units of words.

2.2 Module Parameter

This section describes differences in module parameters between the module mounted on the remote head module and CPU module.

Refresh settings

- Refresh target: Only specified device is selectable. Module label and refresh data register (RD) cannot be selected.
- Transfer to intelligent function module and transfer to CPU: The settable device range is limited. The device range allowed is as follows.

Item		Setting range of refresh target device
Data to transfer to the intelligent function module	When data is received from the master station with cyclic transmission	• W0 to W03FF • Y (The ones not used by I/O)
	When data is written from the master station with transient transmission	• W0 to W1FFF (The ones not assigned to cyclic transmission) • X/Y (The ones not used by I/O and not assigned to cyclic transmission) • SB1000 to SB1FFF • SW1000 to SW1FFF • RD0 to RD12287
Data to transfer to the CPU module	When data is sent to the master station with cyclic transmission	• W1000 to W13FF • X (The ones not used by I/O)
	When data is read to the master station with transient transmission	• W0 to W1FFF (The ones not assigned to cyclic transmission) • X/Y (The ones not used by I/O and not assigned to cyclic transmission) • SB1000 to SB1FFF • SW1000 to SW1FFF • RD0 to RD12287

Point

Automatic serial number assignment of the refresh settings is useful to make a batch access to all the scattered buffer memory of the intelligent function module existing in more than one area.

- Use the refresh settings of the intelligent function module to make an automatic serial number assignment of the link register (W) to the buffer memory of the remote head module to perform refresh.
- Master stations are able to read and write from/to the link register (W) of the remote head module with a single READ/WRITE instruction.

When the master station directly accesses the buffer memory of the intelligent function module with a REMFR/REMTO instruction, the number of the REMFR/REMTO instructions corresponds to the number of areas of the buffer memory.

Interrupt settings

The interrupt settings are not available.

If the interrupt settings are set, an error occurs in the remote head module.

Refresh Group

The refresh group setting of the refresh settings is not available.

Parameter setting method

For the RJ61BT11, "Program" cannot be set in "Parameter Setting Method" of "Required Setting".

3 AVAILABLE FILE OPERATION

The following table lists file operations which are available for each file type.

○: Available, —: N/A

File type		Operation using engineering tool			Operation with SLMP and FTP server function		
		Write	Read	Delete	Write	Read	Delete
Parameter		○*2	○	○*2	○*1	○	○*1
Device comment		○	○	○	○*1	○	○*1
Global label setting file		○	○	○	○*1	○	○*1
Initial label value file	Initial global label value file	○	○	○	○*1	○	○*1
Event history		—	—	—	○	○	○
Device data storage file		—	—	—	○*1	○	○*1
General-purpose data		○	○	○	○	○	○
Remote password		○*2	○	○*2	○*1	○	○*1

*1 Available only when the remote head module operation status is STOP. A communication error occurs when operated in the RUN state.

*2 Available only when the remote head module operation status is STOP. If performed in RUN state, the operating status of the remote head module is changed by the remote STOP function, and then the operation continues.

MEMO

4 TROUBLESHOOTING

This chapter describes errors that may occur during system operation, error causes, and actions to be taken.
For the troubleshooting specific to each module, refer to the manual for the module used.

Point

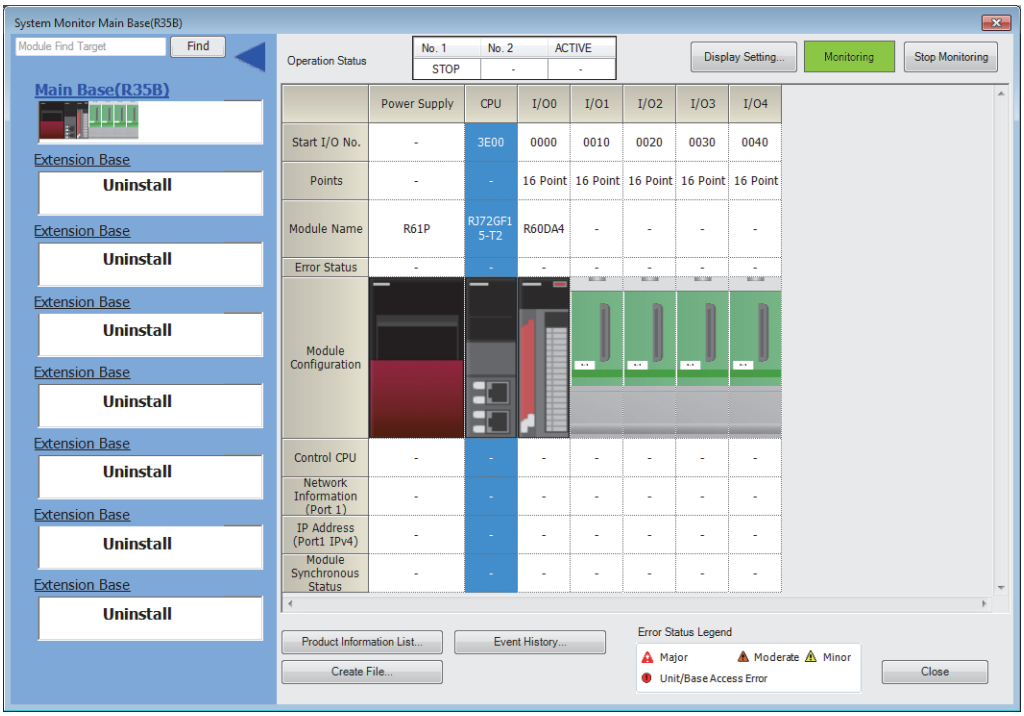
Reading devices and saving the program at the time of an error helps to analyze the error cause. For read operations from the programmable controller, refer to the following.
GX Works3 Operating Manual

4.1 Troubleshooting Procedure

When the system has any trouble, perform troubleshooting in the following order.

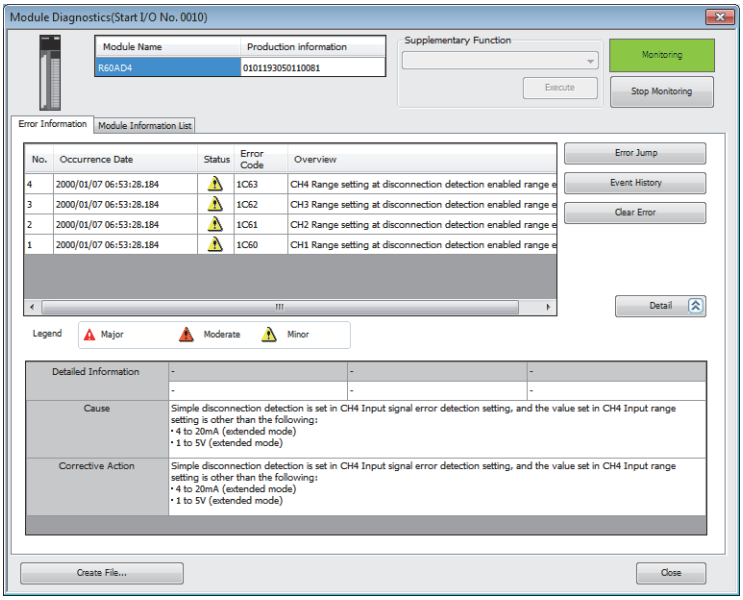
1. Check the LED status of the power supply module. (Page 105 When the POWER LED of the power supply module turns off)
2. Check the LED status of the remote head module. (Page 93 Checking with LED)
3. Check the LED status of each I/O module and intelligent function module. (User's Manual (Application) for the module used)
4. Connect an engineering tool, and execute the system monitor function. The error module can be identified.

[Diagnostics] ⇨ [System Monitor]



5. Select the error module, and execute the module diagnostics function. The error cause and the action to be taken can be displayed. (☞ Page 96 Checking the Module Status)

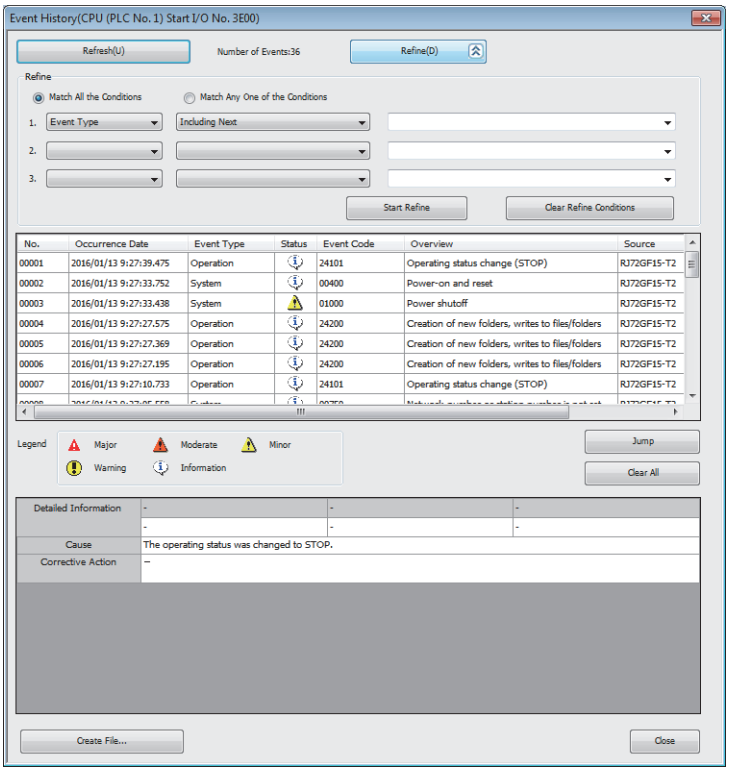
[Diagnostics] ⇨ [System Monitor] ⇨ Double-click the error module.



6. When data link cannot be performed even though the remote head module is normal in the module diagnostics, execute the CC-Link IE Field Network diagnostics, and take action. (☞ Page 99 Checking the Network Status)

7. If the error cause cannot be identified by the module diagnostics and CC-Link IE Field Network diagnostics, check the executed operations and detected error logs on the event history window.

[Diagnostics] ⇨ [System Monitor] ⇨ [Event History] button



8. If the error cause cannot be identified in steps 1 to 7, perform troubleshooting by symptom. (📖 User's Manual (Application) for the module used)

4.2 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.

When the RUN LED turns off

When the RUN LED turns off after powering on the remote head module, check the following.

Check item	Action
Is the remote head module mounted correctly?	Securely mount the remote head module on the main base unit.
Does the RUN LED turn on when the power supply module is replaced and the system is powered on again? (Check the LED status after the power supply module on the extension base unit is also replaced.)	The power supply module before the replacement has failed. Replace the power supply module.
Does the RUN LED remain off even after the power supply module is replaced and the system is powered on again? (Check the LED status after the power supply module on the extension base unit is also replaced.)	One of the modules except the power supply module has failed. Repeatedly supply power to the system, returning the modules to the system one by one. The last module mounted immediately before the RUN LED turns off has failed. Replace the corresponding module.
Is the remote head module of the standby system being replaced in a redundant system?	Reset the replaced remote head module of the standby system.

If the above action does not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 98 Module communication test)

When the BUS RUN LED turns off

When the BUS RUN LED turns off after powering on the remote head module, check the following.

Check item	Action
Is the switch on the remote head module set to RUN?	Set the switch on the remote head module to RUN to start data link.
Is it in the remote STOP state?	Cancel the remote STOP state and start data link.
Has an error occurred in the remote head module?	Identify the error cause on the system monitor window using the engineering tool, and take action. (☞ Page 91 Troubleshooting Procedure)
Is the master station in the RUN state?	Set the operating status of the master station to RUN. If the master station has stopped due to an error, troubleshoot it referring to the manual for the master station. (📖 User's manual for the master/local module used)
Is the remote head module disconnected during STOP of the master station?	• Set the operating status of the master station to RUN and reconnect the remote head module to the network. • Reset the remote head module because it retains the STOP status of the master station.

If the above action does not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 98 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 an error displayed in the CC-Link IE Field Network diagnostics?	Take the actions displayed on the window.

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 98 Module communication test)
- Cable test (📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))

When the D LINK LED turns off

When the D LINK LED turns off, check the following.

Check item	Action
Is the master station connected to the network and operating normally?	• If an error has occurred in the CPU module on the master station, eliminate the cause of the CPU module error. (📖 User's manual for the CPU module used) • Connect the engineering tool to the master station, and check if the master station is performing data link by executing the CC-Link IE Field Network diagnostics. (📖 User's manual for the master/local module used)
Are the Ethernet cables used normally?	• Check if the Ethernet cable which conforms the standard is used. (📖 User's manual for the master/local module used) • Check if the station-to-station distance is set within range. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup)) • Check if the Ethernet cables are not disconnected.
Is a switching hub connected in ring topology?	Configure the network in ring topology without a switching hub.
Are the switching hub and other stations connected to the remote head module operating normally?	Check if the switching hub and other stations are powered on.
Is the switching hub used operating normally?	Check if a switching hub which conforms the standard is used. (📖 User's manual for the master/local module used)
Is the station number of the remote head module duplicated with any of the other stations?	Change the duplicated station number.
Does the network number of the remote head module match with that of the connected network?	Match the network number of the remote head module with that of the connected network.
Is an error displayed in the CC-Link IE Field Network diagnostics?	Take the actions displayed on the window.

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 98 Module communication test)
- Cable test (📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))

When the D LINK LED is flashing

When the D LINK LED is flashing, check the following.

Check item	Action
Does the station number indicated in the dot matrix LED of the remote head module match with that of the remote head module specified in the network configuration setting of the master station?	• Match the network number of the remote head module with that of the remote head module specified in the network configuration setting of the master station. (📖 User's manual for the master/local module used) • Initialize the remote head module and rewrite the parameter using the engineering tool.

If the above actions do not solve the problem, connect the engineering tool to the master station and execute the CC-Link IE Field Network diagnostics. (📖 User's manual for the master/local module used)

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. (📖 User's manual for the master/local module used) • Check if the station-to-station distance is set within range. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup)) • Check if the Ethernet cables are not disconnected.
Is the switching hub used operating normally?	• Check if a switching hub which conforms the standard is used. (📖 User's manual for the master/local module used) • Power off and on the switching hub.
Are other stations connected to the remote head module operating normally?	Check the operation status of modules on other stations.
Is the mode of the module on the master station set to Online?	Change the mode to Online. (📖 User's manual for the master/local module used)
Is there any source of noise near the module or cables?	Change the location of the module or cables.
Is the loopback function enabled for the master station?	When the loopback function is enabled, check if the ring topology is correctly configured for the port where the L ER LED is on. (📖 User's manual for the master/local module used)

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 98 Module communication test)
- Cable test (📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))

When the LINK LED turns off

When the LINK LED turns off, check the following.

Check item	Action
Are the Ethernet cables used normally?	• Check if the Ethernet cable which conforms the standard is used. (📖 User's manual for the master/local module used) • Check if the station-to-station distance is set within range. (📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Startup)) • Check if the Ethernet cables are not disconnected.
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable, and correct the bending radius.
Are the switching hub and other stations connected to the remote head module operating normally?	Check if the switching hub and other stations are powered on.

If the above actions do not solve the problem, perform the following tests to check for an error.

- Module communication test (☞ Page 98 Module communication test)
- Cable test (📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))

When the CTRL LED is flashing

When the CTRL LED is flashing, check the following.

Check item	Action
Has a moderate error or major error occurred in the remote head module of the standby system?	Perform troubleshooting using ERR LED. (☞ Page 93 When the ERR LED turns on or is flashing)
Is the D LINK LED of the remote head module of the standby system off or flashing?	Perform troubleshooting using D LINK LED. (☞ Page 94 When the D LINK LED turns off, Page 94 When the D LINK LED is flashing)
Is the SBY LED of the remote head module of the standby system flashing?	The memory is being copied from the control system to the standby system. Wait until memory copy from the control system to the standby system was completed, the remote head module of the standby system is automatically reset, and the system is restarted.
Are the operating statuses of the remote head modules of both systems (RUN state/STOP state) mismatch?	Match the operating statuses of both systems (RUN state/STOP state).

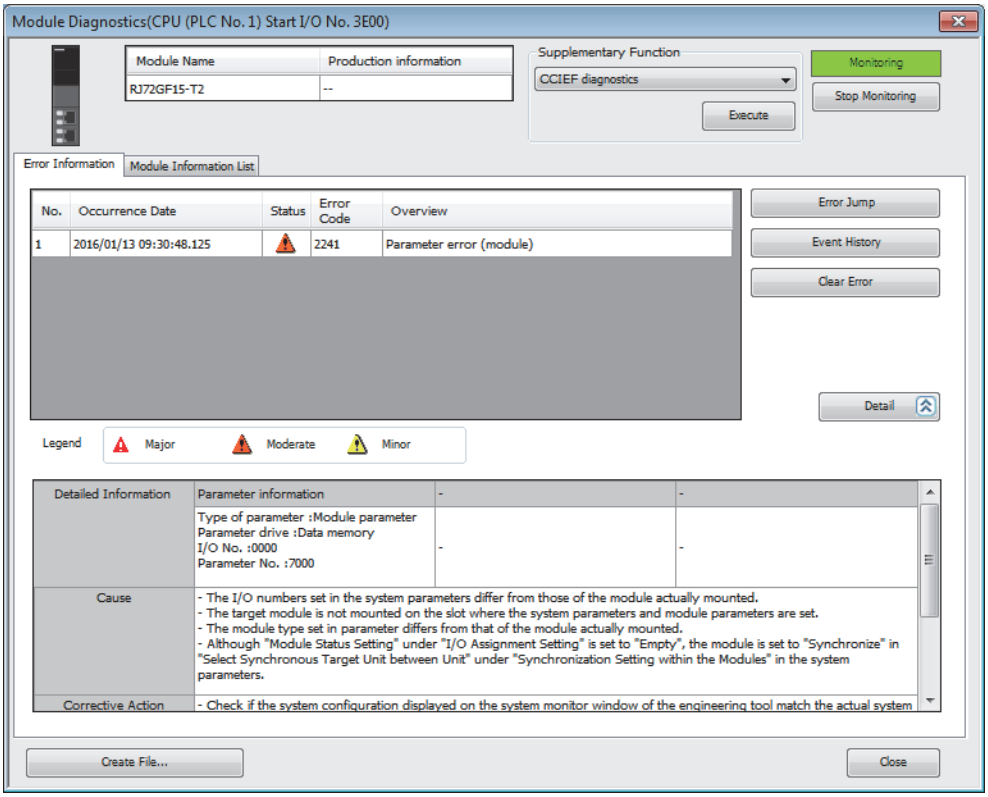
4.3 Checking the Module Status

The following items can be checked in the "Module Diagnostics" window for the remote head module.

Item		Description
Error Information		Displays the details of the errors currently occurring. Click the [Event History] button to check the history of errors that have occurred on the network, errors detected for each module, and operations that have been executed.
Module Information List		Displays various status information of the remote head module.
Supplementary Function	CCIEF diagnostics	Enables checking the cause to resolve the problem when an error occurs in CC-Link IE Field Network. (☞ Page 99 Checking the Network Status)

Error Information

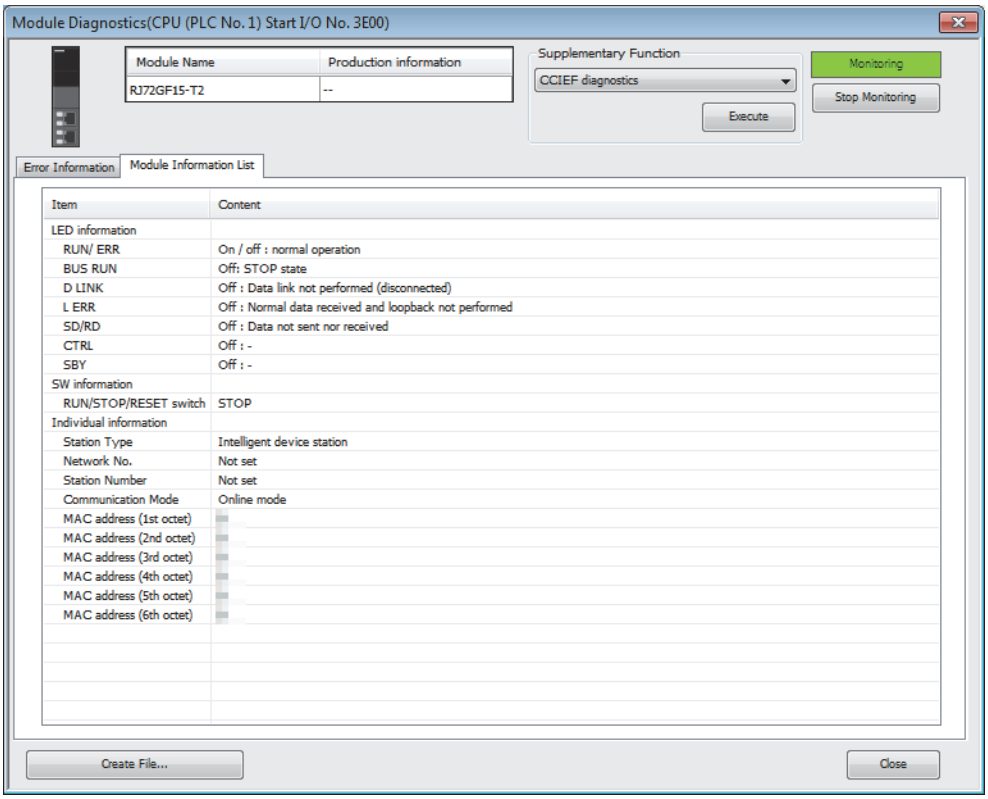
Check the details of the error currently occurring and action to remove the error.



