MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-R series

MELSEC iQ-R CC-Link IE TSN Plus Master/Local Module User's Manual

-RJ71GN11-EIP

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.

[Design Precautions]

⚠ WARNING

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

[Design Precautions]

⚠ CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to electromagnetic interference. Keep a distance of 100mm or more between those cables.
- During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
- After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
- Do not power off the programmable controller or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so also may cause malfunction or failure of the module.

[Design Precautions]

⚠ CAUTION

- 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.

[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.
- 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.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- When a protective film is attached to the top of the module, remove it before system operation. If not, inadequate heat dissipation of the module may cause a fire, failure, or malfunction.
- Programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to the MELSEC iQ-R Module Configuration Manual.
- For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.

[Startup and Maintenance Precautions]

⚠ WARNING

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

[Startup and Maintenance Precautions]

⚠ CAUTION

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

[Startup and Maintenance Precautions]

⚠ CAUTION

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

[Operating Precautions]

⚠ CAUTION

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

[Disposal Precautions]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.
- When disposing of batteries, separate them from other wastes according to the local regulations. For details on battery regulations in EU member states, refer to the MELSEC iQ-R Module Configuration Manual.

[Transportation Precautions]

⚠ CAUTION

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

CONDITIONS OF USE FOR THE PRODUCT

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

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

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

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

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-R series programmable controllers.
This manual describes the system configuration, procedures, wiring, functions, programming, and troubleshooting of the relevant product 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

RJ71GN11-EIP

Point

Unless otherwise specified, the buffer memory addresses used for P1/P2 common in this manual are for when the P1 connecter is used.
Check the corresponding buffer memory addresses in the list and use the correct addresses. (☞ Page 500 List of buffer memory addresses (common information))

WHEN USING A SWITCHING HUB WITH CC-Link IE TSN

A dedicated TSN hub may be required depending on parameter settings or the network topology used to connect modules on CC-Link IE TSN.
Read the following carefully.
☞ Page 26 CC-Link IE TSN SYSTEM CONFIGURATION
☞ Page 71 Switching hub (when the system configured with CC-Link IE TSN)

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

Method of ensuring compliance

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

- MELSEC iQ-R Module Configuration Manual(SH-081262ENG)
- Safety Guidelines (IB-0800525)

Certification marks on the side of the programmable controller indicate compliance with the relevant regulations.

Additional measures

To ensure that this product maintains the EMC and Low Voltage Directives or other regulations, please refer to the following.

- MELSEC iQ-R Module Configuration Manual(SH-081262ENG)
- Safety Guidelines (IB-0800525)

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RELEVANT MANUALS

Manual name [manual number]	Description	Available form
MELSEC iQ-R CC-Link IE TSN Plus Master/Local Module User's Manual [SH-082472ENG] (this manual)	System configuration, specifications, procedures before operation, wiring, parameter settings, functions, programming, troubleshooting, I/O signals, and buffer memory of the CC-Link IE TSN Plus master/local module	Print book e-Manual PDF
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	Print book e-Manual PDF
MELSEC iQ-R Programming Manual (Module Dedicated Instructions) [SH-081976ENG]	Dedicated instructions for the intelligent function modules	e-Manual PDF
MELSEC iQ-R Ethernet, CC-Link IE, and MELSECNET/H Function Block Reference [BCN-P5999-0381]	Specifications of the FBs of the following modules. • MELSEC iQ-R Ethernet-equipped module • CC-Link IE TSN master/local module • CC-Link IE TSN Plus master/local module • CC-Link IE Controller Network module • CC-Link IE Field Network master/local module • MELSECNET/H network module	e-Manual PDF
MELSEC iQ-R EtherNet/IP Function Block Reference [BCN-P5999-0942]	Specifications of the FBs of the EtherNet/IP network interface module and CC-Link IE TSN Plus master/local module	e-Manual PDF
GX Works3 Operating Manual [SH-081215ENG]	System configuration, parameter settings, and online operations of GX Works3	e-Manual PDF
SLMP Reference Manual [SH-080956ENG]	A protocol used to access an SLMP-compatible device from an external device (such as a personal computer or HMI (Human Machine Interface)) or an SLMP-compatible module (such as the Ethernet-equipped module or modules on CC-Link IE TSN)	Print book e-Manual PDF
MELSEC iQ-R Inter-Module Synchronization Function Reference Manual [SH-081401ENG]	Inter-module synchronization function, which controls multiple modules synchronously	e-Manual PDF

This manual does not include detailed information on the following:

- General specifications
- Applicable combinations of CPU modules and the other modules, and the number of mountable modules
- Installation

For details, refer to the following.

MELSEC iQ-R Module Configuration Manual

Point

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- The hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

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.
CC-Link IE TSN Class*1	A group of devices and switching hubs compatible with CC-Link IE TSN, classified according to the functions and performance by the CC-Link Partner Association. For CC-Link IE TSN Class, refer to the CC-Link IE TSN Installation Manual (BAP-C3007ENG-001) published by the CC-Link Partner Association.
CC-Link IE TSN Protocol version 1.0	This protocol is used to perform communications by using the time sharing method defined by IEEE 802.1AS or IEEE 1588 for time synchronization.
CC-Link IE TSN Protocol version 2.0	This protocol is used to perform communications by using the time sharing method defined by IEEE 802.1AS and time-managed polling method for time synchronization.
Conformance test	Test performed for communications of a CC-Link or CC-Link IE product to ensure their high reliability. For details, refer to the CC-Link Partner Association website (www.cc-link.org).
Control CPU	A CPU module that controls connected I/O modules and intelligent function modules. In a multiple CPU system, a control CPU can be set for each module.
CPU module (built-in Ethernet port part)	A built-in Ethernet port part of a CPU module (CPU part for an RnENCPU)
Cyclic data transfer processing	Processing of a cyclic transmission from its start to finish, performed by all the stations on a single network. The processing is performed asynchronously with the sequence scan of the CPU module. The cyclic data transfer processing time varies depending on data volume and the number of transient transmission requests.
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*2	A station other than a master station: a local station, a remote station
Engineering tool	A tool used for setting up programmable controllers, programming, debugging, and maintenance
EtherNet/IP device	A device, personal computer, and other equipment connected via EtherNet/IP for data communications
General-purpose hub	A CC-Link IE TSN Class A switching hub authorized by CC-Link Partner Association (☞ Page 71 Switching hub (when the system configured with CC-Link IE TSN))
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.
Grandmaster	A source device or station to synchronize clocks in the time synchronization via PTP (Precision Time Protocol)
Group No.	Number that is assigned for transient transmission to any given stations. By specifying a group of stations as transient transmission target, data can be sent to the stations of the same group No.
Intelligent function module	A module that has functions other than an input or output, such as an A/D converter module and D/A converter module
Link device	A device (RX, RY, RWr, RWw, LB, or LW) in a module on CC-Link IE TSN
Link refresh	Processing of data transfer between link devices of the network module and CPU module devices. Link refresh is performed in "END processing" of the sequence scan of the CPU module.
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.
Multicast filter	A filter function that selects whether to send cyclic data of multicast mode received by the own station to the subsequent stations. Setting parameters for this function are not required because the master station automatically sets the parameters according to the system configuration.
Multicast mode	A communication mode used to send cyclic data to multiple stations
Relay station	A station that relays data link to other station with mounting more than one network modules on one programmable controller.
Remote station	A station that exchanges I/O signals (bit data) and I/O data (word data) with another station by cyclic transmission. This station can perform transient transmission.
Reserved address	An IP address reserved for special purposes, defined by RFC 6890. This IP address cannot be used when the programmable controller is connected via the global IP network.
RnENCPU (network part)	A module on the right-hand side of the RnENCPU (📖 MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))

Term	Description
SLMP	A SeamLess Message Protocol. This protocol is used to access an SLMP-compatible device or a programmable controller connected to an SLMP-compatible device from an external device.
TSN hub	A CC-Link IE TSN Class B switching hub authorized by CC-Link Partner Association (☞ Page 71 Switching hub (when the system configured with CC-Link IE TSN))
Unicast mode	A communication mode used to send cyclic data to one station

*1 The term has been changed for standardization among manuals and software applications related to CC-Link IE TSN. However, the term used in some CC-Link IE TSN related software windows may remain unchanged and may be different from the term used in this manual.
In case of inconsistency, refer to the following.