Item	Description
Status	Major: An error such as hardware failure or memory failure
	Moderate: An error, such as parameter error, which affect module operation
	Minor: An error such as communication failure
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

Switch to the [Module Information List] tab to check various status information of the remote head module.



Item		Description
LED information		Displays the LED status of the remote head module.
SW information		Displays the switch status of the remote head module.
Individual information	Station Type	Displays "Intelligent device station".
	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 1st octet of the MAC address.
	MAC address (2nd octet)	Displays the 2nd octet of the MAC address.
	MAC address (3rd octet)	Displays the 3rd octet of the MAC address.
	MAC address (4th octet)	Displays the 4th octet of the MAC address.
	MAC address (5th octet)	Displays the 5th octet of the MAC address.
	MAC address (6th octet)	Displays the 6th octet of the MAC address.

Module communication test

The module communication test checks the hardware of the remote head module. When the communication using the remote head module is unstable, whether an 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 cable connected between two connectors.

■Procedure

1. Connect the P1 and P2 of the remote head module with an Ethernet cable.
2. Using the switch on the remote head module, repeat three cycles of STOP→RESET/TEST→STOP, taking less than one second per cycle. (The RUN LED flashes after the 3rd cycle.)
3. Reset the remote head 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.
- The redundant function cannot be used during execution of the module communication test.

■Checking the status and result of module communication test

The test status and result can be checked with LED indication 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 dot matrix LED indicates the error number with the form of "Port number Error number".

For example, "1 3" is indicated 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.

4.4 Checking the Network Status

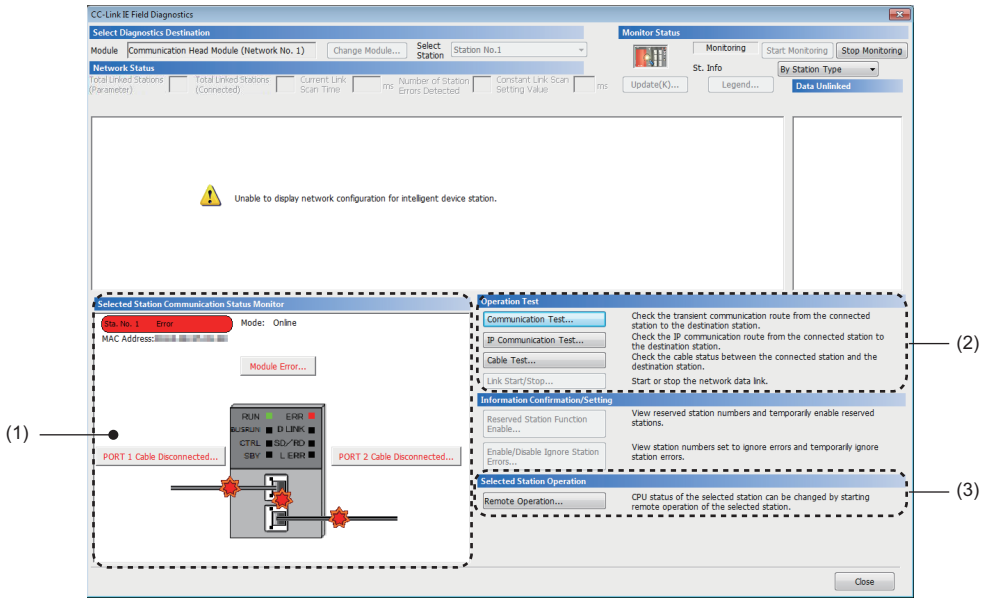
Perform the CC-Link IE Field Network diagnostics to check the network status and error details or to perform an operation test for troubleshooting.

This section describes a method for diagnosing the system by directly connecting the engineering tool to the remote head module. For the method connecting the engineering tool to the master station, refer to the following.

User's manual for the master/local module used

Diagnostic items

The following table lists items that can be diagnosed by the CC-Link IE Field Network diagnostics.



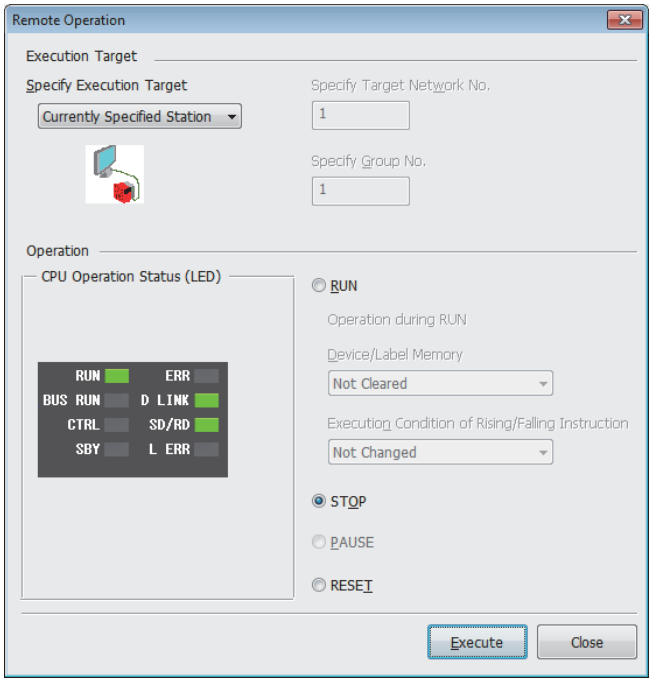
Item		Description	Reference
(1)	Remote head module status and error details	Displays the communication status of the remote head module.	MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)
(2)	Communication Test	Checks if transient transmission data can be properly routed from the connected station to the communication target station.	
	IP Communication Test	Checks the arrival time and route of IP communications from the connected station to the communication target.	
	Cable Test	Checks the connection status of cables between the test target station and the devices connected to the port of the station.	
(3)	Remote Operation	Remotely operates the remote head module (RUN, STOP, RESET).	Page 100 Remote operation

Point

- The CC-Link IE Field Network diagnostics cannot be started when another station has been specified for "Other Station Setting" in the "Specify Connection Destination Connection" window. Directly connect the engineering tool to the remote head module to be diagnosed, and start the CC-Link IE Field Network diagnostics.
- For the redundant system configuration, the CC-Link IE Field Network diagnostics cannot be started when another remote head module has been specified in "Target System" of the "Specify Connection Destination Connection" window. Directly connect the engineering tool to the remote head module to be diagnosed, specify the own remote head module ("Not Specified" in "Multiple CPU Setting" and "Not Specified" in "Specify Redundant CPU"), and start the CC-Link IE Field Network diagnostics.

Remote operation

For remote operations from the CC-Link IE Field Network diagnostics, 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. Select a remote operation (RUN, STOP, or RESET) to be performed in "Operation".*1
4. 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

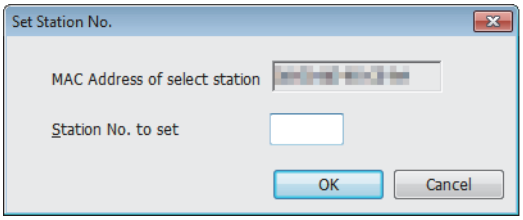
For details on the remote operations, refer to the following.

☞ Page 30 Remote Operation

Station number setting of the remote head module

For the station number setting of the remote head module using the CC-Link IE Field Network diagnostics, follow the steps below.

1. Start the CC-Link IE Field Network diagnostics from the engineering tool connected to the master station.
2. Select the icon of the remote head module with no station number setting from the network map window.
3. Click the [Set Station No.] button in "Selected Station Communication Status Monitor".
4. Set the station number in the following window, and click the [OK] button.



Restriction

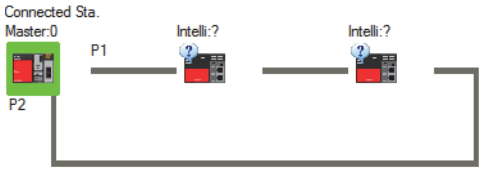
When the station number setting of the remote head module is performed from the master station of the MELSEC-Q/L series, use the master/local module with a serial number (first five digits) of "13032" or later and GX Works2 with Version 1.53F or later.

■Precautions

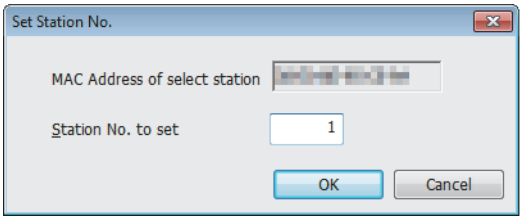
- The network number will be the same as that of the master station.
- When a network number and a station number are set in the "Network Required Setting" tab of "CPU Parameter", the parameter settings take priority.

■When a redundant system of single line is configured

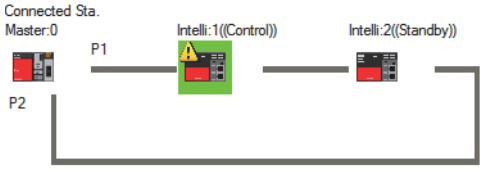
When the remote head module is used in a redundant system of single line the station number setting of the remote head module from the master station is as follows:



1. The remote head modules of both systems are displayed in the network map.



2. Select the remote head No.1 or No.2 and set the station number.



3. The station numbers are set in the remote head modules of both systems.

The station number of the remote head No.1 will be the station number set and that of the remote head No.2 will be the station number set + 1.*1

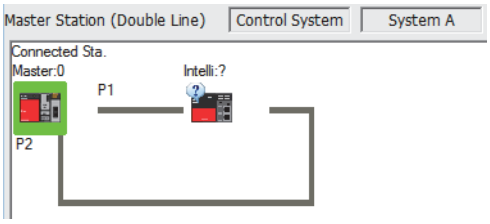
However, when 120 is set in the station number, the station number of the remote head No.1 will be 119 and that of the remote head No.2 will be 120.

*1 When the station number set + 1 already exists on the same network, an error occurs.

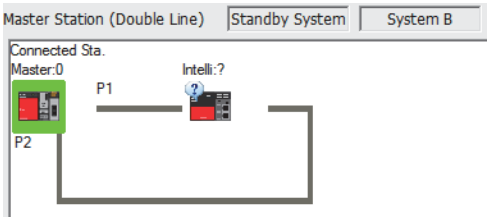
■When a redundant system of redundant line is configured

When the remote head module is used in a redundant system of redundant line, the station number setting of the remote head module from the master station is as follows:

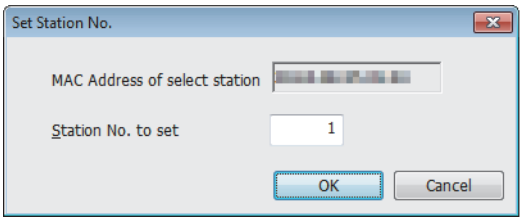
■Control system



■Standby system

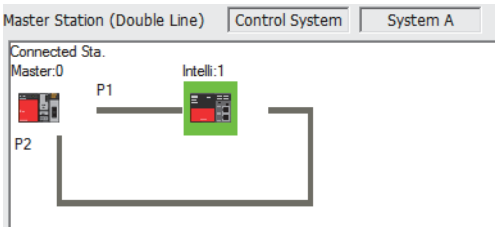


1. Only the remote head module of either system is displayed in the network map.

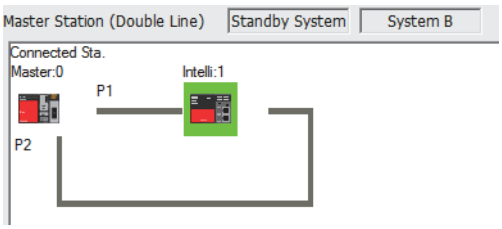


2. Select the remote head module in the control system or standby system to set the station number.

■Control system



■Standby system



3. The station numbers are set in the remote head modules of both systems.

4.5 Replacing the Remote Head Module

This section describes the procedure for replacing the remote head module.

For a system configuration other than a redundant system

The remote head module can be replaced without stopping the data link in the entire network.
Even if the remote head module connected does not have a station number, it can be set from the CC-Link IE Field Network diagnostics of the master station.

1. Read parameters written in the remote head module to a project of the engineering tool.

[Online] ⇨ [Read from PLC]

2. Connect the engineering tool to the master station, and stop the data link of the remote head module from the CC-Link IE Field Network diagnostics.

User's manual for the master/local module used

3. From the CC-Link IE Field Network diagnostics, set the remote head module as a temporary error invalid station.

User's manual for the master/local module used

4. Power off the programmable controller on the remote head module side, and remove the Ethernet cable from the remote head module.

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

5. Replace the remote head module.

MELSEC iQ-R Module Configuration Manual

6. Power on the remote head module.

7. Change the connection destination of the engineering tool to the remote head module, and write the parameters read in the step 1 to the replaced remote head module.

The written parameters are reflected when the system is powered off and on, or when the remote head module is reset.

[Online] ⇨ [Write to PLC]

8. Set the switch of the remote head module to the RUN position.

9. Connect the Ethernet cable to the remote head module.

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

10. Cancel the temporary error invalid station setting on the master station, and start the link.

User's manual for the master/local module used

11. Check if communication is normal by using the CC-Link IE Field Network diagnostics. (☞ Page 99 Checking the Network Status)

For the standby system in a redundant system configuration

This section describes the procedure of replacing the remote head module of the standby system in a redundant system configuration

The remote head module of the standby system can be replaced while the remote head module of the control system controls the system at power-on (online).

1. Check that the remote head module to be replaced is set to the standby system (the CTRL LED turns off). To replace the remote head module of the control system, switch the module to the standby system using the engineering tool.

GX Works3 Operating Manual

2. Disconnect the Ethernet cable from the remote head module to be replaced.

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

3. Set the switch of the remote head module of the standby system to the STOP position.
4. Remove the remote head module of the standby system from the main base unit.

MELSEC iQ-R Module Configuration Manual

5. Set the switch of the remote head module to be replaced to the STOP position.
6. Mount the remote head module to be replaced on the main base unit.

MELSEC iQ-R Module Configuration Manual

7. Reset the replaced remote head module of the standby system.
8. Check that the RUN LED of the remote head module of the standby system turns on, and that power is being supplied normally.
9. When a file mismatch was detected by the consistency check between systems, memory copy from the control system to the standby system is automatically executed. Then, the remote head module of the standby system is automatically reset, and the system is restarted.
10. Connect the Ethernet cable to the remote head module.

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

11. Set the switch of the remote head module of the standby system to the same position as that of the remote head module of the control system.

Point

When the remote head module of the standby system is removed, a minor error occurs in the remote head module of the control system. Replace the remote head module of the standby system, and clear the error in the remote head module of the control system if required.

4.6 Troubleshooting by Symptom

If any function of the remote head module does not operate normally, perform troubleshooting by checking the following items. If the ERR LED is on or flashing, eliminate the error cause using the engineering tool.

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 remote head module turned on?	If the D LINK LED is turned off or flashing, perform troubleshooting using LED. (☞ Page 94 When the D LINK LED turns off, Page 94 When the D LINK LED is flashing)
Is "I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window correctly set?	Set the I/O assignment correctly. (📖 MELSEC iQ-R Module Configuration Manual)
Is the switch on the remote head module set to RUN?	Set the switch of the remote head module to RUN.
Is the RUN LED of the remote head module turned on?	If the RUN LED is turned off, perform troubleshooting using LED. (☞ Page 93 When the RUN LED turns off)

If the above actions do not solve the problem, check the link device assignment of the master station and the refresh target device setting of refresh parameters for an error. (📖 User's manual for the master/local module used)

When transient transmission cannot be performed

The following table lists the actions to be taken if transient transmission cannot be performed.

Check item	Action
Is the D LINK LED of the remote head module turned on?	If the D LINK LED is off or flashing, perform troubleshooting using LED. (☞ Page 94 When the D LINK LED turns off, Page 94 When the D LINK LED is flashing)

If the above actions do not solve the problem, refer to the troubleshooting of the master/local module. (📖 User's manual for the master/local module used)

When the POWER LED of the power supply module turns off

When the POWER LED of the power supply module turns off, check the following items.

Check item	Action
Is the power supply module mounted on the base unit normally?	Remove the power supply module from the base unit, and mount it back on the base unit. Then, restore power to the system.
Is the RUN LED of the remote head module turned on?	The power supply module has failed. Replace the power supply module.
Is the power supply voltage appropriate?	Supply power voltage within the specified range. (📖 MELSEC iQ-R Module Configuration Manual)
Does the internal current consumption within the entire system exceed the rated output current of the power supply module?	Review the system configuration so that the internal current consumption does not exceed the rated output current. (📖 MELSEC iQ-R Module Configuration Manual)
Does the POWER LED turn on when power is restored to the system after all modules, except the power supply module, have been removed?	One of the modules except the power supply module has failed. Repeatedly supply power to the system, returning the modules to the system one by one. The last module mounted immediately before the POWER LED turns off has failed. Replace the corresponding module.

If the POWER LED of the power supply module does not turn on even after the items above are checked and the actions are taken, the possible cause is a hardware failure of the power supply module. Please consult your local Mitsubishi representative.

When the specific extension base unit cannot be recognized

When the specific extension base unit cannot be recognized, check the following items.

Check item	Action
Is the extension base unit that cannot be recognized the Q series extension base unit?	Refer to the troubleshooting for the case where the specific Q series extension base unit cannot be recognized. (☞ Page 106 When the specific Q series extension base unit cannot be recognized)
Is the POWER LED of the power supply module of the extension base unit that cannot be recognized turned off?	Refer to the troubleshooting for the power supply module. (☞ Page 105 When the POWER LED of the power supply module turns off)
Is the extension cable installed correctly?	Correctly install the extension cable.
Can the specific extension base unit be recognized after the above items were checked?	Execute in the order shown below. • Replace the extension cable. • Replace the corresponding extension base unit. • Replace the base unit at one level before the corresponding extension base unit.

If the specific extension base unit cannot be recognized even after the items above are checked and the actions are taken, the possible cause is a hardware failure. Please consult your local Mitsubishi representative.

When the specific Q series extension base unit cannot be recognized

When the specific Q series extension base unit cannot be recognized, check the following items.

Check item	Action
Is the POWER LED of the power supply module of the Q series extension base unit that cannot be recognized turned off?	Refer to the troubleshooting for the power supply module. (📖 User's Manual (Hardware Design, Maintenance, and Inspection) for the Q series CPU module used)
Is the POWER LED of the power supply module of the extension base unit that cannot be recognized turned off?	Refer to the troubleshooting for the power supply module. (☞ Page 105 When the POWER LED of the power supply module turns off)
Is the connector pin for setting the number of extension base units correctly mounted?	Correctly mount the connector pin for setting the number of extension base units.
Is the extension cable installed correctly?	Correctly install the extension cable.
Can the specific Q series extension base unit be recognized after the above items were checked?	Execute in the order shown below. • Replace the extension cable. • Replace the corresponding Q series extension base unit. • Replace the base unit at one level before the corresponding Q series extension base unit.

If the specific extension base unit cannot be recognized even after the items above are checked and the actions are taken, the possible cause is a hardware failure. Please consult your local Mitsubishi representative.

When a redundant system is configured

The redundant system has not started.

When the redundant system of the remote head module has not started, check the following items.

Check item	Action
Does a moderate error or major error occur in the remote head No.1 and No.2?	Perform troubleshooting using LED. (☞ Page 93 When the ERR LED turns on or is flashing)
Is the switch of the remote head No.1 and No.2 set to RUN?	Set the switch of the remote head No.1 and No.2 to RUN.
Is the D LINK LED of the remote head No.1 and No.2 turned off?	Perform troubleshooting using LED. (☞ Page 94 When the D LINK LED turns off)
Is the D LINK LED of the remote head No.1 and No.2 flashing?	Perform troubleshooting using LED. (☞ Page 94 When the D LINK LED is flashing)

The systems cannot be switched.

When the systems of the remote head modules cannot be switched even if the system switching cause occurs, check the following items.

Check item	Action
Has a moderate error or major error occurred in the remote head module of the standby system?	Perform troubleshooting using LED. (☞ Page 93 When the ERR LED turns on or is flashing)
Is the RUN LED of the remote head module of the standby system off?	Perform troubleshooting using LED. (☞ Page 93 When the RUN LED turns off)
Is "Module Operation Mode" under "Network Application Setting" of "CPU Parameter" set to "Offline" in the remote head module of the standby system?	Set "Module Operation Mode" under "Network Application Setting" of "CPU Parameter" to "Online". (☞ Page 85 Network Application Setting)
Is the remote head module of the standby system in the module communication test status?	Complete the module communication test if the test is in progress.
Is the remote head module of the standby system being replaced?	Complete the replacement of the remote head module of the standby system.
Is the D LINK LED of the remote head module of the standby system off or flashing?	Perform troubleshooting using LED. (☞ Page 94 When the D LINK LED turns off, Page 94 When the D LINK LED is flashing)
In a redundant line configuration, is the system switching disabled for the master/local module of the master station on the remote head module side network of the standby system?	Enable the system switching for the master/local module. (📖MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))
In a redundant line configuration, is the system switching disabled for the CPU module of the master station on the remote head module side network of the standby system?	Enable the system switching for the CPU module. (📖 MELSEC iQ-R CPU Module User's Manual (Application))
Is the D LINK LED of the new control system turned off?	Perform troubleshooting using LED. (☞ Page 94 When the D LINK LED turns off)

Safety communication relay cannot be performed

The following lists the actions to be taken if safety communication relay cannot be performed.

Check item	Action
Is the D LINK LED of the remote head module turned on?	If the D LINK LED is turned off or flashing, perform troubleshooting using LED. (☞ Page 94 When the D LINK LED turns off, Page 94 When the D LINK LED is flashing)
Is the switch on the remote head module set to RUN?	Set the switch on the remote head module to RUN to start data link.
Is it in the remote STOP state?	Cancel the remote STOP state and start data link.

If the above actions do not solve the problem, refer to the troubleshooting of each module. (📖 Manual for the module used)

4.7 Error Codes

The remote head module stores the corresponding error code in the special register (SD) upon detection of an error using the self-diagnostic function. If an error occurs when the data communications are requested from the engineering tool, intelligent function module, or network system connected, the remote head module returns the corresponding error code to the request source. The error details and cause can be identified by checking the error code. The error code can be checked in either of the following ways.

- Module diagnostics in the engineering tool (☞ Page 91 Troubleshooting Procedure)
- Special register ('Latest self-diagnostic error code' (SD0), 'Self-diagnostic error number' (SD10 to SD25) (☞ Page 153 List of Special Register (SD) Areas)

This section describes errors that may occur in the remote head module and actions to be taken for the errors.

Error code system

All error codes are given in hexadecimal format (4 digits) (16-bit unsigned integer). The type of error includes the error, which is detected through the self-diagnostic function of each module, and the common error, which is detected during communication between modules. The following table lists the error detection type and the error code ranges.

Error detection type	Range	Description
Detection by the self-diagnostic function of each module	1000H to 3FFFH	Error specific to each module, such as self-diagnostic errors
Detected during communication between modules	4000H to 4FFFH	Error in the CPU module or remote head module
	7000H to 7FFFH	Error in the serial communication module
	B000H to BFFFH	Error in the CC-Link module
	C000H to CFFFH	Error in the Ethernet-equipped module
	D000H to DFFFH	Error in the CC-Link IE Field Network module

Detailed information

Upon detection of an error by the self-diagnostic function, the detailed information of the error cause is stored together with an error code. The detailed information can be checked using the engineering tool. The following detailed information is added to each error code. (Up to two types of information are stored for each error code. The types differ depending on error code.)
Detailed information 1 and 2 for the latest error code(s) can also be checked with the special register (SD). (☞ Page 153 List of Special Register (SD) Areas)

Detailed information	Item	Description
Detailed information 1	Drive/file information	Information on the corresponding drive name and file name
	Parameter information	Information on the parameter, such as parameter storage location and parameter type
	System configuration information	Information on the system configuration, such as I/O numbers and power supply numbers
	Frequency information	Information on the frequency, such as the number of writes to memory
	Failure information	Information on failures
	System switching information	Information on the system switching
Detailed information 2	Drive/file information	Information on the corresponding drive name and file name
	Parameter information	Information on the parameter, such as parameter storage location and parameter type
	System configuration information	Information on the system configuration, such as I/O numbers and power supply numbers

How to clear errors

Error clear is available only for the error which can be cleared. (☞ Page 35 RAS Function)

List of error codes

Self-diagnostic error code of the remote head module (1000H to 3FFFH)

The following table lists error codes detected by the self-diagnostic function of the remote head module.

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
1000H	Power shutoff	• A momentary power failure has occurred. • The power supply has been shut off.	Check the power supply status.	—	Always
1010H	Power shutoff (either of the redundant power supply modules)	Power has been shut off or the power supply voltage has dropped in either of the redundant power supply modules on the redundant power supply base unit. Or, only one redundant power supply module is mounted.	• Check the power supplied to the power supply modules on the base unit. • Check that two power supply modules are mounted on the base unit. If the same error code is displayed again, the possible cause is a hardware failure of the power supply module. Please consult your local Mitsubishi representative.	System configuration information	Always
1020H	Failure (either of the redundant power supply modules)	A failure has been detected in either of the redundant power supply modules on the redundant power supply base unit.	The possible cause is a hardware failure of the power supply module. Please consult your local Mitsubishi representative.	System configuration information	Always
1030H	Invalid power supply module	An invalid power supply module has been mounted on the redundant power supply base unit.	Mount only applicable power supply modules. If the same error code is displayed again, the possible cause is a hardware failure of the power supply module. Please consult your local Mitsubishi representative.	System configuration information	Always
1031H	Redundant power supply system error	A power supply module other than the redundant power supply module has been mounted on the redundant power supply base unit.	Mount only applicable power supply modules. If the same error code is displayed again, the possible cause is a hardware failure of the power supply module. Please consult your local Mitsubishi representative.	System configuration information	Always
1080H	ROM write count error	The number of writes to the flash ROM (data memory and system memory) has exceeded 100000. (Number of writes > 100000 times)	Replace the remote head module.	Frequency information	At power-on, at RESET, at write
1200H	Module moderate error	A moderate error has been notified from the intelligent function module connected.	Check the detailed information (system configuration information) of the error by executing module diagnostics using the engineering tool, identify the error module, and eliminate the error cause.	System configuration information	Always
1210H	Module moderate error	An inter-module synchronous signal error has been notified from the intelligent function module connected.	Check the detailed information (system configuration information) of the error by executing module diagnostics using the engineering tool, identify the error module, and eliminate the error cause.	System configuration information	Always
1830H	Receive queue full	Number of reception requests of transient transmission exceeded upper limit of simultaneously processable requests.	Lower the transient transmission usage frequency, and then perform again.	—	Always
1831H	Receive processing error	Transient reception failed.	Lower the transient transmission usage frequency, and then perform again.	System configuration information	Always
1832H	Transient data transmission error	Too much transient transmission processing exists and transient transmission cannot be performed.	Correct the number of transient transmissions executions.	—	Always
1850H	Network error	A CC-Link IE Field Network error has occurred.	Check the details of the error by executing the CC-Link IE Field Network diagnostics, and take action according to the action for the relevant error.	—	Always

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
1B61H	Standby system remote head module error	A moderate error or major error has been detected in the remote head module of the standby system. (The error is detected in the control system.)	Eliminate the error cause, and restart the system. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	—	Always
1B70H	Communications with the other system disabled	Data communications cannot be performed with the other system. (The error is detected in the control system or the standby system.)	• When the remote head module of the standby system is in the reset mode, exit the reset mode. • When the remote head module of the standby system is not mounted, mount the module. • Take measures to reduce noise. • If the same error code is displayed again, the possible cause is a hardware failure of the remote head module or base unit. Please consult your local Mitsubishi representative.	—	Always
1BD0H	System switching error	The systems were not switched. There was a cause of system switching failure. (The error is detected in the control system.)	Check the cause of system switching failure in the detailed information (system switching information) of the error by executing module diagnostics using the engineering tool, eliminate the error cause, and switch the systems from the engineering tool again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	System switching information	At execution of system switching
1D10H	Inter-module synchronization transmission skip occurrence	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 inter-module synchronization cycle will not be exceeded. • Reduce the refresh processing time by reducing the data targeted for synchronization refreshing so that the inter-module synchronization cycle will not be exceeded. • Set modules not requiring synchronization to asynchronous so that the inter-module synchronization cycle will not be exceeded.	—	Always
1D30H	Disabled safety communication after system switching	The remote head module of the standby system has been replaced with a module that does not support the safety protocol version used for the safety communication relay function. After system switching, the module in SIL2 mode mounted cannot continue safety communications. (The error is detected in the control system.)	Replace the remote head module of the standby system with a module whose firmware version supports the safety protocol version for the module in SIL2 mode mounted. For the safety protocol version of the module in SIL2 mode, refer to the manual for the module in SIL2 mode mounted. For the firmware version of the remote head module and the supported safety protocol version, refer to ☞ Page 69 Safety Communication Relay Function.	—	At replacement of remote head module of the standby system
2000H	Module configuration error	The module type set in the system parameters ("I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window) differs from that of the module actually mounted.	Re-set the module type in the system parameters in accordance with the remote head module or intelligent function module actually mounted.	System configuration information	At power-on, at RESET
2001H	Module configuration error	The I/O numbers set in the system parameters ("I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window) are overlapping between modules.	Re-set the I/O numbers in the system parameters in accordance with the intelligent function module or I/O module actually mounted.	System configuration information	At power-on, at RESET
2002H	Module configuration error	The number of points assigned to the intelligent function module in the system parameters ("I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window) is smaller than that of the module actually mounted.	Re-set the number of points in the system parameters in accordance with the intelligent function module actually mounted.	System configuration information	At power-on, at RESET

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
2004H	Module configuration error	• CC-Link IE Controller Network module* or/and CC-Link IE Field Network module* are mounted on the main base unit or extension base unit. • Nine or more CC-Link master/local modules are mounted on the main base unit and extension base unit. The CC-Link IE built-in Ethernet interface module is included if the module is used as a CC-Link IE Controller Network module or CC-Link IE Field Network module.	• Remove the CC-Link IE Controller Network module or CC-Link IE Field Network module which is mounted on the main base unit or extension base unit. • Decrease the total number of CC-Link master/local modules mounted on the main base unit and extension base unit to eight or less. * The CC-Link IE built-in Ethernet interface module is included if the module is used as a CC-Link IE Controller Network module or CC-Link IE Field Network module.	System configuration information	At power-on, at RESET
2006H	Module configuration error	A module is mounted on the 65th slot or later.	Remove the module mounted on the 65th slot or later.	System configuration information	At power-on, at RESET
2007H	Module configuration error	A module is mounted on the slot whose number is later than that specified in the system parameters ("I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window).	Remove the module mounted on the slot whose number is later than that specified in the system parameters.	System configuration information	At power-on, at RESET
2008H	Module configuration error	• A module is mounted over or across the maximum number of I/O points (4096).	• Remove the module mounted over or across the maximum number of I/O points (4096). • Replace the module mounted on the last slot to the one that does not exceed the maximum number of I/O points (4096).	System configuration information	At power-on, at RESET
2009H	Module configuration error	There is no response from the I/O module or intelligent function module accessed.	• Check and correct the setting of "I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window. • Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the I/O module or intelligent function module. Please consult your local Mitsubishi representative.	System configuration information	Always
2020H	Module configuration error	There is a mounted module that is not supported, or there is a mounted module that does not support the network type (module model name) set in the system parameters ("I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window).	• Remove the unsupported module. • Check whether the modules support the network type (module model name) set in the system parameters. • If all the modules and the network type (module model name) are supported, the possible cause is a hardware failure of the remote head module, base unit, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	System configuration information	At power-on, at RESET
2022H	Module configuration error	A power supply module other than the redundant power supply module has been mounted on the redundant power supply base unit.	Mount the redundant power supply module. If the same error code is displayed again, the possible cause is a hardware failure of the power supply module, remote head module, or base unit. Please consult your local Mitsubishi representative.	System configuration information	At power-on, at RESET
2040H	Remote head module configuration error	• The number of remote head modules set in the system parameters ("I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window) differs from the number of remote head modules actually mounted. • The remote module is mounted on the slot different from the one specified in the system parameters (I/O assignment setting).	• Correctly set the number of remote head modules (including the empty setting) in the system parameters in accordance with the number of remote head modules actually mounted. • Correctly set the system parameters so that the setting and actual remote head module mounting status will be the same.	System configuration information	At power-on, at RESET

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
2041H	Remote head module configuration error	• The remote head module is not mounted on the slot that is set for the remote head module in the system parameters ("I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window). • The remote head module is mounted on the slot that is set for empty in the system parameters ("I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window). • An I/O module or intelligent function module is mounted between the remote head modules.	• Correctly set the number of remote head modules (including the empty setting) in the system parameters in accordance with the number of remote head modules actually mounted. • Remove the I/O module or intelligent function module mounted between the remote head modules.	System configuration information	At power-on, at RESET
2043H	Remote head module configuration error	The remote head module is mounted on the inapplicable slot.	• Mount the remote head module on the applicable slot (CPU slot or slot No.0). • Remove the remote head module from the inapplicable slot.	System configuration information	At power-on, at RESET
2044H	Remote head module configuration error	The own remote head No. set in the system parameters ("I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window) differs from the one determined by the mounting position of the remote head module.	Re-set the own remote head No. in the system parameters in accordance with the mounting position of the remote head module.	System configuration information	System configuration information
2050H	Remote head module configuration error	An unsupported CPU module or remote head module is mounted.	Remove the unsupported CPU module or remote head module. If all the remote head modules are supported, the possible cause is a hardware failure of the remote head module or base unit. Please consult your local Mitsubishi representative.	System configuration information	System configuration information
2060H	Base unit configuration error	Eight or more extension base units are connected.	Reduce the number of extension base units to seven or less.	System configuration information	At power-on, at RESET
2061H	Base unit configuration error	Any of the following base units is connected: QA1S3□B, QA1S5□B/QA1S6□B, QA6□B, QA6ADP+A5□B/A6□B, or QA1S6ADP+A1S5□B/A1S6□B.	Remove the inapplicable base unit: QA1S3□B, QA1S5□B/QA1S6□B, QA6□B, QA6ADP+A5□B/A6B□B, and QA1S6ADP+A1S5□B/A1S6□B.	System configuration information	At power-on, at RESET
2063H	Base unit configuration error	Extension base unit levels are overlapping.	Check and correct the level setting of the extension base units.	System configuration information	At power-on, at RESET
2070H	Base unit configuration error	• An unsupported base unit is connected. • A GOT is bus-connected to the Q series extension base unit.	• Disconnect the unsupported base unit. If all the base units are supported, the possible cause is a hardware failure of the remote head module or base unit. Please consult your local Mitsubishi representative. • Disconnect the GOT bus-connected to the Q series extension base unit.	System configuration information	At power-on, at RESET
2080H	Inter-module synchronization configuration error	An inter-module synchronization signal error has been detected.	The possible cause is a hardware failure of the remote head module, base unit, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	System configuration information	At power-on, at RESET
20E0H	Invalid module	A module that the remote head module cannot recognize is mounted.	• Mount only applicable modules. • The possible cause is a hardware failure of the I/O module or intelligent function module accessed. Please consult your local Mitsubishi representative.	System configuration information	Always

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
2180H	Invalid file	An invalid file has been detected.	Check the detailed information (drive/file information) of the error by executing module diagnostics using the engineering tool, select the correct file name, and write the specified file to the remote head module. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Drive/file information	Always
21A2H	File specification error	A file other than the remote head module project file has been written.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and overwrite the file corresponding to the displayed number (file name.extension) with the one created in the project of the remote head module.	Drive/file information	At write, at power-on, at RESET, at STOP → RUN state
2220H	Parameter error	The parameter setting is corrupted.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and write the displayed parameter setting to the remote head module. If the same error code is displayed again, the possible cause is a hardware failure of the data memory in the remote head module or the module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	Parameter information	At power-on, at RESET, at STOP → RUN state
2221H	Parameter error	The set value is out of range.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number. If the same error code is displayed again, the possible cause is a hardware failure of the data memory in the remote head module or the module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	Parameter information	At power-on, at RESET, at STOP → RUN state, at instruction execution, at module access
2222H	Parameter error	Use of the function that is not supported by the module is enabled in parameter.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number. If the same error code is displayed again, the possible cause is a hardware failure of the data memory in the remote head module or the module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	Parameter information	At power-on, at RESET, at STOP → RUN state
2223H	Parameter error	The parameter that needs a reset of the remote head module was modified and overwritten.	Reset the remote head module, and run it again.	Parameter information	At write, at power-on, at RESET, at STOP → RUN state
2224H	Parameter error	A memory area cannot be ensured.	• Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, display the error-detected area by clicking the [Error Jump] button, and increase the capacity of the area. (If the capacity of the area cannot be increased, decrease the capacity of other areas.) • Reduce the number of labels used.	Parameter information	At write, at power-on, at RESET, at STOP → RUN state
2225H	Parameter error	A parameter information other than that of the remote head module project has been written.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and overwrite the parameters with the one created in the project of the remote head module.	Parameter information	At write, at power-on, at RESET, at STOP → RUN state

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
2241H	Parameter error (module)	• The I/O numbers set in the system parameters differ from those of the module actually mounted. • The target module is not mounted on the slot where the system parameters and module parameters are set. • The module type set in parameter differs from that of the module actually mounted. • Although "Module Status Setting" under "I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window is set to "Empty", the module is set to "Synchronize" in "Select Inter-module Synchronous Target Module" under "Inter-module Synchronous Setting" in the [Inter-module Synchronous Setting] tab of the "System Parameter" window.	• Check if the system configuration displayed on the system monitor window of the engineering tool match the actual system configuration. • For the module where "Module Status Setting" under "I/O Assignment Setting" in the [I/O Assignment] tab of the "System Parameter" window is set to "Empty", do not set "Synchronize" in "Select Inter-module Synchronous Target Module" under "Inter-module Synchronous Setting" in the [Inter-module Synchronous Setting] tab of the "System Parameter" window. • Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number. If the same error code is displayed again, the possible cause is a hardware failure of the data memory in the remote head module or the module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	Parameter information	At power-on, at RESET, at STOP → RUN state, at instruction execution, at module access
2242H	Parameter error (module)	The intelligent function module has detected a module parameter error.	Check the detailed information (system configuration information) of the error by executing module diagnostics using the engineering tool, and check the module corresponding to the displayed I/O number. If the same error code is displayed again, the possible cause is a hardware failure of the data memory in the remote head module or the intelligent function module connected. Please consult your local Mitsubishi representative.	System configuration information	At power-on, at RESET, at STOP → RUN state
2260H	Parameter error (network)	Network numbers are overlapping.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number. If the same error code is displayed again, the possible cause is a hardware failure of the data memory in the remote head module or the intelligent function module connected. Please consult your local Mitsubishi representative.	Parameter information	At power-on, at RESET
2261H	Parameter error (network)	Different line types (single line and redundant line) are set to the master station and a device station.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number. If the same error code is displayed again, the possible cause is a hardware failure of the data memory in the remote head module or the intelligent function module connected. Please consult your local Mitsubishi representative.	Parameter information	At power-on, at RESET, at STOP → RUN state
2280H	Parameter error (refresh)	The refresh setting is not set correctly.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number so that the data are refreshed within the specified device range. (Take actions such as reducing the refresh device range.)	Parameter information	At power-on, at RESET, at STOP → RUN state, at instruction execution, at module access
2281H	Parameter error (refresh)	A device that cannot be used as a refresh device is specified.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number.	Parameter information	At power-on, at RESET, at STOP → RUN state

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
2282H	Parameter error (refresh)	The number of specified refresh points is invalid.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number.	Parameter information	At power-on, at RESET, at STOP → RUN state
2283H	Parameter error (refresh)	The total number of refresh points exceeded the maximum limit.	Check the detailed information (parameter information) of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number.	Parameter information	At power-on, at RESET, at STOP → RUN state
2290H	Parameter error (interrupt)	The interrupt settings were set.	Clear the values of the interrupt settings.	Parameter information	At power-on
2320H	Remote password setting error	• The start I/O number of the remote password target module is set to other than 0H to 0FF0H. • There is a problem on the slot specified by the start I/O number of the remote password setting. (1) No module is mounted. (2) The mounted intelligent function module does not support the remote password setting.	• Set the start I/O number of the remote password target module within the range of 0H to 0FF0H. • On the specified slot, mount an intelligent function module that supports the remote password setting.	System configuration information	At power-on, at RESET, at STOP → RUN state
2400H	Module verification error	• The module information at power-on differs from the information of modules actually mounted. • The I/O module or intelligent function module is not mounted properly or was removed during operation.	• Check the detailed information (system configuration information) of the error by executing module diagnostics using the engineering tool, and check the module corresponding to the displayed slot number. • Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	System configuration information	Always
2401H	Module verification error	A CPU module, remote head module, I/O module, or intelligent function module was mounted on the base unit during operation.	• Check the detailed information (system configuration information) of the error by executing module diagnostics using the engineering tool, and check the module corresponding to the displayed slot number. • Do not mount a CPU module, remote head module, I/O module, nor intelligent function module during operation. • Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	System configuration information	Always
2420H	Fuse blown error	The output module with a blown fuse has been detected.	• Check the FUSE LED of each output module, and replace the one with the FUSE LED on. • Check the detailed information (system configuration information) of the error by executing module diagnostics using the engineering tool, and replace the module corresponding to the displayed slot number.	System configuration information	Always
2440H	Module major error	An error has been detected in the I/O module or intelligent function module during the initial processing.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	System configuration information	At power-on, at RESET
2442H	Module major error	An error has been detected in the I/O module or intelligent function module.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	System configuration information	At module access

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
2443H	Module major error	An error has been detected in the I/O module or intelligent function module.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	System configuration information	At module access
2450H	Module major error	• A major error has been notified from the intelligent function module connected. • The I/O module or intelligent function module is not mounted properly or was removed during operation.	• Take measures to reduce noise. • Check the connection of an extension cable. • Check the detailed information (system configuration information) of the error by executing module diagnostics using the engineering tool, and check the module corresponding to the displayed slot number. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	System configuration information	Always
24C0H	System bus error	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module, base unit, extension cable, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	System configuration information	At module access
24C1H	System bus error	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module, base unit, extension cable, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	System configuration information	At module access
24C2H	System bus error	• The I/O module or intelligent function module is not mounted properly or was removed during operation. • An error was detected on the system bus.	• Check the detailed information (system configuration information) of the error by executing module diagnostics using the engineering tool, and check the module corresponding to the displayed slot number. • Check the connection of an extension cable. • Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module, base unit, extension cable, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	System configuration information	Always
24C3H	System bus error	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module, base unit, extension cable, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	System configuration information	At module access
24C4H	System bus error	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the base unit, extension cable, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	System configuration information	At module access