Term used in software window	Term after change
Authentication Class	CC-Link IE TSN Class

*2 The term has not been replaced yet in some areas in the engineering tool, and there may be differences between some window images of the engineering tool and the corresponding description in this manual.
In case of inconsistency, refer to the following.

Term used in software window	Term after change
Slave station	Device station

GENERIC TERMS AND ABBREVIATIONS

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

Generic term/abbreviation	Description
API	An abbreviation for Actual Packet Interval. A communication cycle that is decided by the target during communications between EtherNet/IP devices.
CC-Link IE	A generic term for the following items: • CC-Link IE TSN • CC-Link IE Controller Network (📖 MELSEC iQ-R CC-Link IE Controller Network User's Manual (Application)) • CC-Link IE Field Network (📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application))
CC-Link IE Controller Network-equipped module	An RJ71GP21-SX CC-Link IE Controller Network module, an RJ71GP21S-SX CC-Link IE Controller Network module, and the following modules when the CC-Link IE Controller Network function is used: • RJ71EN71 • RnENCPU
CC-Link IE Field Network-equipped master/local module	A generic term for the RJ71GF11-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
CC-Link IE TSN Plus module	An abbreviation for the MELSEC iQ-R CC-Link IE TSN Plus master/local module
CC-Link IE TSN-equipped module	A generic term for the RJ71GN11-T2 and RJ71GN11-EIP
CONCLOSE	An abbreviation for GP.CONCLOSE
CONOPEN	An abbreviation for GP.CONOPEN
Consumer Tag	Another name for the consumed tag
CPU module	A generic term for the MELSEC iQ-R series CPU modules
Data link	A generic term for cyclic transmission and transient transmission
DHCP	An abbreviation for Dynamic Host Configuration Protocol. A protocol used for automatically assigning the information required for the network such as an IP address.
Ethernet device	A generic term for the devices supporting IP communication (such as a personal computer, a vision sensor, and a bar code reader)
Ethernet-equipped module	A generic term for the following modules when the Ethernet function is used: • RJ71EN71 • CPU module
ICMP	An abbreviation for Internet Control Message Protocol. This protocol is used to exchange messages of errors in an IP network or other information related to an Ethernet network.
LB	An abbreviation for a link relay of a link device. Bit data send from each station of the network.
LW	An abbreviation for a link register of a link device. Word data send from each station of the network.
MELSECNET/10	An abbreviation for the MELSECNET/10 network system
MELSECNET/H	An abbreviation for the MELSECNET/H network system
Network module	A generic term for the following modules: • Ethernet interface module • CC-Link IE TSN modules (CC-Link IE TSN master/local module, CC-Link IE TSN Plus master/local module, and remote station module) • CC-Link IE Controller Network module • A module on CC-Link IE Field Network (a master/local module, and a module on a remote I/O station, a remote device station, and an intelligent device station) • MELSECNET/H network module • MELSECNET/10 network module • RnENCPU (network part)
NZ2MHG-TSNT□	A CC-Link IE TSN-compatible industrial managed switch classified as a TSN hub 📖 CC-Link IE TSN Industrial Managed Ethernet Switch User's Manual
PDO	An abbreviation for Process Data Object. Aggregation of application objects transferred periodically between multiple CANopen nodes.
PPS	An abbreviation for Packets Per Second. The number of packets that can be processed per second.
Producer Tag	Another name for the produced tag
Protocol version	An abbreviation for CC-Link IE TSN Protocol version
PTP	An abbreviation for Precision Time Protocol. A predefined protocol for time synchronization between devices on a network.
READ	A generic term for the JP.READ and GP.READ
RECV	A generic term for the JP.RECV and GP.RECV
REMFR	A generic term for the JP.REMFR and ZP.REMFR

Generic term/abbreviation	Description
REMFRD	An abbreviation for the JP.REMFRD
REMFRDIP	An abbreviation for the GP.REMFRDIP
REMFRIP	An abbreviation for the GP.REMFRIP
REMTO	A generic term for the JP.REMTO and ZP.REMTO
REMTOD	An abbreviation for the JP.REMTOD
REMTODIP	An abbreviation for the GP.REMTODIP
REMTOIP	An abbreviation for the GP.REMTOIP
REQ	A generic term for the J.REQ, JP.REQ, G.REQ, and GP.REQ
RPI	An abbreviation for Requested Packet Interval. A communication cycle that is decided by the originator during communications between EtherNet/IP devices.
RWr	An abbreviation for a remote register of a link device. 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.)
RWw	An abbreviation for a remote register of a link device. 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.)
RX	An abbreviation for remote input of a link device. Bit data input from a device station to the master station. (For some areas in a local station, data are input in the opposite direction.)
RY	An abbreviation for remote output of a link device. Bit data output from the master station to a device station. (For some areas in a local station, data are output in the opposite direction.)
SB	An abbreviation for a link special relay. Bit data that indicates the operating status and data link status of a module on CC-Link IE.
SDO	An abbreviation for Service Data Object. A message to access an object entry in the object dictionary of a CANopen node. Data is sent/received between the stations aperiodically.
SEND	A generic term for the JP.SEND and GP.SEND
SLMPSND	A generic term for the J.SLMPSND, JP.SLMPSND, G.SLMPSND, and GP.SLMPSND
SOCRCV	An abbreviation for GP.SOCRCV
SOCSND	An abbreviation for GP.SOCSND
SREAD	A generic term for the JP.SREAD and GP.SREAD
SW	An abbreviation for a link special register. Word data that indicates the operating status and data link status of a module on CC-Link IE.
SWRITE	A generic term for the JP.SWRITE and GP.SWRITE
WRITE	A generic term for the JP.WRITE and GP.WRITE

PART 1 OVERVIEW

This part consists of the following chapters.

1 WHAT CAN BE PERFORMED WITH THIS MODULE

2 CC-Link IE TSN SYSTEM CONFIGURATION

3 EtherNet/IP SYSTEM CONFIGURATION

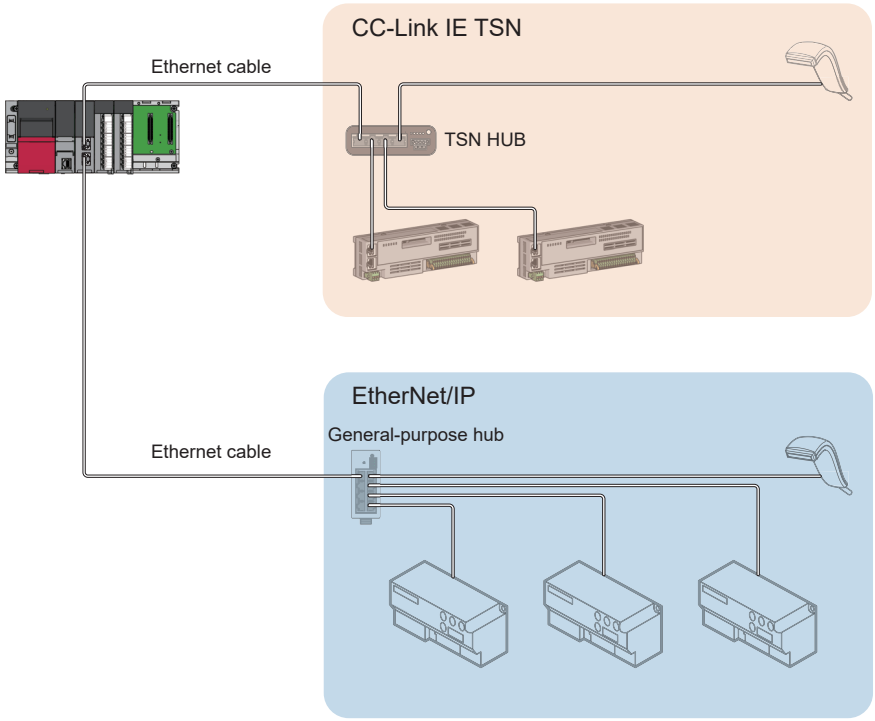
1 WHAT CAN BE PERFORMED WITH THIS MODULE

The CC-Link IE TSN Plus module has the following features.