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
24C5H	System bus error	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the base unit, extension cable, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	—	At module access
24C6H	System bus error	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module or extension cable. Please consult your local Mitsubishi representative.	—	At module access
24C8H	System bus error	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the extension cable, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	—	At power-on, at RESET
24D0H	System bus error	• The extension level setting of the Q series extension base unit is overlapping with that of any other extension base units. • An error was detected on the system bus.	• Check and correct the level setting of the Q series extension base unit. • Check the connection of an extension cable. • Check that the 10m mark is printed on the base unit connected when using the ten-meter extended cables (RC100B). (📖 MELSEC iQ-R Module Configuration Manual) • Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module, base unit, or extension cable. Please consult your local Mitsubishi representative.	System configuration information	Always
24E0H	System bus error	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module or base unit. Please consult your local Mitsubishi representative.	System configuration information	Always
2500H	Network processing error	A failure has detected in network processing.	• Check whether the network is incorrectly configured in a ring topology, and correct the wiring. • Take measures to reduce noise. • If the same error code is displayed again, please consult your local Mitsubishi representative.	Time information	Always
2501H	Network processing error	A failure has detected in network processing.	• Check whether the network is incorrectly configured in a ring topology, and correct the wiring. • Take measures to reduce noise. • If the same error code is displayed again, please consult your local Mitsubishi representative.	Time information	Always
2600H	Inter-module synchronization processing error	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 to decrease the link scan time.	—	Always

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
2610H	Inter-module synchronization signal error	An inter-module synchronization error has been detected.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module, base unit, extension cable, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	—	Always
2611H	Inter-module synchronization signal error	An inter-module synchronization error has been detected.	• Check that the remote head module is connected to the inter-module synchronous master using the CC-Link IE Field Network diagnostics of the engineering tool. • Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module, base unit, extension cable, or module (I/O module or intelligent function module) connected. Please consult your local Mitsubishi representative.	System configuration information	Always
3001H	Station number duplication detection	A station with the same station number was found 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	Always
3006H	Pairing setting error	Pairing is not set to the stations in a redundant system.	Check the pairing setting in the network configuration setting of the master station.	Parameter information	At power-on, at RESET
3007H	Pairing setting error	Pairing is set to the stations not included in a redundant system.	Check the pairing setting in the network configuration setting of the master station.	Parameter information	At power-on, at RESET
301EH	Safety protocol version error	The remote head module of the standby system does not support the safety protocol version used for the safety communication relay function by the remote head module of the control system.	Replace the remote head module with a module whose firmware version supports the safety protocol version for the module in SIL2 mode mounted. For the safety protocol version of the module in SIL2 mode, refer to the manual for the module in SIL2 mode mounted. For the firmware version of the remote head module and the supported safety protocol version, refer to ☞ Page 69 Safety Communication Relay Function.	—	At power-on, at RESET
301FH	Safety protocol version error	The remote head module does not support the safety protocol version for the module in SIL2 mode mounted on the remote head module.	Replace the remote head module with a module whose firmware version supports the safety protocol version for the module in SIL2 mode mounted. For the redundant line configuration, check the firmware versions of the remote head modules for both the control system and the standby system. Then replace the remote head module with a module whose firmware version supports the safety protocol version for the module in SIL2 mode mounted. For the safety protocol version of the module in SIL2 mode, refer to the manual for the module in SIL2 mode mounted. For the firmware version of the remote head module and the supported safety protocol version, refer to ☞ Page 69 Safety Communication Relay Function.	—	At power-on, at RESET
3040H	Response data creation failure	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.	—	Always

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
3200H	Label information mismatch	Memory/Device Setting set in the CPU parameters differ from those assigned to the global label setting file.	• Write the global label setting file together with the CPU parameter file to the remote head module. • If no global label is used, delete the global label setting file.	Drive/file information	At power-on, at RESET, at STOP → RUN state
3205H	Label information mismatch	• After the global label setting file was modified, only the modified file was written to the remote head module. Or, after the global label setting file was modified, only the CPU parameters were written to the remote head module. (The global label setting file was not written to the remote head module.) • After the CPU parameters were modified, only the CPU parameters were written to the remote head module. • After the external device access setting of the global label setting was modified, only the global label assignment information was written to the remote head module. Or, after the external device access setting of the global label setting was modified, only the CPU parameters were written to the remote head module. (The external device access setting of the global label setting file was not written to the remote head module.)	• Write CPU parameters, global label setting, and global label assignment information files to the remote head module. • If no global label is used, delete the global label setting file. • If the external device access setting is not used, initialize the memory where the global label assignment information file is stored, and write the CPU parameters and global label setting file to the remote head module.	Drive/file information	At power-on, at RESET, at STOP → RUN state
3206H	Label information mismatch	After the global label setting file was modified, only the modified file was written to the remote head module. Or, without writing the modified global label setting file, only the initial global label value file was written to the remote head module.	• Write both the global label setting file and initial global label value file to the remote head module. • If no initial global label value is used, delete the initial global label value file.	Drive/file information	At power-on, at RESET, at STOP → RUN state
3500H	Safety protocol version coexistence error	Modules in SIL2 mode supported by different safety protocol versions are mounted.	Mount only the modules in SIL2 mode supported by the same safety protocol version to a remote head module.	—	At power-on, at RESET, at STOP → RUN state
3501H	Module configuration error (SIL2)	17 or more modules set to SIL2 mode Main supported by safety protocol version 2 are mounted.	Remove the modules so that the number of mounted modules set to SIL2 mode Main is 16 or less.	—	At power-on, at RESET, at STOP → RUN state
3600H	Inter-module synchronization cycle mismatch	The value of the inter-module synchronization cycle setting differs from the one set in the master station.	Correct the parameter so that all modules performing inter-module synchronization have the same frequency setting.	Parameter information	Always
3601H	Inter-module synchronization cycle mismatch	In the network synchronous communication setting of the network configuration setting of the master station, the own station is not set as a target of inter-module synchronization.	Check the network configuration setting of the master module and check if inter-module synchronization is set.	Parameter information	Always
3602H	Inter-module synchronization signal failure via network	Inter-module synchronization cycle failure occurred between networks.	• Check the network status and take corrective action using the CC-Link IE Field Network diagnostics. • Check if the switching hub and the cables are connected properly. • If the error occurs again even after taking the above, please consult your local Mitsubishi representative.	—	Always

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
3714H	System consistency check error (file)	A file mismatch was detected in the system consistency check. (The error is detected in the standby system.)	• Check the detailed information (drive/file information) of the error by executing module diagnostics using the engineering tool, format the corresponding drive of the remote head module in the standby system, write all files to the remote head module, and then restart the remote head module of the standby system. • Execute the memory copy function to match files in the control system and the standby system. Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Drive/file information	At write, at power-on, at RESET, at STOP → RUN state, at execution of system switching
3C00H to 3C02H	Hardware failure	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	Always
3C0FH	Hardware failure	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	Always
3C10H	Hardware failure	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	At power-on, at RESET
3C11H	Hardware failure	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	Always
3C12H	Hardware failure	• The waveform of the voltage out of the specified range has been detected in the power supply module. • A hardware failure has been detected in the power supply module, remote head module, base unit, or extension cable. (In a redundant power supply system, a hardware failure has been detected in both of two power supply modules.)	• Check the waveform of the voltage applied to the power supply module. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the power supply module, remote head module, base unit, or extension cable. Please consult your local Mitsubishi representative.	Failure information	Always
3C13H	Hardware failure	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	At power-on, at RESET
3C21H	Memory error	An error has been detected in the memory.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	Always
3C22H	Memory error	An error has been detected in the memory.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	Always

Error code (Hex)	Error name	Error details and cause	Action	Detailed information	Diagnostic timing
3C2FH	Memory error	An error has been detected in the memory.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	Always
3C31H	Memory error	An error has been detected in the memory.	• Take measures to reduce noise. • Format the memory. Write all files to the remote head module. Then, reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	Always
3C32H	Memory error	An error has been detected in the memory.	• Take measures to reduce noise. • Reset the remote head module, and run it again. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.	Failure information	Always

Error codes detected by other causes than self-diagnostic function (4000H to 4FFFH)

If an error occurs when the data communications are requested from the engineering tool, intelligent function module, or network system connected, the remote head module returns the corresponding error code (4000H to 4FFFH) to the request source.

These error codes are not stored in 'Latest self-diagnostic error code' (SD0) because the errors are not the ones detected by the self-diagnostic function of the remote head module.

When the request source is an engineering tool, a message and an error code are displayed on the engineering tool.

When the request source is an intelligent function module or network system, the remote head module returns an error code to the request source.

Error code (Hex)	Error name	Error details and cause	Action
4000H	Common error	Serial communication sum check error	• Connect the serial communication cable correctly. • Take measures to reduce noise.
4001H	Common error	An unsupported request was executed. (The request was executed to the remote head module that does not support the request.)	• Check the command data of the SLMP/MC protocol. • Check the CPU module model name selected in the engineering tool. • Check the target CPU module model name.
4002H	Common error	An unsupported request was executed.	• Check the command data of the SLMP/MC protocol. • Check the CPU module model name selected in the engineering tool. • Execute the request again. • If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.
4003H	Common error	Command for which a global request cannot be performed was executed.	Check the command data of the SLMP/MC protocol.
4004H	Common error	All the operations to the remote head module are disabled because of the following reason: • The remote head module is starting up.	Perform operations to the remote head module again after the start-up processing ends.
4005H	Common error	The volume of data handled according to the specified request is too large.	Check the command data of the SLMP/MC protocol.
4006H	Common error	Initial communication has failed.	• When using serial communication, inquire of the external device manufacturer for support conditions. • When using serial communication, check the CPU module model name selected in the engineering tool. • When using Ethernet communication, shift the communication start timing.
4008H	Common error	The remote head module is BUSY. (The buffer is not vacant.)	Execute the request again after the specified period of time has elapsed.
4010H	Remote head module operation error	The request cannot be executed because the remote head module is running.	Set the operating status of the remote head module to STOP, and execute the request again.
4013H	Remote head module operation error	The request cannot be executed because the remote head module is not in a STOP state.	Set the operating status of the remote head module to STOP, and execute the request again.
4021H	File related error	The specified drive (memory) does not exist or there is an error.	• Check the specified drive (memory) status. • Back up data in the remote head module, and then initialize the memory.
4022H	File related error	The file with the specified file name or file No. does not exist.	Check the specified file name and file No.
4023H	File related error	The file name and file No. of the specified file do not match.	Delete the file and then recreate the file.
4024H	File related error	The specified file cannot be handled by a user.	Do not access the specified file.
4025H	File related error	The specified file is processing the request from another engineering tool.	Forcibly execute the request. Or, execute the request again after the processing being performed ends.
4026H	File related error	The file password set in advance to the target drive (memory) must be specified.	Specify the file password set in advance, and then access to the drive (memory).

Error code (Hex)	Error name	Error details and cause	Action
4027H	File related error	The specified range is larger than the file size.	Check the specified range and access within that range.
4028H	File related error	The same file already exists.	Forcibly execute the request. Or, change the file name and execute the request again.
4029H	File related error	The specified file capacity cannot be obtained.	Review the specified file capacity, and execute the request again.
402AH	File related error	The specified file is abnormal.	Back up data in the remote head module, and then initialize the memory.
402BH	File related error	The request cannot be executed in the specified drive (memory).	Set the operating status of the remote head module to STOP, and execute the request again.
402CH	File related error	The request cannot be executed currently.	Execute the request again after a while.
4030H	Device specification error	The specified device is not supported.	Check the specified device.
4031H	Device specification error	• The specified device number is out of range. The remote head module does not support the specified device.	• Check the specified device number. • Check the specified device.
4032H	Device specification error	The device modification was incorrectly specified. Or, the unusable device (TS, TC, SS, SC, CS, or CC) was specified in any of the following SLMP/MC protocol commands; Read random, Write random (in units of words), Entry monitor device, or Execute monitor.	• Check the device modification method. • Check the specified device.
4033H	Device specification error	Writing cannot be done because the specified device is for system use.	Do not write the data in the specified device, and do not turn on or off.
4034H	Device specification error	The dedicated instruction cannot be executed since the completion device for the dedicated instruction does not turn on.	Since the completion device for the SREAD or SWRITE instruction does not turn on in the remote head module on the target station, execute the instruction again after setting the operating status of the remote head module on the target station to the RUN status.
4040H	Intelligent function module specification error	The request cannot be executed to the specified intelligent function module.	Check whether the specified module is the intelligent function module having the buffer memory.
4041H	Intelligent function module specification error	The access range exceeds the buffer memory range of the specified intelligent function module.	Check the start address and access number of points and access using a range that exists in the intelligent function module.
4042H	Intelligent function module specification error	The specified intelligent function module cannot be accessed.	• Check that the specified intelligent function module is operating normally. • Check the specified module for a hardware fault.
4043H	Intelligent function module specification error	The intelligent function module does not exist in the specified position.	Check the I/O number of the specified intelligent function module.
4044H	Intelligent function module specification error	A control bus error occurred during access to the intelligent function module.	Check the specified intelligent function module and other modules and base units for a hardware fault.
4049H	Intelligent function module specification error	A request cannot be processed because the module extension parameter of the positioning module is being used for the positioning control.	Turn off module ready (Yn+0) of the positioning module or execute the processing again after removing the extension parameter of the positioning module from the target data.
4051H	Protect error	The specified drive (memory) cannot be accessed.	Check that the drive (memory) can be used.
4052H	Protect error	The specified file attribute is read only, so the data cannot be written.	Do not write data in the specified file. Or, change the file attribute.
4053H	Protect error	An error occurred when writing data to the specified drive (memory).	Check the specified drive (memory) and write data again.
4054H	Protect error	An error occurred when deleting the data in the specified drive (memory).	Check the specified drive (memory) and delete data again.
4063H	Online registration error	The registered number of locked files exceeded the maximum value.	Execute the request again after the file access from another engineering tool ends.
4066H	Online registration error	The specified file password is incorrect.	Check and specify the correct file password.
4067H	Online registration error	Monitor communication has failed.	Execute again after checking the communication route such as the communication cable.
4068H	Online registration error	Operation is disabled because it is being performed with another engineering tool.	Execute the request again after the processing of the function executed from another engineering tool ends.

Error code (Hex)	Error name	Error details and cause	Action
406AH	Online registration error	The drive (memory) number other than 4 was specified.	Check the drive and specify the drive number correctly.
406BH	Online registration error	Online operation was interrupted due to a remote head module error.	Check the status of the remote head module by executing the module diagnostics. Identify the error, and take a corrective action referring to the troubleshooting section.
4080H	Any other error	Request data error	Check the request data that has been specified.
4082H	Any other error	The specified command cannot be executed because it is being executed.	Execute the command again after the processing of the command from another engineering tool ends.
408BH	Any other error	The remote request cannot be executed.	• Change the status of the remote head module so that the remote request can be executed, and execute the request again. • For remote operation, set the parameter to "Enable remote reset".
40C0H	Label communication error	The specified label name does not exist.	Check the label setting. If the "Access from External Device" checkbox is not selected, check the checkbox.
40C1H	Label communication error	Label access with a label name has failed because the specified array element number is out of range.	Specify the array element number within the set range.
40C2H	Label communication error	Label access with a label name has failed because the bit array type label is not specified by bit specification.	Specify the label by bit specification, and access again.
40C3H	Label communication error	Label access with a label name has failed because the word array type label is not specified by word specification.	Specify the label by word specification, and access again.
40C4H	Label communication error	Label access with a label name has failed because the number of labels used in the program exceeded its limit.	Reduce the number of labels in the program, and access the labels multiple times.
40C8H	Label communication error	Registration of a label definition has failed because the number of registered labels reached its limit.	Reduce the number of registered labels with the "Access from External Device" checkbox selected.
40C9H	Label communication error	A label definition could not be registered because the registration target memory capacity has been exceeded its limit.	• Reduce the number of registered labels with the "Access from External Device" checkbox selected. • Change the settings of the functions that use the registration target memory.
40CAH	Label communication error	A label definition could not be changed, added, or deleted because the label communication data does not exist in the remote head module.	Write the label communication data to the programmable controller.
40CBH	Label communication error	Data are not written to the CPU module because the data type of the specified label does not match the size of the write data.	Change the size of data written from the external device (SLMP/MC protocol device) so that it matches the data type of the label in the specified remote head module.
40CCH	Label communication error	Online program change has failed because the global setting file before modification and the global label assignment information do not match.	Write the global setting file and the global label assignment information to the programmable controller together after modification.
40CEH	Label communication error	An attempt was made to access a label that cannot be accessed with a label name.	• Change the data type of the specified label to the one other than "Function Block" or "Pointer". • Change the class of the specified label to the one other than "VAR_GLOBAL_CONSTANT". • Specify a device that is not being modified. (Bit-specified word devices and digit-specified bit devices can be specified.)
4100H	Any other error	Hardware failure of the remote head module.	Replace the remote head module.
4108H	Any other error	The device monitor/test cannot be performed normally.	Execute the function again. Check that the access prohibited area is not accessed, and execute the function again.
410CH	Any other error	Writing to the specified data is not supported.	• Check that the version of the engineering tool used is correct. • Check the settings and make a correction.
4110H	Remote head module error	The request cannot be executed because a moderate or major error has occurred in the remote head module.	Reset the remote head module, and execute the request again.
4121H	File related error	The specified drive (memory) or file does not exist.	Execute again after checking the specified drive (memory) or file.

Error code (Hex)	Error name	Error details and cause	Action
4122H	File related error	The specified drive (memory) or file does not exist.	Execute again after checking the specified drive (memory) or file.
4123H	File related error	The specified drive (memory) is abnormal.	Initialize the memory, and restore the drive (memory) to its normal state.
4124H	File related error	The specified drive (memory) is abnormal.	Initialize the memory, and restore the drive (memory) to its normal state.
4125H	File related error	The specified drive (memory) or file is performing processing.	Execute again after a while.
4126H	File related error	The specified drive (memory) or file is performing processing.	Execute again after a while.
4127H	File related error	File password mismatch	Execute again after checking the file password.
4128H	File related error	File password mismatch with copy destination	Execute again after checking the file password.
4129H	File related error	The request cannot be executed since the specified drive (memory) is ROM.	Execute again after changing the target drive (memory).
412AH	File related error	The request cannot be executed since the specified drive (memory) is ROM.	Execute again after changing the target drive (memory).
412BH	File related error	The specified drive (memory) is write-inhibited.	Execute again after changing the write inhibit condition or drive (memory).
412CH	File related error	The specified drive (memory) is write-inhibited.	Execute again after changing the write inhibit condition or drive (memory).
412DH	File related error	The specified drive (memory) does not have enough free space.	Execute again after increasing the free space of the drive (memory).
412EH	File related error	The specified drive (memory) does not have enough free space.	Execute again after increasing the free space of the drive (memory).
412FH	File related error	The drive (memory) capacity differs between the drive (memory) copy destination and copy source.	Execute again after checking the drive (memory) copy destination and copy source.
4130H	File related error	The drive (memory) type differs between the drive (memory) copy destination and copy source.	Execute again after checking the drive (memory) copy destination and copy source.
4131H	File related error	The file name of the file copy destination is the same as that of the copy source.	Execute again after checking the file names.
4132H	File related error	The specified number of files does not exist.	Execute again after checking the specified data.
4133H	File related error	The specified drive (memory) has no free space.	Execute again after increasing the free space of the drive (memory).
4134H	File related error	The attribute specification data of the file is wrong.	Execute again after checking the specified data.
4135H	File related error	The date/time data of the engineering tool (personal computer) is out of range.	Execute again after checking the clock setting of the engineering tool (personal computer).
4136H	File related error	The specified file already exists.	Execute again after checking the specified file name.
4137H	File related error	The specified file is read-only.	Execute again after changing the condition of the specified file.
4138H	File related error	Simultaneously accessible files exceeded the maximum.	Execute again after decreasing file operations.
4139H	File related error	The size of the specified file has exceeded that of the existing file.	Execute again after checking the size of the specified file.
413AH	File related error	The specified file has exceeded the already existing file size.	Execute again after checking the size of the specified file.
413BH	File related error	The same file was simultaneously accessed from different engineering tools.	Execute again after a while.
413CH	File related error	The specified file is write-inhibited.	Execute again after changing the file condition.
413DH	File related error	The specified file capacity cannot be secured.	Execute again after increasing the capacity of the specified drive (memory).
413EH	File related error	Operation is disabled for the specified drive (memory).	Execute again after changing the target drive (memory).
413FH	File related error	The file is inhibited to be written to the file storage area.	Execute again after changing the specified drive (memory).
414CH	Intelligent function module specification error	The specified buffer memory address cannot be accessed.	Execute again after checking the buffer address.
4150H	File related error	An attempt was made to initialize the drive (memory) protected by the system.	Do not initialize the target drive (memory) as it cannot be initialized.

Error code (Hex)	Error name	Error details and cause	Action
4151H	File related error	An attempt was made to delete the file/folder protected by the system.	Do not delete the target file as it cannot be deleted.
41C1H	File related error	The format information data of the specified drive (memory) is abnormal.	• The file information data may be corrupted. • Back up data in the remote head module, and then initialize the memory.
41C2H	File related error	File open specification data for file access is wrong.	Execute again after checking the specification data.
41C3H	File related error	Simultaneously accessible files exceeded the maximum.	Execute again after decreasing file operations.
41C4H	File related error	Simultaneously accessible files exceeded the maximum.	Execute again after decreasing file operations.
41C5H	File related error	The specified file does not exist.	Execute again after checking the file.
41C7H	File related error	The specified file or drive (memory) does not exist.	Execute again after checking the file or drive (memory).
41C8H	File related error	The size of the specified file has exceeded that of the existing file.	• Execute again after checking the size of the specified file. • If the error recurs after re-execution, the file information data may be corrupted. • Back up data in the remote head module, and then initialize the memory.
41C9H	File related error	• Access to the file sector has failed. • The format information data of the target drive (memory) is abnormal.	Back up data in the remote head module, and then initialize the memory.
41CAH	File related error	• Access to the file sector has failed. • The format information data of the target drive (memory) is abnormal.	Back up data in the remote head module, and then initialize the memory.
41CBH	File related error	The file name is specified in a wrong method.	Execute again after checking the file name.
41CCH	File related error	The specified file does not exist. Or, the specified subdirectory does not exist.	Execute again after checking the name of the file and subdirectory.
41CDH	File related error	An access to the file is prohibited in the system.	• Do not access the specified file or subdirectory. • Execute again after checking the file and subdirectory.
41CEH	File related error	The file cannot be written because the specified file is read-only.	Execute again after checking the attribute of the specified file.
41CFH	File related error	The specified drive (memory) has been used exceeding the capacity.	Execute again after checking the drive (memory) capacity.
41D0H	File related error	The specified drive (memory) has no free space. Or, the number of files in the directory of the specified drive (memory) has exceeded the maximum.	• Execute again after increasing the free space of the drive (memory). • Delete files in the drive (memory), and execute the function again.
41D1H	File related error	The file name is specified in a wrong method.	• Execute again after checking the file name. • If the error recurs after re-execution, the file information data may be corrupted. • Back up data in the remote head module, and then initialize the memory.
41D5H	File related error	The file of the same name exists.	Forcibly execute the request, or execute after changing the file name.
41D6H	File related error	The format information data of the specified drive (memory) is abnormal.	• The file information data may be corrupted. • Back up data in the remote head module, and then initialize the memory.
41D7H	File related error	The format information data of the specified drive (memory) is abnormal.	• The file information data may be corrupted. • Back up data in the remote head module, and then initialize the memory.
41D8H	File related error	The specified file is being accessed.	Execute again after a while.
41DFH	File related error	The specified drive (memory) is write-protected.	Execute again after canceling the write protect of the specified drive (memory).
41E0H	File related error	The specified drive (memory) is abnormal or does not exist.	Back up data, and then initialize the memory.
41E1H	File related error	Access to the SD memory card has failed.	Back up data, and then write the data to the data memory.
41E7H	File related error	The format information data of the specified drive (memory) is abnormal.	• The file information data may be corrupted. • Back up data in the remote head module, and then initialize the memory.

Error code (Hex)	Error name	Error details and cause	Action
41E8H	File related error	The format information data of the specified drive (memory) is abnormal.	• The file information data may be corrupted. • Back up data in the remote head module, and then initialize the memory.
41E9H	File related error	The specified file is being accessed.	Execute again after a while.
41EBH	File related error	The file name is specified in a wrong method.	Execute again after checking the file name.
41ECH	File related error	The file system of the specified drive (memory) is logically corrupted.	• The file information data may be corrupted. • Back up data in the remote head module, and then initialize the memory.
41EDH	File related error	The specified drive (memory) does not have continuous free space. (The free space for file is sufficient but the continuous free space is insufficient.)	Execute again after deleting unnecessary files.
41F3H	File related error	The file size is larger than the following: • the value to be acquired when 2 bytes are subtracted from 4G bytes.	Specify a smaller value for the file size when creating a file or changing the file size. Alternatively, divide the file so that each file size is smaller.
41F4H	File related error	The request cannot be executed because the operation is prohibited by the system.	Do not request the file operation because it is prohibited by the system.
41FBH	File related error	The specified file is already being manipulated from the engineering tool.	Execute again after the currently performed operation is completed.
41FCH	File related error	An attempt was made to initialize the drive (memory) being used.	Stop all accesses to the specified drive (memory), and execute the request again.
41FDH	File related error	There are no data written to the data memory.	Write all the required files to the programmable controller.
4202H	Online module change function error	The request cannot be executed because the specified module is being changed online.	• Execute the request again after the online module change processing ends. • If the online module change operation cannot be completed, power off the system, and change the module.
4240H	Redundant system related error	The following operations is requested to the remote head module in the standby system, but cannot be performed because they are not supported. • System switching	Perform these operations to the remote head module in the control system.
4241H	Redundant system related error	Data communications cannot be performed with the other system because of any of the following reasons: • The remote head module of the other system is in a reset state. • Hardware failure of the remote head module of the other system	Check that there is no error or failure in the remote head module of the other system, and perform a retry. If the same error code is displayed again, the possible cause is a hardware failure of the remote head module. Please consult your local Mitsubishi representative.
4243H	Redundant system related error	The request cannot be executed because a moderate or major error has occurred in the remote head module of the standby system.	Check the moderate or major error, eliminate the error cause, and then execute the request again.
4244H	Redundant system related error	The request cannot be executed because the operating status of the remote head module in the control system differs from that of the remote head module in the standby system.	Match the operating status of the remote head module between the systems, and execute the request again.
4246H	Redundant system related error	The request cannot be executed because the systems are being switched.	Execute the request again after the system switching processing ends.
4247H	Redundant system related error	The request cannot be executed because the memory copy function is being executed.	Execute the request again after the memory copy processing ends. The completion status can be checked in the following special relay areas. • SM1654 (Memory copy being executed): Off • SM1655 (Memory copy completion): On
4248H	Redundant system related error	Data communications cannot be performed with the system specified as a connection destination (request destination module I/O number) because of either of the following reasons: • The request was issued during the system switching processing. • The system specified as a connection destination (request destination module I/O number) does not exist.	Check the following, and execute the request again. • The system switching processing has completed. • The redundant system has started up successfully.

Error code (Hex)	Error name	Error details and cause	Action
4249H	Redundant system related error	The request cannot be executed because the system setting (control system or standby system) has not been determined (the system has not been started up as the redundant system).	Determine the control system or standby system (start up the system as the redundant system normally), and execute the request again. Or, do not specify any connection destination system (request destination module I/O number), and execute the request again.
424AH	Redundant system related error	The request cannot be executed because the PLC No.1, PLC No.2, control system, or standby system is set as a connection destination (request destination module I/O number).	Do not specify any connection destination system (request destination module I/O number), and execute the request again.
424BH	Redundant system related error	The request cannot be executed because system switching is disabled because of the following reasons: • SM1646 (System switching by a user) is off.	Perform either of the following operations to enable system switching, and execute the request again. • Turn on SM1646 (System switching by a user).
424FH	Redundant system related error	The request cannot be executed because system switching due to a different cause was executed during execution of system switching by the engineering tool.	Check that the systems are switched successfully. If not, monitor SD1644 (Cause of system switching failure), eliminate the error cause, and then execute the function again.
425AH	Redundant system related error	The request cannot be executed because the system has not operated as the redundant system	Start up the system as the redundant system normally, execute the function again.
4269H	Any other error	The remote RUN (function) cannot be executed.	Execute the function again after a while.
433CH	Maintenance and inspection error	The error was not cleared. (Error clear was performed during execution of error clear.)	Execute again after a while. If the same error code is displayed again, the possible cause is a hardware failure of the target module. Please consult your local Mitsubishi representative.
4400H	Security function error	A file protected by a password has been opened without unlocking the password.	Enter a correct password and perform password authentication.
4401H	Security function error	• Read password authentication has failed when required. • The file password format is incorrect.	• Set a correct read password and perform password authentication. • Access the file with the correct method.
4402H	Security function error	• Write password authentication has failed when required. • The file password format is incorrect.	• Set a correct write password and perform password authentication. • Access the file with the correct method.
4403H	Security function error	Both passwords for reading and for writing that are set upon Create, Change, Delete, or Disable do not match the previous ones.	Set correct passwords for both reading and writing, and perform password authentication.
4404H	Security function error	A file error was detected before or after performing Create, Change, or Delete.	• Initialize the drive including the target file by initializing the memory. • Write the target file to the programmable controller again, and then register or cancel the file password.
4408H	Security function error	Password authentication failed when access was required.	Set a correct password and perform password authentication again.
4409H	Security function error	Password authentication failed when access was required.	Set a correct password and perform password authentication again 1 minutes later.
440AH	Security function error	Password authentication failed when access was required.	Set a correct password and perform password authentication again 5 minutes later.
440BH	Security function error	Password authentication failed when access was required.	Set a correct password and perform password authentication again 15 minutes later.
440CH	Security function error	Password authentication failed when access was required.	Set a correct password and perform password authentication again 60 minutes later.
440DH	Security function error	Password authentication failed when access was required.	Set a correct password and perform password authentication again 60 minutes later.
440EH	Security function error	The security function was activated and password authentication cannot be performed.	Set a correct password and perform password authentication again after a certain period of time.
4500H	Remote head module error	The request cannot be executed because the system is in the redundant line configuration.	The request cannot be executed because it is not supported by the redundant line configuration.
4501H	Remote head module error	The system cannot be switched because the network error is occurring in the remote head module of the standby system.	Execute again after eliminating the network error in the remote head module of the standby system.

Error code (Hex)	Error name	Error details and cause	Action
4905H	Any other error	The capacity of label area used exceeded its limit.	Delete the unused global label definitions, compile the program, and then write the program to the programmable controller.
4A00H	Network error	• Access to the specified station cannot be made since the routing parameters are not set to the start source CPU module and/or relay CPU module. • For routing via a multiple CPU system, the control CPU of the network module for data routing has not started. • The third octet of the IP address (network number) specified for the IP communication test is the same as that of the remote head module where the test is executed. • The CPU module that performs IP packet transfer is not the control CPU of the CC-Link IE module, which is on the path that IP packets travel.	• Set to the related stations the routing parameters for access to the specified station. • Retry after a while. Or, start communication after checking that the system for data routing has started. • Do not use the same third octet of the IP address (network number) specified for the IP communication test with that of the remote head module where the test is executed. • Set the CPU module that performs IP packet transfer as the control CPU of the CC-Link IE module, which is on the path that IP packets travel.
4A01H	Network error	• The network of the number set to the routing parameters does not exist. • The specified CPU module cannot be communicated through the network that is not supported by the CPU module.	• Check and correct the routing parameters set to the related stations. • Set communication through the network that is supported by the specified CPU module.
4A02H	Network error	Access to the specified station cannot be made.	• Check the network module for error, or check that the modules are not in offline. • Check if the network numbers/PC numbers are correctly set.
4A03H	Network error	A request for network test was issued.	Check the request of the SLMP/MC protocol.
4A20H	IP communication test error	• The first octet and second octet of the IP addresses do not match between the CPU module and the request destination device on the same path that IP packets travel. • The first octet and second octet of the IP addresses do not match between the CPU module and the CC-Link IE module on the same path that IP packets travel. • The first octet and second octet of the IP addresses do not match between the CC-Link IE modules on the same path that IP packets travel. • The first octet and second octet of the IP addresses do not match between the request source device and the CPU module connected to the request destination device by Ethernet.	• Check and correct the IP address settings of the CPU module. • Check and correct the IP address of the request destination device. • Check and correct the IP address of the CC-Link IE module. • Check and correct the IP address of the request source device.
4A22H	IP communication test error	The IP address is not set to the CC-Link IE module on the path that IP packets travel.	• Set the IP address to the CC-Link IE module used as a master station or control station. • Check the communication status with the master station or control station when the CC-Link IE module is used as a local station or normal station. • Replace the CC-Link IE module (master station or control station) with the one that supports the IP packet transfer function. • Conduct the IP communication test again after the CC-Link IE module is started up. • Check and correct the IP address of the request destination device.
4A23H	IP communication test error	• The CPU module on the path that IP packets travel does not support the IP packet transfer function. • Routing parameters are set so that IP packets are routed to CPU modules that are incompatible with IP packet transfer.	• Replace the CPU module with the one supporting the IP packet transfer function. • Correct routing parameter so that IP packets are routed to the CPU module that supports the IP packet transfer function. • Check and correct the IP address of the request destination device.

Error code (Hex)	Error name	Error details and cause	Action
4A24H	IP communication test error	• The network module on the path that IP packets travel does not support the IP packet transfer function. • Routing parameters are set so that IP packets are routed to the network module that does not support the IP packet transfer function. • The third octet (Network No.) of the IP address of the device on the path that IP packets travel is overlapping with the network No. of the module connected to the CPU module and does not support the IP packet transfer function. • The third octet (Network No.) of the IP address of the request destination device is overlapping with the network No. of the module connected to the CPU module and does not support the IP packet transfer function.	• Replace the CC-Link IE module with the one supporting the IP packet transfer function. • Correct routing parameter so that IP packets are routed to the CC-Link IE module that supports the IP packet transfer function. • Check and correct the setting so that the third octet (Network No.) of the IP address of the device on the path that IP packets travel does not overlap with the network No. of the module connected to the CPU module and does not support the IP packet transfer function. • Check and correct the setting so that the third octet (Network No.) of the IP address of the request destination device does not overlap with the network No. of the module connected to the CPU module and does not support the IP packet transfer function. • Check and correct the IP address of the request destination device.
4A25H	IP communication test error	• The IP packet transfer setting is not set in the CPU module or the Ethernet module connected with the request source device. • Routing parameters are set so that IP packets are routed to the CPU module where IP packet transfer setting is not set. • The Ethernet module is not mounted with the remote head module. • In the Ethernet module, "Disable" is selected for "Communications by Network No./Station No." under "Own Node Settings" of "Module Parameter". • In the Ethernet module, the third octet (network No.) of the IP address and the network number are not the same in "Own Node Settings" of "Module Parameter". Or, the fourth octet of the IP address and the station number are not the same.	• In the CPU module, select "Use" for the IP packet transfer function setting in the CPU parameters. • In the Ethernet module, select "Use" for the IP packet transfer function setting in the module parameters. • Correct routing parameters so that IP packets are routed to the CPU module where IP packet transfer setting is set. • Check and correct the IP address of the request destination device. • Mount the Ethernet module with the remote head module. • Select "Enable" for "Communications by Network No./Station No." under "Own Node Settings" of "Module Parameter" in the Ethernet module. • Check and correct the network number and station number of the Ethernet module.
4A27H	IP communication test error	The CPU module that performs IP packet transfer is not the control CPU of the CC-Link IE module, which is on the path that IP packets travel.	Set the CPU module that performs IP packet transfer as the control CPU of the CC-Link IE module, which is on the path that IP packets travel.
4A28H	IP communication test error	In the remote head module, the request path and the response path of IP packets differ.	Correct the routing parameter setting so that IP packets travel the same path for both request and response transmission.
4A29H	IP communication test error	The third octet (network No.) of the IP address of the request destination device is overlapping with the request source device and third octet (network No.) of the IP address of the Ethernet module.	• Check and correct the IP address settings of the Ethernet module. • Check and correct the IP address of the request destination device.
4A2AH	IP communication test error	An IP address of a device on CC-Link IE Controller Network or CC-Link IE Field Network or that of the CPU module is not specified.	Specify an IP address of a device on CC-Link IE Controller Network or CC-Link IE Field Network or that of the CPU module.
4B00H	Target module error	• An error occurred in the access destination or the relay station. • The specified connection destination (request destination module I/O number) is incorrect. • The CPU module or remote head module of the access destination has not started up.	• Check the error occurred in the specified access destination or the relay station, and take an action. • Check the connection destination (request destination module I/O number or request destination station number (PC number)) in the request data of SLMP/MC protocol. • Check the stop error in the CPU module or the moderate or major error in the remote head module, and take an action.
4B02H	Target module error	The request is not addressed to the remote head module.	Perform operation for the module that can execute the specified function.
4B03H	Target module error	• The specified route is not supported by the specified CPU module or remote head module version. • The communication target CPU module or remote head module is not mounted.	• Check whether the specified route is supported or not. • Check the mounting status of the CPU module or remote head module. • Check the stop error in the CPU module or the moderate or major error in the remote head module, and take an action.

Error code (Hex)	Error name	Error details and cause	Action
4B04H	Target module error	The specified connection destination (request destination module I/O number) is not supported.	An invalid value is set as the start I/O number of the connection target module. Set the start I/O number of the target module correctly, and retry data communications.

Error codes of CC-Link IE Field Network (D000H to DFFFH)

For the error messages, error details and causes, and action of the error codes (D000H to DFFFH), refer to the following.

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

4.8 List of Parameter Numbers

This section lists parameter numbers.

System Parameter

The following is the list of parameter numbers of system parameters.

Item			Parameter No.
I/O Assignment	Base/Power/Extension Cable Setting	Slots	0201H
		Base, Power Supply Module, Extension Cable	0203H
	I/O Assignment Setting	Points, Start XY, Module Status Setting	0200H
		Control PLC Settings	0202H
		Module Name	0203H
		Remote head Module Operation Setting at Error Detection	3600H
	Setting of Points Occupied by Empty Slot		0100H
Inter-module Synchronous Setting	Select Inter-module Synchronous Target Module		0101H
	Fixed Scan Interval Setting of Inter-module Synchronization		0101H

CPU Parameter

The following is the list of parameter numbers of the CPU parameter.

Item			Parameter No.
Name Setting	Title Setting		3100H
	Comment Setting		3101H
Operation Related Setting	Remote Reset Setting		3202H
RAS Setting	Error Detection Setting		3501H
	Remote head Module Operation Setting at Error Detection		3501H
	Online module change setting	Direct change setting	3505H
Network Required Setting	Network No.		6D00H
	Station No.		6D00H
Network Application Setting	Module Operation Mode		6D00H
	Transfer Setting between Devices		6D01H
	Redundant System Settings	Line Type	6D02H

4.9 Event List

The remote head module collects information from each module such as errors detected by the module, operations performed for the module, and stores it in the data memory. (☞ Page 37 RAS Function) When an event occurs, its event code and description can be read using an engineering tool.

Point

For details on events occurred on each module, refer to the manual for the module used.

How to read the event list

The event list contains the following information.

Item	Description
Event code	ID number assigned to an event
Event type	Type of an event
Event category	Category of an event
Detected event	Description of a detected event
Detailed information 1 to 3	Details of a detected event

Detailed information

The following table lists the details of information displayed in the detailed information 1 to 3.

Detailed information	Item	Description
Detailed information 1	Operation source information	Information on the operation source • Connection port (such as Ethernet and USB) • I/O No. • Remote head No. • Network No. • Station No. • IP address
	Own station information	Information on the own station • I/O No. • Network No. • Station No.
	System switching information	Information on the system switching cause, the cause of system switching failure, and the transition state of the systems (control system and standby system)

Detailed information	Item	Description
Detailed information 2	Start instruction issuing source	Information on the start instruction issuing source • Network No. • Station No.
	Error-detected station information	Information on the error-detected station • Error occurrence port • All receive frame count • Error frame count
	Cause of baton pass interruption	'Cause of baton pass interruption' (SW0048)
	Cause of data link stop	'Cause of data link stop' (SW0049) (Except for the stop by the data link stop instruction.)
	Remote password information	Information on the corresponding remote password • I/O No. • Result • Connection No.
	File password information	Information on the corresponding file password • Operation • Result • Memory (drive No.) • File name
	Drive/file information	Information on the corresponding drive name and file name • Drive No. • File name/folder name
	Copy source drive/file information	Information on the corresponding drive name and file name • Drive No. • File name
	Operation target information	Information on the operation target: I/O number
	Remote operation type information	Information on the remote operation type
	System configuration information	Information on the system configuration
	Setting/change information	Information on the setting and change
	Cause of parameter change	Cause of parameter change
	System switching information	Information on the system switching cause, the cause of system switching failure, and the transition state of the systems (control system and standby system)
Detailed information 3	Copy destination drive/file information	Information on the corresponding drive name and file name • Drive No. • File name

Event list

The following table lists events related to the remote head module.