Communicating with two networks with a single module

The CC-Link IE TSN Plus module can communicate with the following networks.

- CC-Link IE TSN
- EtherNet/IP™



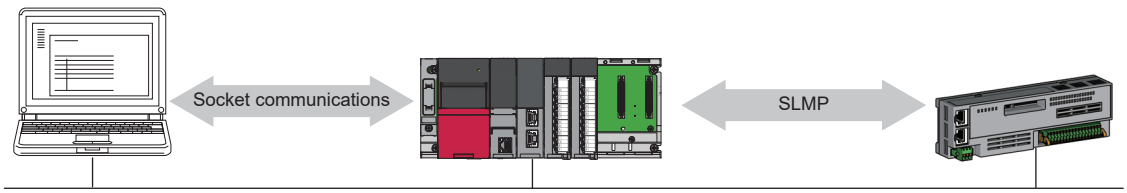
A single CC-Link IE TSN Plus module can communicate with CC-Link IE TSN and EtherNet/IP compatible products.
While CC-Link IE TSN is used, EtherNet/IP compatible products can be used. Both networks can be used simultaneously without affecting the performance of each other.

Point

When using CC-Link IE TSN, connect the Ethernet cable to P1.
When using EtherNet/IP, connect the Ethernet cable to P2.

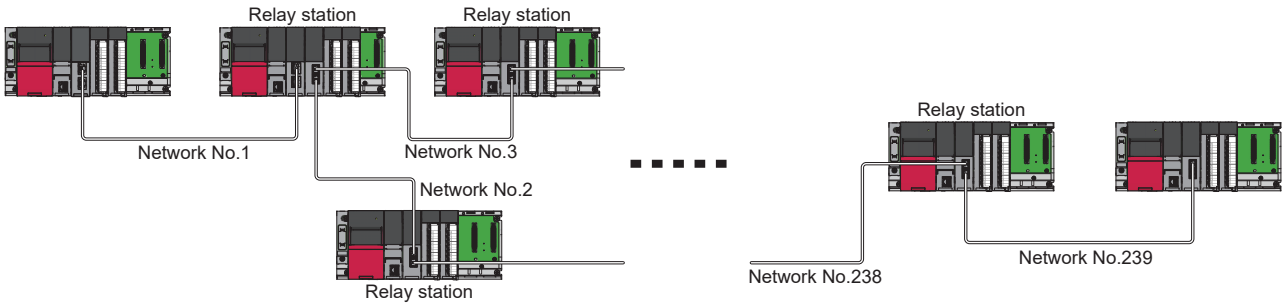
Supporting socket communications

The CC-Link IE TSN Plus module supports socket communications, which enables direct communication with external devices via Ethernet communication.
In addition to SLMP-compatible devices, devices that do not support SLMP can be connected via general-purpose Ethernet communication.



Number of connectable networks

In CC-Link IE TSN communications, a total of 239 networks can be connected between Mitsubishi Electric programmable controller network modules by relay stations*1, regardless of the network type*2. (Relaying via EtherNet/IP cannot be performed.)



*1 This is a station that relays data link to other station with mounting more than one network modules on one programmable controller.
*2 This type corresponds to CC-Link IE TSN, Ethernet, CC-Link IE Field Network, and CC-Link IE Controller Network.

Primary functions of CC-Link IE TSN

The CC-Link IE TSN Plus module has the following functions using CC-Link IE TSN. (☞ Page 152 FUNCTIONS)

- Cyclic transmission
- Transient transmission
- Security (IP filter, remote password)
- RAS (device station disconnection, automatic return, master station duplication detection, IP address duplication detection, time synchronization)
- CC-Link IE TSN Network synchronous communication function
- CC-Link IE TSN/CC-Link IE Field diagnostics

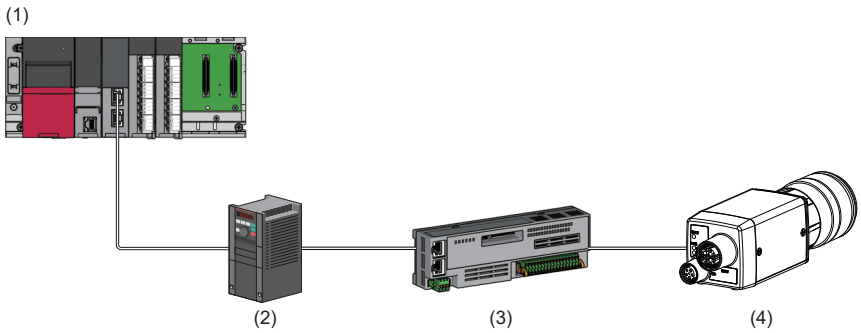
Primary functions of EtherNet/IP

The CC-Link IE TSN Plus module has the following functions using EtherNet/IP. (☞ Page 270 FUNCTIONS)

- Cyclic transmission function (Class1 communications)
- Message communication function (Client) (UCMM/Class3 communications)
- Message communication function (Server) (UCMM/Class3 communications)

2 CC-Link IE TSN SYSTEM CONFIGURATION

CC-Link IE TSN is configured using Ethernet cables. (☞ Page 71 Ethernet cable)



(1) CC-Link IE TSN Plus module
(2) Inverter device
(3) Remote I/O module
(4) Ethernet device (such as a vision sensor)

Precautions

- When CC-Link IE TSN is used with the CC-Link IE TSN Plus module, only P1 can be connected. (P2 cannot be connected.) Therefore, connect the CC-Link IE TSN Plus module to the end of the system configuration.
- A dedicated TSN hub may be required depending on parameter settings or the network topology used to connect modules on CC-Link IE TSN.

System configuration list

The following is a list of system configurations.

Structure	Reference
Structure of CC-Link IE TSN Class B devices and Ethernet devices	Page 28 Structure of CC-Link IE TSN Class B Devices and Ethernet Devices
Structure of CC-Link IE TSN Class B/A devices and Ethernet devices	Page 38 Structure of CC-Link IE TSN Class B/A Devices and Ethernet Devices
Structure of CC-Link IE TSN and CC-Link IE Field Network	Page 53 Structure of CC-Link IE TSN and CC-Link IE Field Network
Structure When CC-Link IE TSN Communication Software is used	Page 54 Structure When CC-Link IE TSN Communication Software Is Used

Unicast mode and multicast mode

Cyclic transmission differs depending on the communication mode set by the module parameter of the master station. The communication modes are as follows.

- Unicast mode
- Multicast mode

For details, refer to the following.

☞ Page 156 Cyclic Transmission

CC-Link IE TSN Class Setting

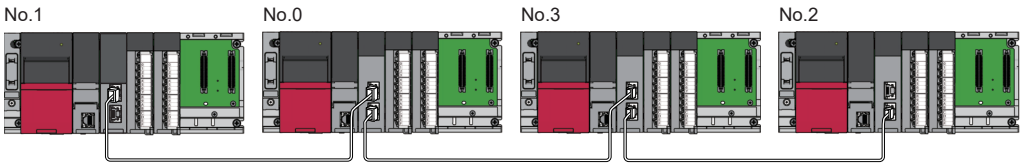
From "Connection Device Information" under "Basic Settings" of the engineering tool, select either of the following items according to devices to be connected.

Connected device information	System configuration	Supported standard
CC-Link IE TSN Class B Only	Select this if the system is to be configured without connecting the CC-Link IE TSN Class A device. ☞ Page 33 Connection with modules on CC-Link IE TSN only ☞ Page 36 Connection with modules on CC-Link IE TSN and Ethernet devices	IEEE 802.1AS
Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only	Select this if the system is to be configured by connecting a CC-Link IE TSN Class A device now or in the future. (Connection is also possible when the system is configured with CC-Link IE TSN Class B devices only.) ☞ Page 38 Structure of CC-Link IE TSN Class B/A Devices and Ethernet Devices	IEEE 802.1AS or IEEE 1588*1

*1 IEEE 802.1AS or IEEE 1588 depends on the protocol version of the connected device. For details, refer to the following.
☞ Page 611 Time synchronization method and connection specifications for network configuration devices

Point

Modules can be connected in any order regardless of the station number. A No.☐ shown in the figure below represents a station number.