Event code (Hex)	Event type	Event category	Detected event	Description	Detailed information		
					Detailed information 1	Detailed information 2	Detailed information 3
00100H	System	Info	Link-up	Link-up has occurred when the network cable connected to the external device was connected.	Operation source information	—	—
00400H			Power-on and reset	The remote head module has been powered on or reset.	—		
00420H			Event history file generation	A event history file has been generated.			
00421H			Event history logging restriction	Event history logging from the module was restricted.	Module information	Restricted event category*2	
00500H			<<Own station>> Baton pass return	Baton pass of the own station was returned from interruption status to normal status.	Own station information	—	
00510H			<<Own station>> Data link restart	Data link of the own station was restarted.	—		
00513H			<<Own station>> Data link start instruction acceptance	Data link startup instruction of the own station was received.	Own station information	Start instruction issuing source	
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.			
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.			
00542H			<<Own station>> Receive frame error line status caution level	A receive frame error (line status: caution level) has been occurred.		Error-detected station information	
00750H			Network number or station number is not set.	Network number or station number of the own station is not set.	Operation source information	Setting/change information	

Event code (Hex)	Event type	Event category	Detected event	Description	Detailed information		
					Detailed information 1	Detailed information 2	Detailed information 3
00800H	System	Warning	Link-down	Link-down has occurred when network cable connected to the external device was disconnected.	Operation source information	—	—
00C00H			<<Own station>> Baton pass interruption	Baton pass of the own station was interrupted.	Own station information	Cause of baton pass interruption	
00C10H			<<Own station>> Data link stop	Data link of the own station was stopped.		Cause of data link stop	
00C28H			<<Own station>> Receive frame error line status warning level	A receive frame error (line status: warning level) has been occurred.		Error-detected station information	
00F00H			System switching (by the system)	The system switching cause had been generated by the system, and the systems were switched.	System switching information	—	
00F01H			Automatic memory copy (control system)	Memory copy from control system to standby system has been executed.	—		
00F02H			Automatic memory copy (standby system)	Memory copy from control system to standby system has been executed.			
10200H	Security	Info	Remote password lock	The lock processing for the remote password was performed.	Operation source information	Remote password information	
10201H			Remote password unlock successful	The lock processing for the remote password was performed and completed successfully.			
10202H			Remote password unlock failed	The lock processing for the remote password was performed and was not completed successfully.			
10400H			File password registration/change/ deletion successful	Registration, change, or deletion of a file password was performed and completed successfully.		File password information	
10401H			File password registration/change/ deletion failed	Registration, change, or deletion of a file password was performed and was not completed successfully.			
10402H			File password clear successful	Clear of a file password was performed and completed successfully.	Operation source information	File password information	
10403H			File password clear failed	Clear of a file password was performed and was not completed successfully.			

Event code (Hex)	Event type	Event category	Detected event	Description	Detailed information		
					Detailed information 1	Detailed information 2	Detailed information 3
20100H	Operation	Info	Error clear	Error clear was performed.	Operation source information	Operation target information	—
20200H			Event history clear	The event history was cleared.		—	
24001H			Remote operation request accepted	A remote operation request (RUN or STOP) was accepted.		Remote operation type information	
24031H			Network number, station number setting/ change execution	Setting or change of the network number or station number of the own station was executed.	—	Setting/change information	
24052H			<<Own station>> Parameter change/new parameter acceptance	The parameter was changed or newly accepted at power-on.	Own station information	Cause of parameter change	
24100H			Operating status change (RUN)	The operating status was changed to RUN.	—	—	
24101H			Operating status change (STOP)	The operating status was changed to STOP.			
24150H			CPU operating status change of the master station (RUN)	The CPU operating status of the master station was changed to RUN.			
24151H			CPU operating status change of the master station (STOP)	The CPU operating status of the master station was changed to STOP.			
24200H			Creation of new folders, writes to files/folders*1	• A new folder was created. • A new file was created or data was written to a file.	Operation source information	Drive/file information	
24201H			File copy*1	A file was copied.		Copy source drive/file information	Copy destination drive/file information
24202H			Folder/file rename*1	A folder name or file name was changed.			
25000H			Online module change	The online module change processing has completed.		System configuration information	—
2A200H		Warning	Memory initialization	The memory was initialized.		Drive/file information	
2A202H			Folder/file deletion*1	A folder or file was deleted.			
2B000H			System switching (user)	The system switching cause had been generated by a user, and the systems were switched.		System switching information	

*1 For file-related events such as write to and deletion of files, operations for the parameter files are logged into the event history.

*2 Detailed information 2 is stored only when detailed information 1 is remote head module.

APPENDICES

Appendix 1 List of Link Special Relay (SB) Areas

The link special relay (SB) is turned on/off depending on various factors during data link. An error status of the data link can be checked by monitoring it.

Application of the link special relay (SB)

By using the link special relay (SB), the status of CC-Link IE Field Network can be checked from HMI (Human Machine Interfaces) as well as the engineering tool.

Ranges turned on/off by users and by the system

- Turned on/off by users: SB0000 to SB001F
- Turned on/off by the system: SB0020 to SB0FFF

A

List of link special relay (SB) areas

The following lists the link special relay (SB) areas.

Point

Do not turn on or off areas whose numbers are not on the list or ranges turned on/off by the system. Doing so may cause malfunction of the programmable controller system.

No.	Name	Description
SB0006	Clear communication error count	Clears the link special register areas related to communication errors (SW0074 to SW0077, SW007C to SW007F) to 0. Off: Clear not requested On: Clear requested (valid while on)
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.
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 (error), data prior to error is held.
SB004A	Minor error status of own station	Stores the minor error occurrence status of the own station. Off: No minor error On: Minor error
SB004B	Moderate/major error status of own station	Stores the moderate/major error occurrence status of the own station. Off: No moderate/major error On: Moderate/major error
SB004C	Operation status of own station	Stores the operating status of the own station. Off: RUN On: STOP or moderate/major error
SB004F	Station number status of the operating station	Stores information on whether the module is operating with the network number and station number set in the "Network Required Setting" of "CPU Parameter", or with the numbers set in the CC-Link IE Field Network diagnostics. Off: Operating using the values set in "Network Required Setting" of "CPU Parameter" On: Operating using the values set in the CC-Link IE Field Network diagnostics (When no parameter is set in the remote head module, or no station number has been set in the CC-Link IE Field Network diagnostics after the network and station number fields are left blank in "Network Required Setting" of "CPU Parameter".) (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 (error), data prior to error is held.
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. Note, however, that the time may be extended further if the link-up processing is repeated depending on the status of the device on the line.
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. Note, however, that the time may be extended further if the link-up processing is repeated depending on the status of the device on the line.

No.	Name	Description
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.
SB007C	Line type setting status	Stores the setting status of line types when the redundant system was configured. Off: Single Line On: Redundant Line The relay turns off for the configuration other than the redundant system.
SB00F1	CPU operating status of master station*1	Stores the operating status of the CPU module on the master operating station. Off: RUN 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 (error), data prior to error is held.
SB0101	CPU moderate/major error status of master station*1	Stores the moderate/major error occurrence status of the CPU module on the 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 (error), data prior to error is held.
SB0111	CPU minor error status of master station*1	Stores the minor error occurrence status of the CPU module on the 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 (error), data prior to error is held.
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 link scan 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 remote head 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
SB1000 to SB1FFF	Areas for the CC-Link master/local module	By setting these areas as the refresh target device of the link special relay (SB) of the CC-Link master/local module, the data link status of CC-Link can be checked.

*1 The information is updated when the master station is connected.

Appendix 2 List of Link Special Register (SW) Areas

The link special register (SW) stores the information during data link as a numerical value. Error locations and causes can be checked by monitoring the link special register (SW).

Application of the link special register (SW)

By using the link special register (SW), the status of CC-Link IE Field Network can be checked from HMI (Human Machine Interfaces) as well as the engineering tool.

Range where data are stored by users and range where data are stored by the system

- Stored by users: None
- Stored by the system: SW0020 to SW0FFF

List of link special register (SW) areas

The following lists the link special register (SW) areas.

Point

Do not write any data to an area whose number is not on the list or range where data are stored by the system. Doing so may cause malfunction of the programmable controller system.

No.	Name	Description
SW0040	Network number	Stores the network number of the own station. Range: 1 to 239
SW0042	Station number	Stores the station number of the own station. Range: 1 to 120, 255 (station number not set)
SW0043	Mode status of own station	Stores the module operation mode of the own station. 00H: Online mode 02H: Offline mode 0BH: Module communication test mode
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
SW0049	Cause of data link stop	Stores the cause which stopped the data link of the own station. This register is disabled for offline mode. 00H: At normal communication or power-on 01H: Stop direction 02H: Monitoring time timeout 10H: Parameter unreceived 11H: Station number of the own station out of the range 12H: Reserved station setting of the own station 13H: Own station number duplication 16H: Station number not set 18H: Parameter error 19H: Parameter communication in progress 1AH: Station type mismatch 1BH: Parameter mismatch 20H: Moderate/major error
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) from the station stored in SW004A. (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
SW004B	Module status of own station	Stores the status of the own station. No value is stored for offline mode. 01H: STOP (normal) 02H: STOP (moderate/major error) 03H: STOP (minor error) 04H: RUN (normal) 05H: RUN (minor error) 0FH: Initial processing
SW004E	Network No. set for diagnostics	Stores the network number set in the CC-Link IE Field Network diagnostics. Range: 1 to 239, 65535 (not set)
SW004F	Station No. set for diagnostics	Stores the station number set in the CC-Link IE Field Network diagnostics. Range: 1 to 120, 65535 (not set)
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)
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)	
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 remote head module. When FFFFH (maximum value 65535) is counted, counting stops.
SW1000 to SW1FFF	Areas for the CC-Link master/local module	By setting these areas as the refresh target device of the link special register (SW) of the CC-Link master/local module, the data link status of CC-Link can be checked.

Appendix 3 List of Special Relay (SM) Areas

The following table shows how to read the special relay (SM) list.

Item	Description
No.	Special relay number
Name	Special relay name
Data stored	Data stored in the special relay and its meaning
Details	Detailed description of the data stored
Set by (setting timing)	Set side of data (system or user) and timing when data is set by the system <Set by> • S: System • U: User (via network or by test operation from an engineering tool). • U/S: User and system <Set timing> • Every END: Data is set every time END processing is performed. • Initial: Data is set when initial processing is performed (e.g. powering on the system, changing the operating status from STOP to RUN). • Status change: Data is set when the status is changed. • Error: Data is set when an error occurs. • Request: Data is set when requested by a user (using the special relay). • Writing: Data is set when a user performs a writing operation. • Power-on to RUN or STOP to RUN: Data is set when the operating status changes from power-on to RUN or from STOP to RUN. • Copy start: Data is set when memory copy is started. • Copy end: Data is set when memory copy is completed.

Point

Do not change the values of special relay set by the system by an engineering tool. Doing so may result in system down or communication failure.

Diagnostic information

The following table lists the special relay areas relating to the diagnostic information.

No.	Name	Data stored	Details	Set by (setting timing)
SM0	Latest self-diagnostic error	Off: No error On: Error	• This relay is turned on when the self-diagnostics returns an error. • The ON state is maintained even after the error has been later cleared.	S (Error)
SM1	Latest self-diagnostic error	Off: No error On: Error	• This relay is turned on when the self-diagnostics returns an error. • The ON state is maintained even after the error has been later cleared.	S (Error)
SM50	Error clear	Off→On: Error clear request On→Off: Error clear complete	• This relay clears the error state when the mode transfers from off to on. • This relay is turned on and off when the error clear has been completed.	U/S (Status change)
SM53	AC/DC DOWN	Off: No AC/DC DOWN detection On: AC/DC DOWN detected	• This relay is turned on when a momentary power failure within 20ms is detected while the AC power supply module is in use. The ON state is reset when the system is powered off and on. • This relay is turned on when a momentary power failure within 10ms is detected while the DC power supply module is in use. The ON state is reset when the system is powered off and on.	S (Error)
SM60	Fuse blown	Off: Normal On: Fuse blown detected	• This relay is turned on when at least one output module is in fuse blown state and the ON state is maintained even after later recovering to the normal state.	S (Error)

No.	Name	Data stored	Details	Set by (setting timing)
SM61	I/O module verification error	Off: Normal On: Error	• This relay is turned on when the state of the I/O module is different from one registered during power-on, and the ON state is maintained even after later recovering to the normal state.	S (Error)
SM80	Detailed information 1 in use flag	Off: Not used On: In use	This relay is turned on if the detailed information exists when 'Latest self-diagnostic error' (SM0) switched to on.	S (Status change)
SM112	Detailed information 2 in use flag			

A

Redundant power supply system

The following table lists the special relay areas relating to the redundant power supply system. The information of the redundant power supply system is stored.

All relays are turned off when the redundant power supply base unit is not used.

No.	Name	Data stored	Details	Set by (setting timing)
SM150	Power-off/power supply voltage drop detection	Off: Power-on/normal power supply voltage On: Power-off/voltage drop detected/power supply module not mounted	• This relay is turned on when one or more of the power supply modules whose power has been shut off or power supply voltage has dropped (not including a momentary power failure), or one or more of empty slots for the power supply module are detected. • This relay is turned on when the factor that any of 'Power-off/power supply voltage drop detection status' (SD150) bits turns on occurs. • This relay is turned off when all factors that bit of 'Power-off/power supply voltage drop detection status' (SD150) turns on are eliminated. • This relay is turned off when the main base unit is not the redundant power supply main base unit.	S (Status change)
SM151	Power supply module failure detection	Off: Not detected/power-off/no power supply module On: Faulty power supply module detected	• This relay is turned on when one or more faulty power supply modules have been detected. • This relay is turned on when the factor that any of 'Power supply failure detection status' (SD151) bits turns on occurs. • This relay is turned off when all factors that bit of 'Power supply failure detection status' (SD151) turns on are eliminated. • This relay is turned off when the main base unit is not the redundant power supply main base unit.	S (Status change)
SM152	Momentary power failure detection (power supply module 1)	Off: No momentary power failure detection On: Momentary power failure detected	• This relay is turned on when one or more momentary power failures of the input power supply to the power supply module 1 have been detected. After this relay is turned on, the ON state is retained even when the momentary power failure is stopped. • This relay is turned off when starting the remote head module. • This relay is turned off when the power supply module 1 turns off. • This relay is turned off when the main base unit is not the redundant power supply main base unit.	S (Status change)
SM153	Momentary power failure detection (power supply module 2)	Off: No momentary power failure detection On: Momentary power failure detected	• This relay is turned on when one or more momentary power failures of the input power supply to the power supply module 2 have been detected. After this relay is turned on, the ON state is retained even when the momentary power failure is stopped. • This relay is turned off when starting the remote head module. • This relay is turned off when the power supply module 2 turns off. This relay is turned off when the main base unit is not the redundant power supply main base unit.	S (Status change)

No.	Name	Data stored	Details	Set by (setting timing)
SM154	Invalid power supply module	Off: Valid/power-off/no power supply module On: Invalid	• This relay is turned on when one or more of invalid power supply modules are existed. • This relay is turned on when the factor that any of 'Details of the invalid power supply module' (SD154) bits turns on occurs. • This relay is turned off when all factors that bit of 'Details of the invalid power supply module' (SD154) turns on are eliminated. • This relay is turned off when the main base unit is not the redundant power supply main base unit.	S (Status change)

System information

The following table lists the special relay areas relating to the system information.

No.	Name	Data stored	Details	Set by (setting timing)
SM203	STOP contact	Off: Other than STOP state On: STOP state	This relay is turned on in STOP state.	S (Status change)
SM230	Remote head No.1 error flag	Off: Remote head No.n normal On: Remote head No.n moderate/major error	• This relay is turned off when the remote head module of the remote head No.n is normal (including minor error). • This relay is turned on when a moderate or major error occurs in the remote head module of the remote head No.n.	S (Status change)
SM231	Remote head No.2 error flag			
SM240	Remote head No.1 reset flag	Off: Remote head No.n not being reset On: Remote head No.n in reset mode	• This relay is turned off when the remote head module of the remote head No.n is not being reset. • This relay is turned on when the remote head module of the remote head No.n is being reset (including the case when the remote head module is removed from the base unit).	S (Status change)
SM241	Remote head No.2 reset flag			

System clock

The following table lists the special relay areas relating to the system clock.

No.	Name	Data stored	Details	Set by (setting timing)
SM400	Always On	ON —————— OFF	Always on	Power-on to RUN or STOP to RUN
SM401	Always Off	ON OFF——————	Always off	S (Status change)

Fixed scan function information

The following table lists the special relay areas relating to the fixed scan function information.

No.	Name	Data stored	Details	Set by (setting timing)
SM480	Cycle overrun flag for inter-module synchronization	Off: No error for the inter-module synchronization (Normal) On: Error state for the inter-module synchronization	• This relay is turned on during inter-module synchronization when the I/O refresh, intelligent function module refresh, and data transfer between the devices are not completed within the inter-module synchronization cycle. • The ON state is maintained even after the later processing is completed within the specified inter-module synchronization cycle. (Cleared by turning power off and on or resetting).	S (Status change)
SM488	Inter-module synchronization error (out of synchronization was detected on the remote head module)	Off: No error for the inter-module synchronization signal (Normal) On: Error state for the inter-module synchronization signal	• This relay is turned on when the inter-module synchronization signal cannot be identified within the inter-module synchronization cycle specified in the parameter or more than one signal has been identified within the same inter-module synchronization cycle. • The ON state is maintained even after the inter-module synchronization signal can be later identified within the specified inter-module synchronization cycle. (Cleared by turning power off and on or resetting).	S (Status change)

Drive information

The following table lists the special relay areas relating to the drive information.

No.	Name	Data stored	Details	Set by (setting timing)
SM632	Data memory write error	Off: No write operation/ normal On: Write error	This relay is turned on when a write error is detected during write operation to the data memory. This relay is turned off when the write instruction is issued.	S (Writing)
SM633	Data memory write flag	Off: No write operation On: Executing write operation	This relay is turned on when the write processing to the data memory is in progress. This relay is turned off when the write processing is completed.	S (Writing)
SM634	Number of rewriting operations error to data memory flag	Off: The number of rewrite operations is lower than 100000 On: The number of rewrite operations reaches 100000	This relay is turned on when the number of data memory rewriting operations reaches 100000. (The remote head module needs to be replaced.)	S (Writing)

Event history

The following table lists the special relay areas relating to the event history.

No.	Name	Data stored	Details	Set by (setting timing)
SM1464	Event history logging restriction status	Off: Not restricted On: Restricted	This relay is turned on when the event history logging has been restricted. The relay remains on even after the restriction is lifted. Restricted modules can be identified in SD1464 to SD1467. SM1466 turns on when the event history logging of the remote head module is restricted and the event category is error (minor error), and SM1467 turns on when the event history logging of the remote head module is restricted and the event category is information or warning.	S (Status change)
SM1466	Event history logging restriction status of remote head module (minor error)	Off: Not restricted On: Restricted	This relay is turned on when remote head module event history logging whose event category is error (minor error) was restricted. The relay remains on even after the restriction is lifted.	S (Status change)
SM1467	Event history logging restriction status of remote head module (information, warning)	Off: Not restricted On: Restricted	This relay is turned on when remote head module event history logging whose event category is information or warning was restricted. The relay remains on even after the restriction is lifted.	S (Status change)

Online module change function

The following table lists the special relay areas relating to the online module change function.

No.	Name	Data stored	Details	Set by (setting timing)
SM1600	Module selection request flag	Off→On: Requested	This relay is turned on to select an online change target module. When changing a module directly, the system turns on this relay upon removal of the target module. This relay can be turned on only when the value set in 'Online module change progress status' (SD1617) is 0 (Normal operation). This relay is turned off upon completion of the online module change processing. If the selection cancel is requested, this relay is turned off after the selection is canceled.	S (Status change)/U (Request)
SM1601	Module selection completion flag	Off: No module selected On: Selected	This relay is turned on when an online change target module has been selected. This relay is turned off upon completion of the online module change processing.	S (Status change)
SM1602	Module removal request flag	Off→On: Requested	This relay is turned on to request a removal of the selected module. When changing a module directly, the system turns on this relay upon removal of the target module. This relay can be turned on only when the value set in 'Online module change progress status' (SD1617) is 2 (Module selected). This relay is turned off upon completion of the online module change processing.	S (Status change)/U (Request)
SM1603	Module removal ready flag	Off: Not ready On: Ready	This relay is turned on when the selected module is ready to be removed. This relay is turned off upon completion of the online module change processing.	S (Status change)
SM1604	Module removal completion flag	Off: Not completed On: Completed	This relay is turned on when the selected module has been removed. This relay is turned off upon completion of the online module change processing.	S (Status change)
SM1605	Module mounting completion flag	Off: Not completed On: Completed	This relay is turned on when a new module has been mounted. This relay is turned off upon completion of the online module change processing.	S (Status change)
SM1606	Module recognition request flag	Off→On: Requested	This relay is turned on to request recognition of the newly-mounted module. When changing a module directly, the system turns on this relay upon mounting of the module. This relay can be turned on only when the value set in 'Online module change progress status' (SD1617) is 6 (Module mounted). This relay is turned off upon completion of the online module change processing.	S (Status change)/U (Request)
SM1607	Module recognition completion flag	Off: Not recognized On: Recognized	This relay is turned on when the newly-mounted module is recognized by the system. This relay is turned off upon completion of the online module change processing.	S (Status change)
SM1608	Module control resumption request flag	Off→On: Requested	This relay is turned on to start control of the replaced module. When changing a module directly, the system turns on this relay upon recognition of the module. This relay can be turned on only when the value set in 'Online module change progress status' (SD1617) is 8 (Module recognized). This relay is turned off upon completion of the online module change processing.	S (Status change)/U (Request)
SM1609	Online module change completion flag	Off: Processing not completed On: Completed	This relay is turned on upon completion of the online module change processing. This relay is turned off in the next scan.	S (Status change)

No.	Name	Data stored	Details	Set by (setting timing)
SM1615	Module selection cancellation request flag	Off→On: Module selection cancellation requested	This relay is turned on to cancel a module selection request. This relay can be turned on only when the value set in 'Online module change progress status' (SD1617) is 2 (Module selected). This relay is turned off after the selection is canceled.	S (Status change)/U (Request)
SM1616	Online module change availability flag	Off: Disabled On: Enabled	Note that the setting details in the direct change setting cannot be checked with 'Online module change availability flag' (SM1616). To check the direct change setting, check the CPU parameters.	S (Initial)
SM1617	Online module change status flag	Off: Function not executed On: Function being executed	This relay is turned on when 'Module selection request flag' (SM1600) is turned on to start the online module change processing. This relay is turned off upon completion of the online module change processing.	S (Status change)
SM1618	Online module change error flag	Off: No error On: Error	This relay is turned on when an error is detected. This relay is turned off when the error cause is eliminated and the online module change related request is executed. An error occurs in selecting a module. Thus, turn off the relay before module selection.	S (Status change)/U (Request)
SM1619	Disable request flag during online module change	Off: No disabled request On: Disable request detected	This relay is turned on when a disabled request is issued during the online module change processing. This relay is turned off upon completion of the online module change processing.	S (Status change)

Redundant function (own system remote head module information)

The following table lists the special relay areas relating to the redundant function. The remote head module information of the own system is stored.