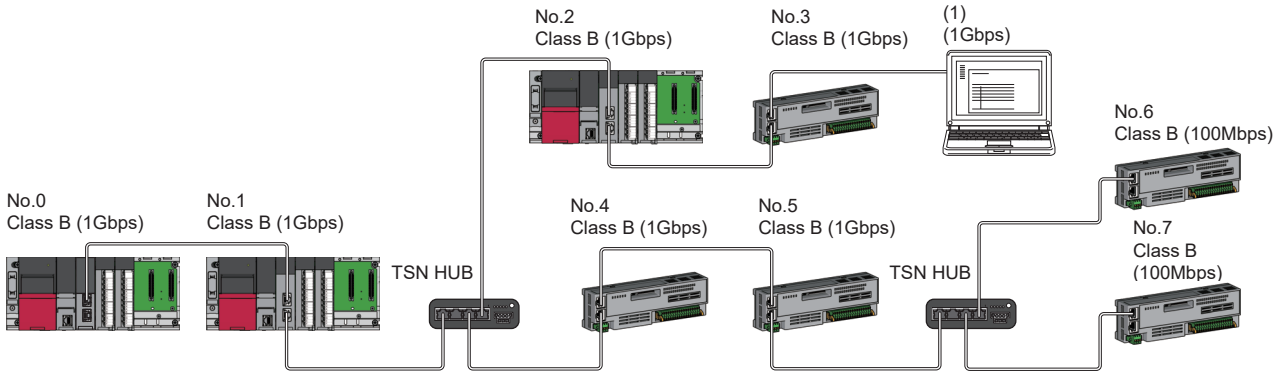
No.1: CC-Link IE TSN Plus module
No.0, No.2, and No.3: CC-Link IE TSN master/local module

Ethernet connection

For connection with MELSOFT products and connection with SLMP-compatible devices, refer to the following.
☞ Page 193 Ethernet Connection

2.1 Structure of CC-Link IE TSN Class B Devices and Ethernet Devices

This section describes the system configuration when "Connection Device Information" under "Basic Settings" of the engineering tool is set to "CC-Link IE TSN Class B Only".
When "Connection Device Information" under "Basic Settings" of the master station is set to "CC-Link IE TSN Class B Only", up to 121 devices (1 master station and 120 device stations) can be connected.

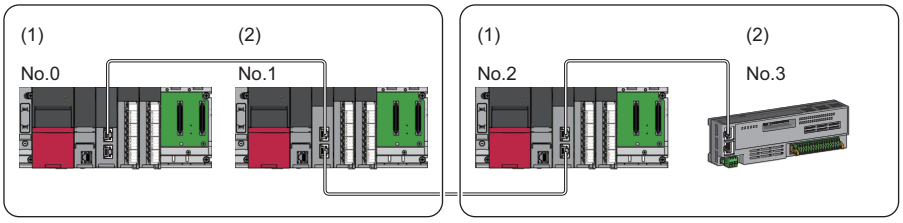


No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3 to No.7: Remote station
(1) Ethernet device
Class B: CC-Link IE TSN Class B device

The availability of connection of network configuration devices varies depending on the communication mode and communication speed.

Communication mode	Reference
Unicast mode	☞ Page 29 When the communication speed for the master station is set to 1Gbps ☞ Page 30 When the communication speed for the master station is set to 100Mbps
Multicast mode	☞ Page 31 When the communication speed for the master station is set to 1Gbps ☞ Page 32 When the communication speed for the master station is set to 100Mbps

The following terms are used to describe the terms in the tables referenced.



No.0: Master station
No.1, No.2: Local station
No.3: Remote station
(1) Device on the master station side (The master station or a device near the master station)
(2) Device on the end side (A device far from the master station)

Structure of unicast mode

This mode indicates the availability of connection with a network configuration device when "Communication Mode" under "Application Settings" is set to "Unicast".

When the communication speed for the master station is set to 1Gbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station is set to "1Gbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (The side near the master station)		Device on the end side (The side far from the master station)					
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	1Gbps	○S*3*4	×	○S*3	△S*1*3	○SH	△SH*5
Local station (CC-Link IE TSN Class B device)	1Gbps	○S*4*6	×	○S*6	△S*1*2*6	○SH*7	△SH*5*7
	100Mbps	×	×	×	×	×	×
Remote station (CC-Link IE TSN Class B device)	1Gbps	○S*4	×	○S	△S*1*2	○SH	△SH
	100Mbps	×	×	×	○S*1*2	×	○SH

*1 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Low-Speed".

*2 A connection cannot be established if the total cyclic data size of all device stations on the 100Mbps device side exceeds 2K bytes at the boundary between the communication speed of 1Gbps and 100Mbps. (☞ Page 56 Calculation of the total cyclic data size)

*3 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*4 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*5 If the device on the master station side is a CC-Link IE TSN Plus module, P2 can be connected without passing through a switching hub.

*6 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*7 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

■Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

When the communication speed for the master station is set to 100Mbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station set to "100Mbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (The side near the master station)		Device on the end side (The side far from the master station)					
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	100Mbps	×	○S*1*2*3	×	○S*1*2	×	○SH
Local station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×
	100Mbps	×	○S*1*3*4	×	○S*1*4	×	○SH*5
Remote station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×
	100Mbps	×	○S*1*3	×	○S*1	×	○SH

*1 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Basic Period" or "Normal-Speed" (4 times).

*2 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*3 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*4 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*5 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

■Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

Structure of multicast mode

This mode indicates the availability of connection with a network configuration device when "Communication Mode" under "Application Settings" is set to "Multicast".

When the communication speed for the master station is set to 1Gbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station is set to "1Gbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (The side near the master station)		Device on the end side (The side far from the master station)					
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	1Gbps	○S*2*5*6	×	○S*2*5	△S*1*2*5	○SH*2	△SH*2*7
Local station (CC-Link IE TSN Class B device)	1Gbps	○S*2*6*8	×	○S*2*8	△S*1*2*3*4*8	○SH*2*4*9	△SH*2*4*7*9
	100Mbps	×	×	×	×	×	×
Remote station (CC-Link IE TSN Class B device)	1Gbps	○S*2*6	×	○S*2	△S*1*2*3*4	○SH*2*4	△SH*2*4
	100Mbps	×	×	×	○S*1*2*3	×	○SH*2*4

*1 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Low-Speed".

*2 When the device is connected on the end side via the switching hub as shown below, communication may not be possible depending on the type of the device.
The communication will be enabled by configuring settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the ports specified below.

Connection structure that cannot be communicated	Port that prohibits multicast frame transfer
Device stations with different communication speeds of 1Gbps and 100Mbps coexist.	Connection port of the device station with 100Mbps
A local station and Ethernet device coexist.	Connection port of the Ethernet device
The remote station and Ethernet device coexist.	

*3 A connection cannot be established if the total cyclic data size of all device stations on the 100Mbps device side exceeds 2K bytes at the boundary between the communication speed of 1Gbps and 100Mbps. (☞ Page 56 Calculation of the total cyclic data size)

*4 For a local station or remote station of a device on the master station side, use a device supporting the multicast filter. For more information regarding support for the multicast filter, refer to the manual for each device to be used.

*5 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*6 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*7 If the device on the master station side is a CC-Link IE TSN Plus module, P2 can be connected without passing through a switching hub.

*8 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*9 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

■Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

When the communication speed for the master station is set to 100Mbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station set to "100Mbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (The side near the master station)		End device (The side far from the master station)					
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	100Mbps	×	○S*1*2*4*5	×	○S*1*2*4	×	○SH*2
Local station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×
	100Mbps	×	○S*1*2*5*6	×	○S*1*2*6	×	○SH*2*3*7
Remote station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×
	100Mbps	×	○S*1*2*5	×	○S*1*2	×	○SH*2*7

*1 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Basic Period" or "Normal-Speed" (4 times).