These relays are enabled only for a redundant system. All relays are turned off when a redundant system is not used.

○: Can be set, ×: Cannot be set

No.	Name	Data stored	Details	Set by (setting timing)	Effective system	
					Control system	Standby system
SM1634	Control system judgment flag	Flag that indicates the operating status of the remote head module SM1634 = Off, SM1635 = Off: Systems not determined SM1634 = Off, SM1635 = On: Standby system SM1634 = On, SM1635 = Off: Control system		S (Status change)	○	○
SM1635	Standby system judgment flag					
SM1637	System switching detection (standby system to control system)	Off: Not detected On: Detected	This relay is turned on after the standby system has been switched to the control system.	S (Status change)	○	○
SM1646	System switching by a user	Off: Disabled On: Enabled	This relay stores whether to enable system switching operation by a user using an engineering tool. The initial value is off.	U	○	○
SM1654	Memory copy being executed	Off: Not executed On: Being executed	This relay is turned on during memory copy from the control system to the standby system. This relay is turned off when memory copy is complete.	S (Status change)	○	○
SM1655	Memory copy completion	Off: Not completed On: Completed	This relay is turned on upon completion of memory copy from the control system to the standby system. The initial value is off.	S (Status change)	○	○

Redundant function (other system remote head module information)

The following table lists the special relay areas relating to the redundant function. The remote head module information of the other system is stored.

All relays are turned off when a redundant system is not used.

○: Can be set, ×: Cannot be set

No.	Name	Data stored	Details	Set by (setting timing)	Effective system	
					Control system	Standby system
SM1679	Error reset (the other system)	Off→On: Standby system error reset requested On→Off: Standby system error reset completed	This relay is turned off and on to clear the minor error occurred in the standby system. This relay is turned off when the error clear of the standby system has been completed. The initial value is off.	U/S (Status change)	○	×
SM1680	Error of the other system monitoring	Off: No error On: Error	This relay is turned on if an error occurs on communications with the other system when an initial processing (including when the system is determined while waiting for the other system starts up) or an END processing is performed. (This relay is turned on when any of 'Cause of the other system monitoring error' (SD1648) bits turns on.) This relay is turned off when an error is cleared.	S (Every END/system switching)	○	○
SM1681	Latest self-diagnostic error	Off: No error On: Error	This relay is turned on if a diagnostic error occurs in the other system remote head module. The status of 'Latest self-diagnostic error' (SM0) for the other system remote head module is reflected.	S (Every END)	○	○
SM1682	Latest self-diagnostic error	Off: No error On: Error	This relay is turned on if a self-diagnostic error occurs in the other system remote head module. The status of 'Latest self-diagnostic error' (SM1) of the other system remote head module is reflected.	S (Every END)	○	○
SM1683	Detailed information 1 in use flag (the other system)	Off: Not used On: In use	This relay is turned on when there is detailed information 1 for an error occurred in the other system remote head module. The status of 'Detailed information 1 in use flag' (SM80) of the other system remote head module is reflected.	S (Every END)	○	○
SM1684	Detailed information 2 in use flag (the other system)	Off: Not used On: In use	This relay is turned on when there is detailed information 2 for an error occurred in the other system remote head module. The status of 'Detailed information 2 in use flag' (SM112) of the other system remote head module is reflected.	S (Every END)	○	○

Appendix 4 List of Special Register (SD) Areas

The following table shows how to read the special register (SD) list.

Item	Description
No.	Special register number
Name	Special register name
Data stored	Data stored in the special register
Details	Detailed description of the data stored
Set by (setting timing)	Set side of data (system or user) and timing when data is set by the system <Set by> • S: System • U/S: User and system <Set timing> • Always: Data is regularly set. • Every END: Data is set every time END processing is performed. • Initial: Data is set when initial processing is performed (e.g. powering on the system, changing the operating status from STOP to RUN). • Status change: Data is set when the status is changed. • Error: Data is set when an error occurs. • Request: Data is set when requested by a user (using the special relay). • Switch change: Data is set when the switch of the remote head module is changed. • Writing: Data is set when a user performs a writing operation. • Cause occurrence: Data is set when the system switching cause occurs by the system. • System switching: Data is set when two systems are switched (between the control system and the standby system)

Point

Do not change the values of special register set by the system by an engineering tool. Doing so may result in system down or communication failure.

Diagnostic information

The following table lists the special register areas relating to the diagnostic information.

No.	Name	Description	Details	Set by (setting timing)
SD0	Latest self-diagnostic error code	Latest self-diagnostic error code	Error codes are stored in a hexadecimal value when the diagnostics detects an error.	S (Error)
SD1	Latest self-diagnostic error time	Latest self-diagnostic error time	The year value (four digits) of the date/time when data of 'Latest self-diagnostic error code' (SD0) was updated is stored as a BIN code.	S (Error)
SD2			The month value of the date/time when data of 'Latest self-diagnostic error code' (SD0) was updated is stored as a BIN code.	
SD3			The day value of the date/time when data of 'Latest self-diagnostic error code' (SD0) was updated is stored as a BIN code.	
SD4			The hour value of the date/time when data of 'Latest self-diagnostic error code' (SD0) was updated is stored as a BIN code.	
SD5			The minute value of the date/time when data of 'Latest self-diagnostic error code' (SD0) was updated is stored as a BIN code.	
SD6			The second value of the date/time when 'Latest self-diagnostic error code' (SD0) was updated is stored as a BIN code.	
SD7			The day of week value of the date/time when 'Latest self-diagnostic error code' (SD0) was updated is stored as a BIN code. (0: Sun, 1: Mon, 2: Tue, 3: Wed, 4: Thu, 5: Fri, 6: Sat)	

No.	Name	Description	Details	Set by (setting timing)
SD10	Self-diagnostic error number	Self-diagnostic error number 1	The maximum of 16 types of error codes are stored into 'Self-diagnostic error number' (SD10) onwards when the diagnostics detects an error. (The same error code as one already stored in 'Self-diagnostic error number' (SD10) onwards is not stored). The 17th error code onwards are not stored. Also error codes are not stored when 16 types of error codes have already been stored into 'Self-diagnostic error number' (SD10) to 'Self-diagnostic error number' (SD25).	S (Error)
SD11		Self-diagnostic error number 2		
SD12		Self-diagnostic error number 3		
SD13		Self-diagnostic error number 4		
SD14		Self-diagnostic error number 5		
SD15		Self-diagnostic error number 6		
SD16		Self-diagnostic error number 7		
SD17		Self-diagnostic error number 8		
SD18		Self-diagnostic error number 9		
SD19		Self-diagnostic error number 10		
SD20		Self-diagnostic error number 11		
SD21		Self-diagnostic error number 12		
SD22		Self-diagnostic error number 13		
SD23		Self-diagnostic error number 14		
SD24		Self-diagnostic error number 15		
SD25		Self-diagnostic error number 16		
SD53	AC/DC DOWN	The number of AC/DC DOWN detections	The value of this register increments by one and stored as a BIN code, each time input voltage drops to 85% (AC power)/65% (DC power) or less of the nominal value while the remote head module is carrying out an operation. A counting cycle from 0 to 65535 to 0 is repeated.	S (Error)
SD60	Number of module with blown fuse	Number of module with blown fuse	The lowest I/O number of module in which a fuse blew is stored.	S (Error)
SD61	I/O module verify error module number	I/O module verify error module number	The lowest I/O number of the module which has an error detected by the I/O module verification is stored.	S (Error)
SD80	Detailed information 1 information category	Detailed information 1 information category code	Detailed information 1 information category code is stored. b0 to b7: Information category code • 0: N/A • 2: Drive/file information • 4: Parameter information • 5: System configuration information • 6: Number of times information • 7: Time information • 24: Failure information • 27: System switching information b8 to b15: Not used (fixed to 0)	S (Error)

No.	Name	Description	Details	Set by (setting timing)
SD81 to SD111	Detailed information 1	Detailed information 1	• The detailed information 1 corresponding to 'Latest self-diagnostic error code' (SD0) is stored. • There are seven types of information to be stored as described below. • The type of the detailed information 1 can be obtained using 'Detailed information 1 information category' (SD80). (The value of the "Detailed information 1 information category code" stored in 'Detailed information 1 information category' (SD80) corresponds to the following (2), (4) to (7), (24), and (27).) (2) Drive/file information ■SD81: With or without specification • b0: Drive No. • b1: File name ■SD82: Drive No. ■SD83 (1st character) to SD90 (8th character): File name (first 8 characters of Unicode character string) (4) Parameter information ■SD81: With or without specification • b0: Parameter type • b1: Parameter storage location • b2: I/O No. • b3: Parameter No. • b4: Network No. • b5: Station No. • b6: System information ■SD82: Parameter type, parameter storage location • b0 to b7: Parameter type (1: System parameter, 2: CPU parameter, 3: Module parameter, 4: Module extension parameter) • b8 to b15: Parameter storage location (4: Data memory) ■SD83: I/O No. For no assignment of I/O No., FFFFH is given. ■SD84: Parameter No. ■SD85: Network No. ■SD86: Station No. 1 to 120 ■SD87 to SD97: System information	S (Error)

No.	Name	Description	Details	Set by (setting timing)
SD81 to SD111	Detailed information 1	Detailed information 1	(5) System configuration information ■SD81: With or without specification • b0: I/O No. • b1: Slot No. • b2: Base No. • b3: Power supply No. • b4: CPU No. • b5: Network No. • b6: Station No. ■SD82: I/O No. ■SD83: Slot No., Base No. • b0 to b7: Slot No. (0 to 11: Slot No.) • b8 to b15: Base No. (0: Main base unit, 1 to 7: 1st to 7th extension base unit, 8: 8th or more) ■SD84: Power supply No., CPU No. • b0 to b7: Power supply No. (1: Power supply module 1, 2: Power supply module 2) • b8 to b15: CPU No. (1: Remote head No.1, 2: Remote head No.2) ■SD85: Network No. ■SD86: Station No. 1 to 120 (6) Number of times information When there is no specification, 0 is set to each SD. ■SD81: With or without specification • b0: Count (setting) • b1: Count (measured) ■SD82: Count (setting) (L) ■SD83: Count (setting) (H) ■SD84: Count (measured) (L) ■SD85: Count (measured) (H) (7) Time information When there is no specification, 0 is set to each SD. ■SD91: With or without specification • b0: Time (setting) (ms) • b1: Time (setting) (μs) • b2: Time (measured) (ms) • b3: Time (measured) (μs) ■SD92: Time (setting) (ms) ■SD93: Time (setting) (μs) ■SD94: Time (measured) (ms) ■SD95: Time (measured) (μs) (24) Failure information Failure information is system information. (27) System switching information ■SD81: With or without specification • b0: System switching cause • b2: Cause of system switching failure ■SD82: System switching cause • 1: Power-off, reset, or hardware failure • 2: Moderate error or major error • 3: System switching due to data link error • 16: System switching of redundant master station system • 17: System switching request using an engineering tool ■SD83: Argument of system switching instruction ■SD84: Cause of system switching failure • 1: The standby system is not available for communications. (The standby system is in reset processing or not connected.) • 2: Communication timeout • 3: Moderate error or major error in the standby system • 4: Both systems operate differently. • 5: Memory copy from the control system to the standby system being executed • 7: Data link error is detected in the standby system. • 8: System switching being performed • 9: Online module change being performed	S (Error)
SD112	Detailed information 2 information category	Detailed information 2 information category code	Detailed information 2 information category code is stored. b0 to b7: Information category code • 0: N/A • 2: Drive number and file name • 4: Parameter information • 5: System configuration information b8 to b15: Not used (fixed to 0)	S (Error)

No.	Name	Description	Details	Set by (setting timing)
SD113 to SD143	Detailed information 2	Detailed information 2	• The detailed information 2 corresponding to 'Latest self-diagnostic error code' (SD0) is stored. • There are four types of information to be stored as described below. • The type of the detailed information 2 can be obtained using 'Detailed information 2 information category' (SD112). (The value of the "Detailed information 2 information category code" stored in 'Detailed information 2 information category' (SD112) corresponds to the following (2), (4), and (5).) (2) Drive number and file name ■SD113: With or without specification • b0: Drive No. • b1: File name ■SD114: Drive No. ■SD115 (1st character) to SD122 (8th character): File name (first 8 characters of Unicode character string) (4) Parameter information ■SD113: With or without specification • b0: Parameter type • b1: Parameter storage location • b2: I/O No. • b3: Parameter No. • b4: Network No. • b5: Station No. • b6: System information ■SD114: Parameter type, parameter storage location • b0 to b7: Parameter type (1: System parameter, 2: CPU parameter, 3: Module parameter, 4: Module extension parameter) • b8 to b15: Parameter storage location (4: Data memory) ■SD115: I/O No. For no assignment of I/O No., FFFFH is given. ■SD116: Parameter No. ■SD117: Network No. ■SD118: Station No. 1 to 120 ■SD119 to SD129: System information (5) System configuration information ■SD113: With or without specification • b0: I/O No. • b1: Slot No. • b2: Base No. • b3: Power supply No. • b4: CPU No. • b5: Network No. • b6: Station No. ■SD114: I/O No. ■SD115: Slot No., Base No. • b0 to b7: Slot No. (0 to 11: Slot No.) • b8 to b15: Base No. (0: Main base unit, 1 to 7: 1st to 7th extension base unit, 8: 8th or more) ■SD116: Power supply No., CPU No. • b0 to b7: Power supply No. (1: Power supply module 1, 2: Power supply module 2) • b8 to b15: CPU No. (1: Remote head No.1, 2: Remote head No.2) ■SD117: Network No. ■SD118: Station No. 1 to 120	S (Error)

Redundant power supply system

The following table lists the special register areas relating to the system information. The information of the redundant power supply system is stored.

All registers are turned off when the redundant power supply base unit is not used.

No.	Name	Description	Details	Set by (setting timing)
SD150	Power-off/power supply voltage drop detection status	Power-off/power supply voltage drop detection status 0: Power-on/normal voltage 1: Power-off/voltage drop detected/no power supply module	• Power supply module status (power is shut off, power supply voltage drop (not including a momentary power failure) is detected, or an empty slot for the power-supply module exists) is stored using the following bit pattern. • When the main base unit is not the redundant power supply main base unit, 0 is stored. ■Powered-off/power supply voltage drop detection status (power supply module 1) b0: Main base unit b1: 1st extension base unit b2: 2nd extension base unit ⋮ b7: 7th extension base unit ■Powered-off/power supply voltage drop detection status (power supply module 2) b8: Main base unit b9: 1st extension base unit b10: 2nd extension base unit ⋮ b15: 7th extension base unit	S (Status change)
SD151	Power supply failure detection status	Power supply failure detection status 0: Not detected/ power-off/no power supply module 1: Detected	• The power supply module failure detection status is stored in the following bit patterns. • Bits corresponding to power-off or empty slots for the power supply module turn off. • When the main base unit is not the redundant power supply main base unit, 0 is stored. ■Power supply failure detection status (power supply module 1) b0: Main base unit b1: 1st extension base unit b2: 2nd extension base unit ⋮ b7: 7th extension base unit ■Power supply failure detection status (power supply module 2) b8: Main base unit b9: 1st extension base unit b10: 2nd extension base unit ⋮ b15: 7th extension base unit	S (Status change)
SD152	Momentary power failure detection count (power supply module 1)	Momentary power failure detection count for power supply module 1	• This register counts the number of momentary power failures. • This register monitors the status of the power supply module mounted on the main base unit and counts the number of momentary power failures. • When the remote head module starts, the counter of the both power supply modules is cleared to 0. • When either of the power supply module is turned off, the counter of the power supply module which is turned off is cleared to 0. • The counter is incremented by one upon one momentary power failure on each power supply. A counting cycle from 0 to 65535 to 0 is repeated. • When the main base unit is not the redundant power supply main base unit, 0 is stored.	S (Status change)
SD153	Momentary power failure detection count (power supply module 2)	Momentary power failure detection count for power supply module 2		S (Status change)

No.	Name	Description	Details	Set by (setting timing)
SD154	Details of the invalid power supply module	Details of the invalid power supply module 0: Valid/power-off/ no power supply module 1: Invalid	• When an invalid power supply module exists, the status is stored using the following bit pattern. • Bits corresponding to power-off or empty slots for the power supply module turn off. • When the main base unit is not the redundant power supply main base unit, 0 is stored. ■Details of the invalid power supply module (power supply module 1) b0: Main base unit b1: 1st extension base unit b2: 2nd extension base unit ⋮ b7: 7th extension base unit ■Details of the invalid power supply module (power supply module 2) b8: Main base unit b9: 1st extension base unit b10: 2nd extension base unit ⋮ b15: 7th extension base unit	S (Status change)

System information

The following table lists the special register areas relating to the system information.

No.	Name	Description	Details	Set by (setting timing)
SD200	Status of switch	Remote head module switch status	The switch status of the remote head module is stored as follows: 0: RUN 1: STOP	S (Switch change)
SD201	LED status	Remote head module LED status	The information that indicates LED status (0: off, 1: on, 2: flashing) of the remote head module is stored in the following bit patterns. 0 = Off, 1 = On, 2 = Flashing b0, b1: RUN b2, b3: ERR b4, b5: BUS RUN b6, b7: D LINK b8, b9: CTRL b10, b11: SD/RD b12, b13: SBY b14, b15: L ERR	S (Status change)
SD203	Remote head module operating status	Remote head module operating status	The operating status of the remote head module is stored as follows: 0: RUN 2: STOP	S (Always)
SD228	Redundant system information	Number of remote head modules	The number of remote head modules which constitute a redundant system is stored. 1: Non-redundant system 2: Redundant system	S (Initial)
SD229		Remote head module number	The remote head number of the own remote head module is stored when a redundant system is configured.	S (Initial)
SD230		Remote head No.1 operating status	The operation information for each remote head number is stored. (The amount of stored information depending on the number of remote head modules indicated in 'Redundant system information' (SD228) is stored). b0 to b3: Operating status • 0: RUN • 2: STOP • 4: INITIALIZE • FH: RESET b4, b5: Classification • 0: Normal • 1: Minor error • 2: Moderate error • 3: Major error b6: Empty b7: Stop error flag • 0: No stop error • 1: Stop error b8 to b14: Empty b15: Mounting status • 0: Not mounted • 1: Mounted	S (During END/Error)
SD231		Remote head No.2 operating status		
SD241	Extension stage number	0: Main base unit only 1 to 7: Number of extension base units	The maximum number of implemented extension base units is stored.	S (Initial)
SD242	Identification for whether or not Q series module can be mounted	Identification of the base type 0: Cannot be mounted (There is no base unit on which the Q series module can be mounted.) 1: Can be mounted (There is a base unit on which the Q series module can be mounted.)	Identify whether or not Q series module can be mounted. When no SD memory card is inserted, the value is fixed to 0. b0: Main base unit (fixed to 0) b1: 1st extension base unit (Q series module can be mounted.) b2: 2nd extension base unit (Q series module can be mounted.) ⋮ b7: 7th extension base unit (Q series module can be mounted.) b8 to b15: Fixed to 0	S (Initial)

No.	Name	Description	Details	Set by (setting timing)
SD243	No. of base slots	No. of base slots	The number of slots of the base unit, which is specified in "Base/Power/Extension Cable Setting" in the [I/O Assignment] tab of "System Parameter", is stored. When the number of slots of the base unit is not specified, that of the base unit actually mounted is stored. ■SD243 b0 to b3: Main b4 to b7: Extension 1 b8 to b11: Extension 2 b12 to b15: Extension 3 ■SD244 b0 to b3: Extension 4 b4 to b7: Extension 5 b8 to b11: Extension 6 b12 to b15: Extension 7	S (Initial)
SD244				
SD250	Loaded maximum I/O	Loaded maximum I/O number	The value obtained by dividing the last I/O number for an implemented unit plus one by 16 is stored. Example 1: Last I/O number 010FH • SD250 = 0011H Example 2: Last I/O number 0FFFH • SD250 = 0100H	S (Initial)
SD260	Number of points assigned to bit devices	X (L)	The number of points assigned to the X device is stored in 32 bits. Fixed to 12288.	S (Initial)
SD261		X (H)		
SD262		Y (L)	The number of points assigned to the Y device is stored in 32 bits. Fixed to 12288.	S (Initial)
SD263		Y (H)		
SD264		M (L)	The number of points assigned to the M device is stored in 32 bits. Fixed to 0.	S (Initial)
SD265		M (H)		
SD266		B (L)	The number of points assigned to the B device is stored in 32 bits. Fixed to 0.	S (Initial)
SD267		B (H)		
SD268		SB (L)	The number of points assigned to the SB device is stored in 32 bits. Fixed to 8192.	S (Initial)
SD269		SB (H)		
SD270		F (L)	The number of points assigned to the F device is stored in 32 bits. Fixed to 0.	S (Initial)
SD271		F (H)		
SD272		V (L)	The number of points assigned to the V device is stored in 32 bits. Fixed to 0.	S (Initial)
SD273		V (H)		
SD274		L (L)	The number of points assigned to the L device is stored in 32 bits. Fixed to 0.	S (Initial)
SD275		L (H)		
SD276		S (L)	The number of points assigned to the S device is stored in 32 bits. Fixed to 0.	S (Initial)
SD277		S (H)		
SD280	Number of points assigned to word devices	D (L)	The number of points assigned to the D device is stored in 32 bits. Fixed to 0.	S (Initial)
SD281		D (H)		
SD282		W (L)	The number of points assigned to the W device is stored in 32 bits. Fixed to 8192.	S (Initial)
SD283		W (H)		
SD284		SW (L)	The number of points assigned to the SW device is stored in 32 bits. Fixed to 8192.	S (Initial)
SD285		SW (H)		
SD288	Number of points assigned to timer/counter devices	T (L)	The number of points assigned to the T device is stored in 32 bits. Fixed to 0.	S (Initial)
SD289		T (H)		
SD290		ST (L)	The number of points assigned to the ST device is stored in 32 bits. Fixed to 0.	S (Initial)
SD291		ST (H)		
SD292		C (L)	The number of points assigned to the C device is stored in 32 bits. Fixed to 0.	S (Initial)
SD293		C (H)		
SD294		LT (L)	The number of points assigned to the LT device is stored in 32 bits. Fixed to 0.	S (Initial)
SD295		LT (H)		
SD296		LST (L)	The number of points assigned to the LST device is stored in 32 bits. Fixed to 0.	S (Initial)
SD297		LST (H)		
SD298		LC (L)	The number of points assigned to the LC device is stored in 32 bits. Fixed to 0.	S (Initial)
SD299		LC (H)		

No.	Name	Description	Details	Set by (setting timing)
SD300	Number of points assigned to the index register	Z	The number of points assigned to the Z device is stored. Fixed to 0.	S (Initial)
SD302	Number of points assigned to the long index register	LZ	The number of points assigned to the LZ device is stored. Fixed to 0.	S (Initial)
SD306	Number of points assigned to the file register	ZR (L)	The number of points assigned to the ZR device is stored in 32 bits. Fixed to 0.	S (Initial)
SD307		ZR (H)		
SD308	Number of points assigned to refresh devices	RD (L)	The number of points assigned to the RD device is stored in 32 bits. Fixed to 12288.	S (Initial)
SD309		RD (H)		

Fixed scan function information

The following table lists the special register areas relating to the fixed scan function information.