*2 When the device is connected on the end side via the switching hub as shown below, communication may not be possible depending on the type of the device.
The communication will be enabled by configuring settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the ports specified below.

Connection structure that cannot be communicated	Port that prohibits multicast frame transfer
A local station and Ethernet device coexist.	Connection port of the Ethernet device
The remote station and Ethernet device coexist.	

*3 For a local station or remote station of a device on the master station side, use a device supporting the multicast filter. For more information regarding support for the multicast filter, refer to the manual for each device to be used.

*4 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*5 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*6 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*7 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

■Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

Structure with modules on CC-Link IE TSN only

This section describes the system configurations when the system consists only of modules with CC-Link IE TSN (master station, local stations, remote stations) of CC-Link IE TSN Class B devices.

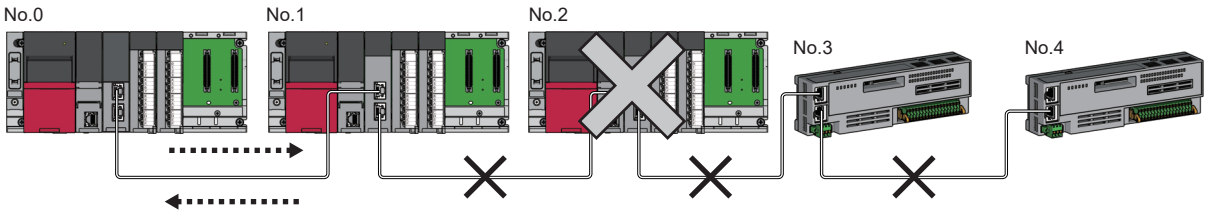
Item	Network topology	Reference
Structure with CC-Link IE TSN modules only	Line topology	Page 33 Line topology
	Star topology	Page 33 Star topology
	Coexistence of line and star topologies	Page 33 Coexistence of line and star topologies
Structure with CC-Link IE TSN modules with a communication speed of 100Mbps	Line topology	Page 34 Line topology
	Star topology	Page 34 Star topology
	Coexistence of line and star topologies	Page 35 Coexistence of line and star topologies

Connection with modules on CC-Link IE TSN only

■Line topology

The network is configured in a line topology. A TSN hub is not required.

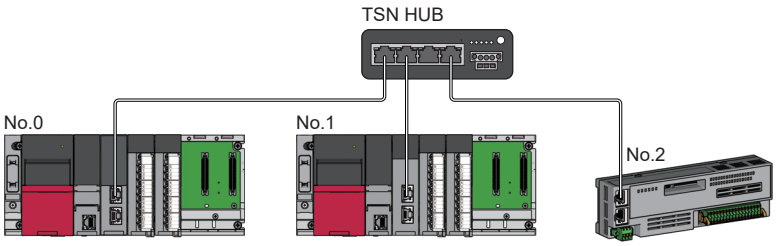
When an error occurs in a device station, the stations connected after the faulty station will be disconnected.



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3, No.4: Remote station

■Star topology

The network is configured in a star topology via a TSN hub. This allows devices to be added easily.

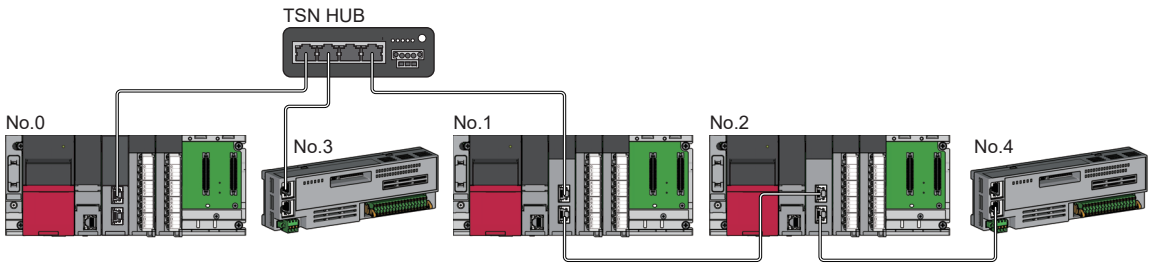


No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2: Remote station

Even when an error occurs in a device station, a data link can be continued with the stations that are operating normally.

■Coexistence of line and star topologies

Line and star topologies can be mixed in the same network configuration.



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3, No.4: Remote station

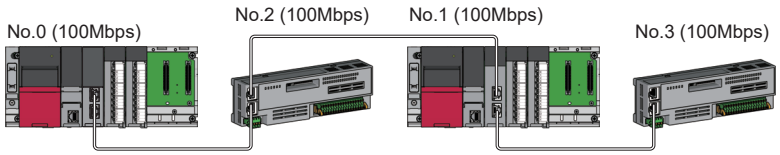
Connection with modules on CC-Link IE TSN with a communication speed of 100Mbps

This section describes the network topology when "Communication Speed" under "Application Settings" is set to "100Mbps".

■Line topology

The network is configured in a line topology.

- Adjust the communication speed of each module.
- When connecting modules with different communication speeds, connect the modules via a TSN hub.

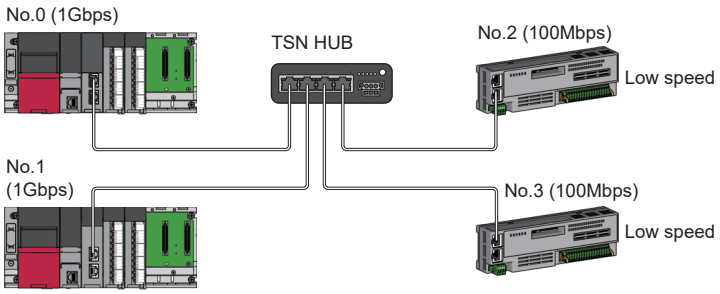


No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station

■Star topology

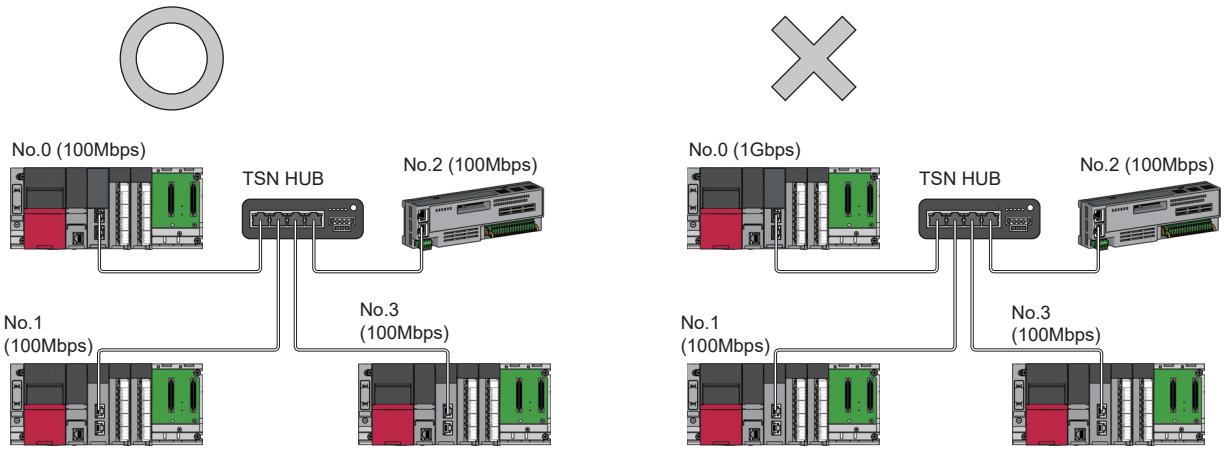
The network is configured in a star topology via a switching hub.

- When the master station with a communication speed of 1Gbps and a remote station with a communication speed of 100Mbps exist in the structure, set "Communication Period Setting" to "Low-Speed" for the remote station with a communication speed of 100Mbps.



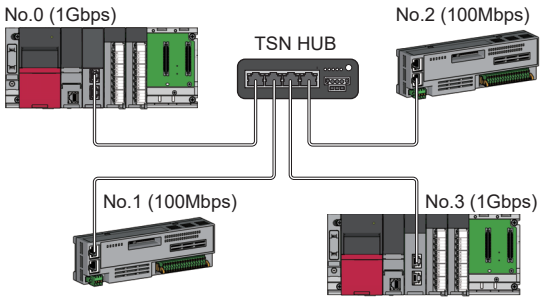
No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station

- Connect the master station and local station at the same communication speed.



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.3: Local station
No.2: Remote station

- When "Communication Mode" is set to "Multicast" and "Communication Speed" of the master station is set to "1Gbps", communication may not be possible depending on the type of the device if device stations with different communication speeds of 1Gbps and 100Mbps coexist on the end side via the switching hub. The communication will be enabled by configuring settings with the TSN hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the device station with 100Mbps.

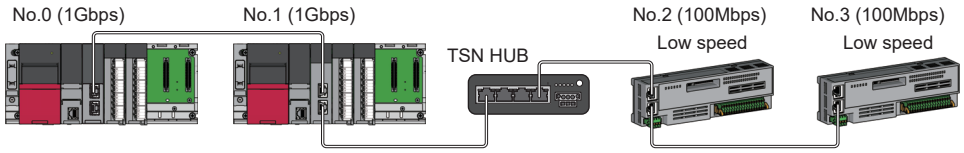


No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Remote station
No.3: Local station

■Coexistence of line and star topologies

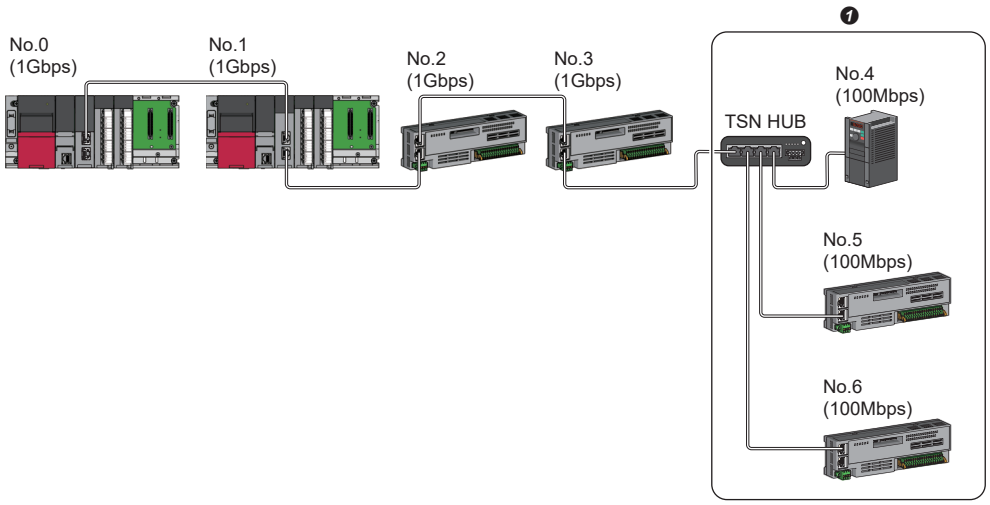
Line and star topologies can be mixed in the same network configuration.

- When the master station with a communication speed of 1Gbps and a remote station with a communication speed of 100Mbps exist in the structure, set "Communication Period Setting" to "Low-Speed" for the remote station with a communication speed of 100Mbps.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station

- When the communication speed of the master station is 1Gbps, a connection cannot be established if the total cyclic data size of all device stations on the 100Mbps device side exceeds 2K bytes. This includes the devices with a communication speed of 100Mbps that form a boundary between the communication speed of 1Gbps and 100Mbps.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2 to No.6: Remote station
❶ Set the total cyclic data size within 2K bytes.

Structure with modules on CC-Link IE TSN and Ethernet devices

Connection with modules on CC-Link IE TSN and Ethernet devices

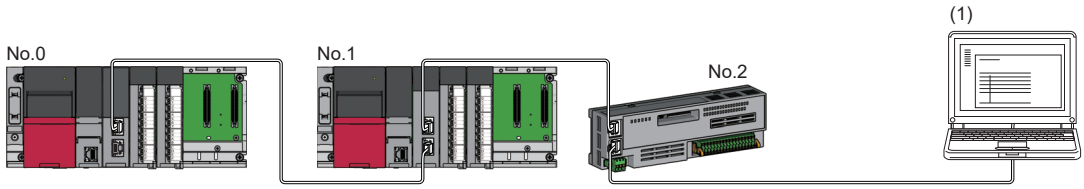
This section describes the system configurations when the system consists of modules with CC-Link IE TSN (master station, local stations, remote stations) of CC-Link IE TSN Class B devices and Ethernet devices.

Network topology	Reference
Line topology	Page 36 Line topology
Star topology	Page 36 Star topology
Coexistence of line and star topologies	Page 37 Coexistence of line and star topologies

■Line topology

The network with modules and devices is configured in a line topology. A TSN hub is not required.

Connect Ethernet devices to the end of the network.



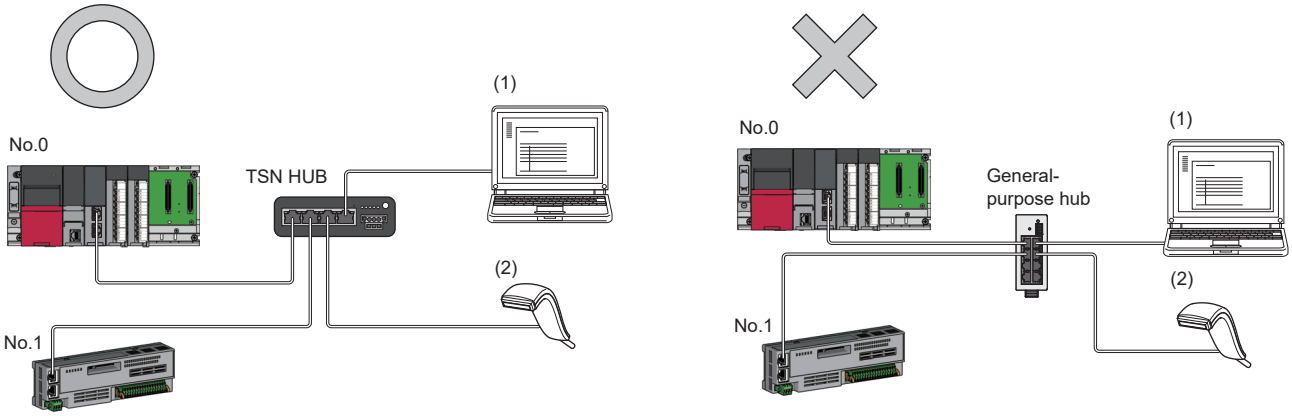
No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2: Remote station
(1) Ethernet device (such as a personal computer)

When an error occurs in a device station, the stations connected after the faulty station will be disconnected.

■Star topology

The network is configured in a star topology via a switching hub.

Device stations cannot be connected with a general-purpose hub. Line and star topologies should be mixed in the same network configuration.

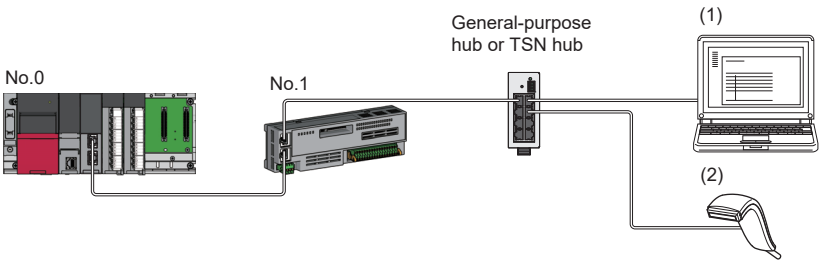


No.0: Master station (CC-Link IE TSN Plus module)
No.1: Remote station
(1), (2): Ethernet device

■Coexistence of line and star topologies

Line and star topologies can be mixed in the same network configuration.