No.	Name	Description	Details	Set by (setting timing)
SD480	Inter-module synchronization cycle over count	0: No cycle overrun event 1 to 65535: Cumulative number of times	The number of counts in which the inter-module synchronous I/O refresh, intelligent function module refresh, and data transfer between the devices have not been completed is stored within the inter-module synchronization cycle. When the count exceeds 65535, it returns to 0 and starts a new cycle.	S (Status change)
SD520	Current scan time*1	Current scan time (unit: ms)	• The current scan time is stored into 'Current scan time' (SD520) and 'Current scan time' (SD521). (The time is measured in increments of μs). 'Current scan time' (SD520): The ms part is stored. (Range: 0 to 65535) 'Current scan time' (SD521): The μs part is stored. (Range: 0 to 999) Example: If the current scan time is 23.6ms, the following values are stored: SD520 = 23 SD521 = 600 • This register is cleared to 0 when the mode transfers from STOP to RUN mode.	S (Always)
SD521		Current scan time (unit: μs)		
SD522	Minimum scan time*1	Minimum scan time (unit: ms)	• The scan time is stored into 'Minimum scan time' (SD522) and 'Minimum scan time' (SD523). (The time is measured in increments of μs). 'Minimum scan time' (SD522): The ms part is stored. (Range: 0 to 65535) 'Minimum scan time' (SD523): The μs part is stored. (Range: 0 to 999) • This register is cleared to 0 when the mode transfers from STOP to RUN mode.	S (Always)
SD523		Minimum scan time (unit: μs)		
SD524	Maximum scan time*1	Maximum scan time (unit: ms)	• The scan time is stored into 'Maximum scan time' (SD524) and 'Maximum scan time' (SD525). (The time is measured in increments of μs). 'Maximum scan time' (SD524): The ms part is stored. (Range: 0 to 65535) 'Maximum scan time' (SD525): The μs part is stored. (Range: 0 to 999) • This register is cleared to 0 when the mode transfers from STOP to RUN mode.	S (Always)
SD525		Maximum scan time (unit: μs)		

*1 The scan time of the remote head module shows the interval of the I/O refresh and intelligent function module (including a network module) refresh.

Drive information

The following table lists the special register areas relating to the drive information.

No.	Name	Description	Details	Set by (setting timing)
SD620	Data memory (drive 4) usage status	Data memory (drive 4) usage status	Usage status of the data memory is stored using the following bit pattern. (ON indicates being used.) b0: Event history b1: Unused b2: Label communication data b3 to b15: Unused	S (Status change)
SD622	Data memory (drive 4) capacity	Data memory (drive 4) capacity: the lower digits (unit: K bytes)	The capacity of the data memory is stored in increments of 1K byte. (The amount of free space for a formatted memory card is stored.)	S (Initial)
SD623		Data memory (drive 4) capacity: the higher digits (unit: K bytes)	The capacity of the data memory is stored in increments of 1K byte. (The amount of free space for a formatted memory card is stored.)	S (Initial)
SD633	Data memory write (transfer) status	Write (transfer) status display (percent)	This register displays write (transfer) status to the data memory in percentage. (0 to 100%). The initial value is "0". Upon completion of writing, this register is set to "100". It is set to "0" at the time when the write command is issued.*1	S (Writing)
SD634 SD635	Index for the number of data memory write operations	Index of the number of write operations up to now	• This register indicates the index value for the number of write operations to the data memory up to now (stored as a 32-bit BIN value). However, the number of write operations is not equal to the index value. • When the index value exceeds 100000, an error is generated. (The index value is continued to be counted even when it exceeds 100000.) If the index value exceeds 100000, the remote head module must be replaced.	S (Writing)

*1 "100" is stored when powering off and on or reset the remote head module. (Since the event history will be stored and data will be written into the data memory at the timing of powering off and on and resetting the remote head module, "100" is stored.)

Event history

The following table lists the special register areas relating to the event history.

No.	Name	Description	Details	Set by (setting timing)
SD1464 to SD1467	Module information on event history logging restriction	Module information on event history logging restriction	Modules on which event history logging is restricted are stored in the following bit patterns. (Off: No event history logging restricted, On: Event history logging restricted) b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SD1464: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 SD1465: 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 SD1466: 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 SD1467: 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 The numbers in the table indicate slot numbers. The ON state is maintained even after the event history logging restriction is lifted.	S (Status change)

A

Online module change function

The following table lists the special register areas relating to the online module change function.

No.	Name	Description	Details	Set by (setting timing)
SD1600	Module selection (base unit No.)	Base unit No. where the online change target module is mounted	The base unit number where the online change target module is mounted is specified. 0: Main base unit 1: 1st extension base unit ⋮ 7: 7th extension base unit FFFFH: Not specified (Default) The value returns to its default (FFFFH) upon completion of the online module change processing. When changing a module directly, the system stores the corresponding base unit number upon removal of the target module.	S (Status change)/U (Request)
SD1601	Module selection (slot No.)	Slot No. where the online change target module is mounted	The slot number where the online change target module is mounted is specified. 0: Slot No.0 1: Slot No.1 ⋮ 11: Slot No.11 FFFFH: Not specified (Default) The value returns to its default (FFFFH) upon completion of the online module change processing. When changing a module directly, the system stores the corresponding slot number upon removal of the target module.	S (Status change)/U (Request)
SD1602	I/O No. of the module being changed online	I/O No. of the module being changed online	This register stores the value of the I/O number of the module being changed online divided by 16. Other than FFFFH: I/O No. ÷ 16 FFFFH: Not specified (Default) The value returns to its default (FFFFH) upon completion of the online module change processing.	S (Status change)
SD1617	Online module change progress status	Online module change progress status	This resister stores the online module change progress status. 0: Normal operation 1: Module being selected 2: Module selected 3: Module removal requested 4: Module removal ready 5: Module removed 6: Module mounted 7: Module being recognized 8: Module recognized 9: Module control resumed The value becomes 0 upon completion of the online module change processing.	S (Status change)
SD1618	Online module change error code	0: Normal operation Other than 0: Error code	The corresponding error code is stored when an error is detected during online module change. For the value stored, refer to the list of error codes in the following manual. • 📖 MELSEC iQ-R CPU Module User's Manual (Application) This register is cleared to 0 when the error cause is eliminated and the online module change related request is executed. However, the error code needs to be cleared to 0 before module selection since this register is not cleared to 0 if an error occurs in selecting a module.	S (Status change)/U (Request)
SD1619	Disable request error code during online module change	0: Normal operation Other than 0: Error code	The corresponding error code is stored when a disable request is executed during online module change. The error code is cleared to 0 when the error cause is eliminated and the online module change related request is executed. For the value stored, refer to the list of error codes in the following manual. 📖 MELSEC iQ-R CPU Module User's Manual (Application)	S (Status change)

Redundant function

The following table lists the special register areas relating to the redundant function.

○: Can be set, ×: Cannot be set

No.	Name	Description	Details	Set by (setting timing)	Effective system	
					Control system	Standby system
SD1643	System switching cause	System switching cause occurred in own system	System switching cause occurred in own system is stored. The system switching cause is stored in this register even if the systems cannot be switched by a cause of system switching failure. This register is cleared to 0 when the system is powered on and off or reset. 0: Initial value (the control system never been switched) 1: Reset or hardware failure of the remote head module 2: Moderate error or major error 3: System switching due to data link error 16: Follow the system switching of the redundant line master station. 17: System switching request from the engineering tool When the systems are switched by resetting the control system, "1" is not stored in 'Cause of system switching' (SD1643) of the new standby system.	S (System switching)	○	○
SD1644	Cause of system switching failure	Cause number of system switching failure	Error cause in the control system is stored in this register when a system switching is failed. 0: System switching completed normally (default) 1: The standby system is not available for communications. (The standby system is in reset processing or not connected.) 2: Communication timeout 3: Moderate error or major error in the standby system 4: Both systems operate differently. 5: Memory copy from the control system to the standby system being executed 7: Data link error is detected in the standby system. 8: System switching being performed 9: Online module change being performed • When own system is powered on, this register is cleared to 0. • When the system switching is completed, 0 is stored in this register.	S (System switching)	○	○
SD1648	Cause of the other system monitoring error	Cause of the other system monitoring error	The following corresponding bit turns on when communication error occurs in the other system. That bit turns off when the error is cleared after that. Each bit turns on when the value is "0" and off when the value is "1". b0: Fixed to 0 b1: Reset or hardware failure in the other system b2: Moderate error or major error in the other system b3 to b14: Fixed to 0 b15: The other system is not available for communications. • If any of b1, b2, and b15 is on, the other bits are off. • When the other system is reset or in a hardware failure, b15 may turn on depending on the timing.	S (Every END/system switching)	○	○

No.	Name	Description	Details	Set by (setting timing)	Effective system	
					Control system	Standby system
SD1649	System switching cause (when the systems are successfully switched)	System switching cause (when the systems are successfully switched)	System switching cause is stored. • When the systems are switched, the cause for system switching is stored in 'System switching cause (when the systems are successfully switched)' (SD1649) of both systems. • This register is cleared to 0 when the system is powered on and off or reset. • The following shows the values stored in this register. 0: Initial value (the control system never been switched) 1: Reset or hardware failure of the remote head module 2: Moderate error or major error 3: System switching due to data link error 16: Follow the system switching of the redundant line master station. 17: System switching request from the engineering tool When the systems are switched by resetting the control system, "1" is not stored in 'System switching cause (when the systems are successfully switched)' (SD1649) of the new standby system.	S (System switching)	○	○
SD1654	Memory copy completion status	Memory copy completion status	This register stores the execution status of the memory copy. When the value other than 0 is stored, the memory copy is completed with an error or cannot be executed. 0: Memory copy completed normally 4241H: Power-off of the standby system 4247H: Memory copy being executed 4248H: Unsupported copy destination I/O number	S (Status change)	○	○
SD1681	Latest self-diagnostic error code (the other system)	Latest self-diagnostic error code (the other system)	• This register stores an error code for the error occurred in the other system with hexadecimal. • 'Latest self-diagnostic error code' (SD0) of the other system is reflected.	S (Every END)	○	○
SD1682 to SD1688	Latest self-diagnostic error time (the other system)	Latest self-diagnostic error time (the other system)	• An error time for the error occurred in the other system is stored. • Data configuration is the same as 'Latest self-diagnostic error time' (SD1) to 'Latest self-diagnostic error time' (SD7). • The values in 'Latest self-diagnostic error time' (SD1) to 'Latest self-diagnostic error time' (SD7) of the other system are reflected.	S (Every END)	○	○
SD1689	Detailed information 1 information category (the other system)	Information category code 1 (the other system)	• A detailed information 1 category code for the error occurred in the other system is stored. • Data configuration is the same as 'Detailed information 1 information category' (SD80). • The value in 'Detailed information 1 information category' (SD80) of the other system is reflected.	S (Every END)	○	○
SD1690 to SD1720	Detailed information 1 (the other system)	Detailed information 1 (the other system)	• A detailed information 1 for the error occurred in the other system is stored. • Data configuration is the same as 'Detailed information 1' (SD81 to SD111). • The values in 'Detailed information 1' (SD81 to SD111) of the other system are reflected.	S (Every END)	○	○

No.	Name	Description	Details	Set by (setting timing)	Effective system	
					Control system	Standby system
SD1721	Detailed information 2 information category (the other system)	Information category code 2 (the other system)	• A detailed information 2 category code for the error occurred in the other system is stored. • Data configuration is the same as 'Detailed information 2 information category' (SD112). • The value in 'Detailed information 2 information category' (SD112) of the other system is reflected.	S (Every END)	○	○
SD1722 to SD1752	Detailed information 2 (the other system)	Detailed information 2 (the other system)	• A detailed information 2 for the error occurred in the other system is stored. • Data configuration is the same as 'Detailed information 2' (SD113 to SD143). • The values in 'Detailed information 2' (SD113 to SD143) of the other system are reflected.	S (Every END)	○	○

Appendix 5 Access Code and Attribute Code

The following table lists the access codes and attribute code that are set when accessing the remote head module by using the RIRD or RIWT instruction of the master/local module.

Device description*1	Name	Device type		Unit	Access code	Attribute code
		Bit	Word			
Input	X	○	—	Hexadecimal	01H	05H
Output	Y	○	—	Hexadecimal	02H	
Link register	W	—	○	Hexadecimal	24H	
Link special relay	SB	○	—	Hexadecimal	63H	
Link special register	SW	—	○	Hexadecimal	64H	
Special relay	SM	○	—	Decimal	43H	
Special register	SD	—	○	Decimal	44H	

*1 Devices not listed in the table cannot be accessed. To access a bit device, specify 0 or a multiple of 16.

Appendix 6 Processing Time

Processing time used to calculate the transmission delay time

This section describes the processing time of the remote head module.

Point

To calculate the processing time of CC-Link IE Field Network, add the processing time of the remote head module to the processing time of the device stations.
For the processing time of the CC-Link IE Field Network, refer to the following.
User's manual for the master/local module used

Cyclic transmission delay time

The following is the formula to calculate the cyclic transmission delay time.*1

Condition	Input	Output
Normal value	Rio = 0.5 × (Z + 1) × LS + X + Y	Rio = 0.5 × Z × LS + X + Y
Maximum value	Rio = (Z + 1) × LS + X + Y	Rio = Z × LS + X + Y

*1 The meanings of the variables in the equation are as follows.

Variable	Meaning
Rio	Processing time [μs]
X	(Number of RX/RY points) × 0.026 + (Number of RWw/RWr points) × 0.255 + 620 + Ka [μs] • Number of RX/RY points: The number of RX/RY points assigned to the remote head module in the network configuration setting of the master module • Number of RWw/RWr points: The number of RWw/RWr points assigned to the remote head module in the network configuration setting of the master module • Ka: 90 × The number of mounted modules in which refresh settings are configured
Y	(Response time of the connected modules) [μs] (Manual for the module used)
Z	X ÷ LS (Round down the calculated value to the nearest integer.) [μs]
LS	Link scan time [μs]

The above formula calculates the average value when the number of RX/RY points is the same as the number of actual I/O points of the module connected to the remote head module, and an auto refresh of the same number of points as the number of RWw/RWr points was performed.

Transmission delay time of the safety communication relay

The following is the formula to calculate the I/O processing time of the intelligent device station (safety station) included in the transmission delay time of the safety communication relay.*1

Condition	Input	Output
Normal value	SRi = 0.5 × (Z+1) × LS + Ys	SRo = 0.5 × Z × LS + Ys
Maximum value	SRi = (Z+1) × LS + Ys	SRo = Z × LS + Ys

*1 The meanings of the variables in the equation are as follows.

Variable	Meaning
SRi	Input response time [μs]
SRo	Output response time [μs]
Ys	Safety I/O response time of the mounted modules [μs] (Manual for the module used)
Z	X ÷ LS (Round down the calculated value to the nearest integer.) [μs]
LS	Link scan time [μs]

A

Processing time of the safety communication relay

The following table lists the processing time of the safety communication relay of the remote head module during the link scan time of the master station.*1

Condition	Calculation formula
When modules in SIL2 mode of the intelligent device station communicate using safety protocol version 1	SRelay = 74 × Sa + 622
When modules in SIL2 mode of the intelligent device station communicate using safety protocol version 2	SRelay = 96 × Sa + 622

*1 The meanings of the variables in the equation are as follows.

Variable	Meaning
SRelay	Send processing time [μs]
Sa	The number of the target modules for safety communication relay (the number of modules set to SIL2 mode Main)

Transmission delay time of the dedicated instructions

The following is the formula to calculate the transmission delay time of the dedicated instructions.*1*2

Condition	Calculation formula
Normal value	Rio = 12 × X
Maximum value	Rio = 24 × X

*1 When the master station is in "Normal" mode

*2 The meanings of the variables in the equation are as follows.

Variable	Meaning
Rio	Processing time [μs]
X	(Number of RX/RY points) × 0.026 + (Number of RWw/RWr points) × 0.255 + 620 + Ka [μs] • Number of RX/RY points: The number of RX/RY points assigned to the remote head module in the network configuration setting of the master module • Number of RWw/RWr points: The number of RWw/RWr points assigned to the remote head module in the network configuration setting of the master module • Ka: 90 × The number of mounted modules in which refresh settings are configured

The above formula calculates the average value when the number of RX/RY points is the same as the number of actual I/O points of the module connected to the remote head module, and an auto refresh of the same number of points as the number of RWw/RWr points was performed.

System switching time

The calculation formula for the system switching time of the remote head module is as follows:*1

Line Type	System switching method	System switching cause	Calculation formula
Single Line	Automatic system switching	Reset or hardware failure	$H_{SW} = 15.5 + (2 \times LS)$
		Moderate error or major error	$H_{SW} = 13 + (3 \times LS)$
		Data link error	$H_{SW} = 2106 + T_C + (3 \times LS)$
	Manual system switching	System switching operation using the engineering tool	$H_{SW} = 13 + (3 \times LS)$
Redundant Line	Automatic system switching	Tracking of system switching of redundant master station system	$H_{SW} = 13 + (3 \times LS)$

*1 The meanings of the variables in the equation are as follows.

Variable	Meaning
H_{SW}	System switching time of the remote head module [ms]
LS	Link scan time [ms] (MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))
T_C	Setting value [ms] of system switching monitoring time set in the master station (MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))

Point

For the cyclic data hold time at system switching, refer to the following.
MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

A

Appendix 7 New or Revised Functions

The following table lists the new or revised functions of the remote head module.

New or revised function	Firmware version*1
Safety communication relay function	"05" or later
Event history logging restriction	"12" or later
Safety protocol version 2 for the safety communication relay function	"14" or later

*1 When 8-digit number is displayed on "Firmware Version" of "Product Information List" window in engineering tool, the first 2-digit shows the firmware version.

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REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Description
May 2016	SH(NA)-081616ENG-A	First edition
August 2016	SH(NA)-081616ENG-B	Error correction
January 2017	SH(NA)-081616ENG-C	■Added or modified parts SAFETY PRECAUTIONS, INTRODUCTION, TERMS, Section 1.2, 1.5, 1.8, 2.1, 4.7, 4.8
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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]

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(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

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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.
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TRANSLATION OF THE ORIGINAL INSTRUCTIONS

SH(NA)-081616ENG-K(2510)MEE
MODEL: RJ72GF15-T2-U-OU-E

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