- Connect Ethernet devices to the end of the network.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Remote station
(1), (2): Ethernet device

2.2 Structure of CC-Link IE TSN Class B/A Devices and Ethernet Devices

The following diagram shows the system configuration under the conditions below:

- CC-Link IE TSN Plus module supports protocol version 2.0.
- CC-Link IE TSN Plus module is protocol version 2.0 only.
- "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only" is set for "Connection Device Information" under "Basic Settings" in the engineering tool

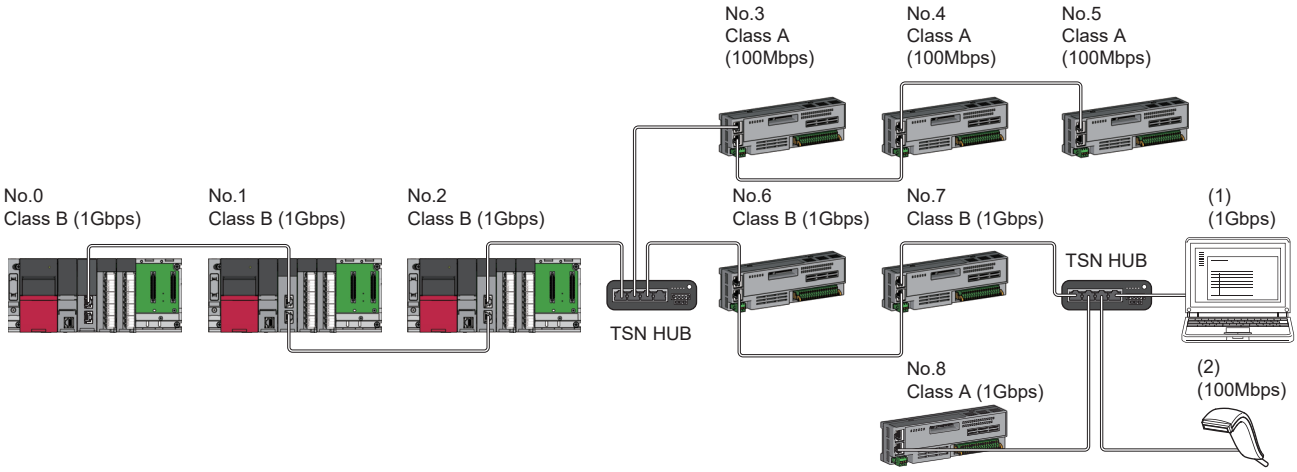
When "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only", up to 121 devices (1 master station and 120 device stations) can be connected.

Point

If a CC-Link IE TSN module with protocol version 1.0 is to be connected as well, refer to the following.

☞ Page 595 Structure of CC-Link IE TSN Class B/A Devices (Protocol Version 1.0 Only) and Ethernet Devices

☞ Page 610 Structure of CC-Link IE TSN Class B/A Devices (Mixture of Protocol Versions 1.0 and 2.0) and Ethernet Devices

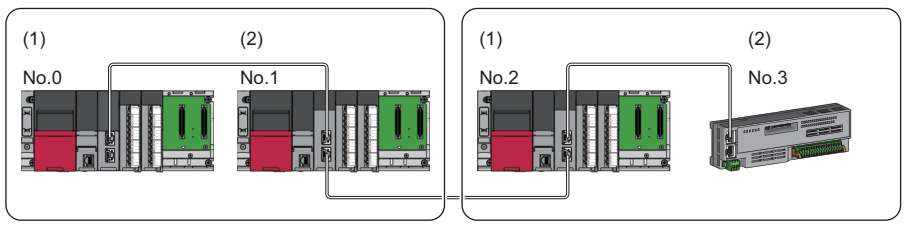


No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3 to No.8: Remote station
(1), (2): Ethernet device
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

The availability of connection of network configuration devices varies depending on the communication mode and communication speed.

Communication mode	Reference
Unicast mode	☞ Page 39 When the communication speed for the master station is set to 1Gbps ☞ Page 40 When the communication speed for the master station is set to 100Mbps
Multicast mode	☞ Page 41 When the communication speed for the master station is set to 1Gbps ☞ Page 42 When the communication speed for the master station is set to 100Mbps

The following terms are used to describe the terms in the tables referenced.



No.0: Master station
No.1, No.2: Local station
No.3: Remote station
(1) Device on the master station side (The master station or a device near the master station)
(2) Device on the end side (A device far from the master station)

Structure of unicast mode

This mode indicates the availability of connection with a network configuration device when "Communication Mode" under "Application Settings" is set to "Unicast".

When the communication speed for the master station is set to 1Gbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station is set to "1Gbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (A device near the master station)		Device on the end side (A device far from the master station)							
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class A device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	1Gbps	○S*4*5	×	○S*4	△S*1*4	○SH*2*4	△SH*1*2*4	○SH	△SH*6
Local station (CC-Link IE TSN Class B device)	1Gbps	○S*5*7	×	○S*7	△S*1*3*7	○SH*2*7	△SH*1*2*7	○SH*8	△SH*6*8
	100Mbps	×	×	×	×	×	×	×	×
Remote station (CC-Link IE TSN Class B device)	1Gbps	○S*5	×	○S	△S*1*3	○SH*2	△SH*1*2	○SH	△SH
	100Mbps	×	×	×	○S*1*3	×	○SH*1*2*3	×	○SH
Remote station (CC-Link IE TSN Class A) device	1Gbps	×	×	×	×	○SH	△SH*1	○SH	△SH
	100Mbps	×	×	×	×	×	○SH*1	×	○SH

*1 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Low-Speed" (16 times).

*2 NZ2MHG-TSNT□ is recommended when CC-Link IE TSN Class A devices are connected via a TSN hub.

*3 A connection cannot be established if the total cyclic data size of all device stations on the 100Mbps device side exceeds 2K bytes. This includes the devices with a communication speed of 100Mbps that form a boundary between the communication speed of 1Gbps and 100Mbps. (☞ Page 56 Calculation of the total cyclic data size)

*4 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*5 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*6 If the device on the master station side is a CC-Link IE TSN Plus module, P2 can be connected without passing through a switching hub.

*7 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*8 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

When the communication speed for the master station is set to 100Mbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station set to "100Mbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (A device near the master station)		Device on the end side (A device far from the master station)							
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class A device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	100Mbps	×	○S*1*3*4	×	○S*1*3	×	○SH*2*3	×	○SH
Local station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	○S*1*4*5	×	○S*1*5	×	○SH*2*5	×	○SH*6
Remote station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	○S*1*4	×	○S*1	×	○SH*2	×	○SH
Remote station (CC-Link IE TSN Class A device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	×	×	×	×	○SH	×	○SH

*1 Set "Communication Period Setting" to "Basic Period" or "Normal-Speed" (4 times).

*2 NZ2MHG-TSNT□ is recommended when CC-Link IE TSN Class A devices are connected via a TSN hub.

*3 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*4 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*5 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*6 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

Structure of multicast mode

This mode indicates the availability of connection with a network configuration device when "Communication Mode" under "Application Settings" is set to "Multicast".

When the communication speed for the master station is set to 1Gbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station is set to "1Gbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (A device near the master station)		Device on the end side (A device far from the master station)							
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class A device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	1Gbps	○S*2*6*7	×	○S*2*6	△S*1*2*6	○SH *2*4*6	△SH *1*2*4*6	○SH*2	△SH*2*8
Local station (CC-Link IE TSN Class B device)	1Gbps	○S*2*7*9	×	○S*2*9	△S *1*2*3*5*9	○SH *2*3*4*9	△SH *1*2*3*4*9	○SH *2*3*10	△SH *2*3*8*10
	100Mbps	×	×	×	×	×	×	×	×
Remote station (CC-Link IE TSN Class B device)	1Gbps	○S*2*7	×	○S*2	△S*1*2*3*5	○SH *2*3*4	△SH *1*2*3*4	○SH*2*3	△SH*2*3
	100Mbps	×	×	×	○S*1*2*5	×	○SH *1*2*3*4*5	×	○SH*2*3
Remote station (CC-Link IE TSN Class A) device	1Gbps	×	×	×	×	○SH*2	△SH*1*2	○SH	△SH
	100Mbps	×	×	×	×	×	○SH*1*2	×	○SH

*1 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Low-Speed" (16 times).

*2 When the device is connected on the end side via the switching hub as shown below, communication may not be possible depending on the type of the device.
The communication will be enabled by configuring settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the ports specified below.

Connection structure that cannot be communicated	Port that prohibits multicast frame transfer
Device stations with different communication speeds of 1Gbps and 100Mbps coexist.	Connection port of the device station with 100Mbps
A local station and Ethernet device coexist.	Connection port of the Ethernet device
A local station and CC-Link IE TSN Class A remote station coexist.	Connection port of the CC-Link IE TSN Class A remote station

*3 For a local station or remote station of a device on the master station side, use a device supporting the multicast filter. (📖 Manual of the device used)

*4 NZ2MHG-TSNT☐ is recommended when CC-Link IE TSN Class A devices are connected via a TSN hub.

*5 A connection cannot be established if the total cyclic data size of all device stations on the 100Mbps device side exceeds 2K bytes. This includes the devices with a communication speed of 100Mbps that form a boundary between the communication speed of 1Gbps and 100Mbps. (☞ Page 56 Calculation of the total cyclic data size)

*6 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*7 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*8 If the device on the master station side is a CC-Link IE TSN Plus module, P2 can be connected without passing through a switching hub.

*9 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*10 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

When the communication speed for the master station is set to 100Mbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station set to "100Mbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (A device near the master station)		Device on the end side (A device far from the master station)							
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class A device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	100Mbps	×	○S*1*2*5*6	×	○S*1*2*5	×	○SH*2*4*5	×	○SH*2
Local station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	○S*1*2*6*7	×	○S*1*2*7	×	○SH *2*3*4*7	×	○SH*2*3*8
Remote station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	○S*1*2*6	×	○S*1*2	×	○SH*2*3*4	×	○SH*2*3
Remote station (CC-Link IE TSN Class A) device	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	×	×	×	×	○SH*2	×	○SH

*1 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Basic Period" or "Normal-Speed" (4 times).

*2 When the device is connected on the end side via the switching hub as shown below, communication may not be possible depending on the type of the device.
The communication will be enabled by configuring settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the ports specified below.

Connection structure that cannot be communicated	Port that prohibits multicast frame transfer
A local station and Ethernet device coexist.	Connection port of the Ethernet device
A local station and CC-Link IE TSN Class A remote station coexist.	Connection port of the CC-Link IE TSN Class A remote station

*3 For a local station or remote station of a device on the master station side, use a device supporting the multicast filter. (📖 Manual of the device used)

*4 NZ2MHG-TSNT☐ is recommended when CC-Link IE TSN Class A devices are connected via a TSN hub.

*5 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*6 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*7 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*8 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

Structure with modules on CC-Link IE TSN

This section describes the system configurations when CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices coexist, or when the system consists of modules with CC-Link IE TSN (master station, local stations, remote stations) of CC-Link IE TSN Class A devices only.

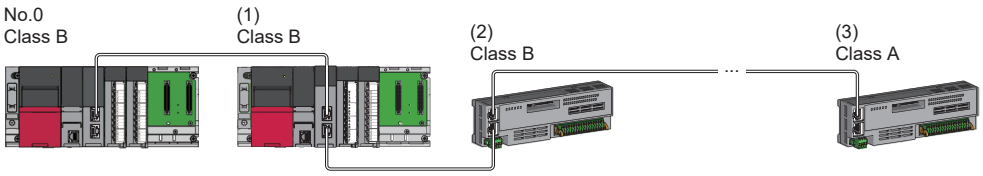
Item	Network topology	Reference
Structure with CC-Link IE TSN modules only	Line topology	Page 43 Line topology
	Star topology	Page 44 Star topology
	Coexistence of line and star topologies	Page 45 Coexistence of line and star topologies
Structure with CC-Link IE TSN modules with a communication speed of 100Mbps	Line topology	Page 48 Line topology
	Star topology	Page 48 Star topology
	Coexistence of line and star topologies	Page 50 Coexistence of line and star topologies

Connection with modules on CC-Link IE TSN only

■Line topology

The network is configured in a line topology.

- When connecting CC-Link IE TSN Class A devices, connect them to the end side of the CC-Link IE TSN Class B devices.

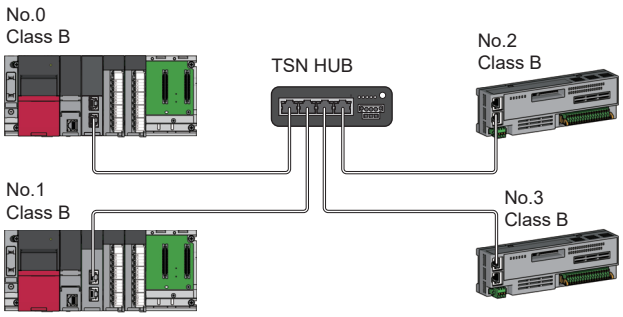


No.0: Master station (CC-Link IE TSN Plus module)
(1) Local station
(2) Remote station
(3) Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Star topology

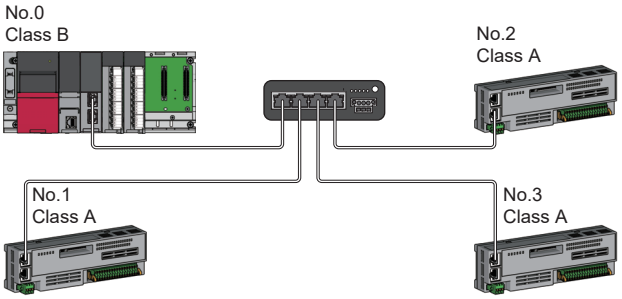
The network is configured in a star topology via a switching hub.

- When connecting CC-Link IE TSN Class B devices in a star topology, use a TSN hub.



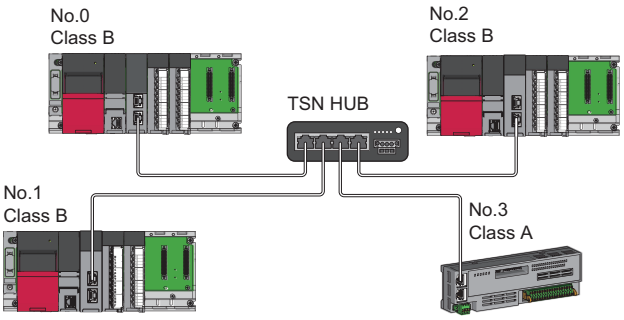
No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station
Class B: CC-Link IE TSN Class B device

- When connecting a CC-Link IE TSN Class A device to a CC-Link IE TSN Class B device or connecting a CC-Link IE TSN Class A device to another CC-Link IE TSN Class A device in a star topology, connect them via a switching hub.



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2, and No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

- When "Communication Mode" is set to "Multicast", if a local station and a CC-Link IE TSN Class A remote station are both connected on the end side via a switching hub, communication may not be possible depending on the type of the device. The communication will be enabled by configuring settings with the TSN hub so that multicast frame (with multicast MAC addresses 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the CC-Link IE TSN Class A remote station.

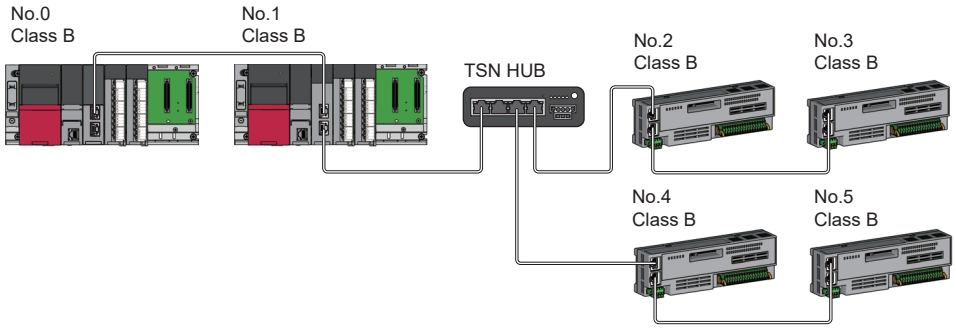


No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Coexistence of line and star topologies

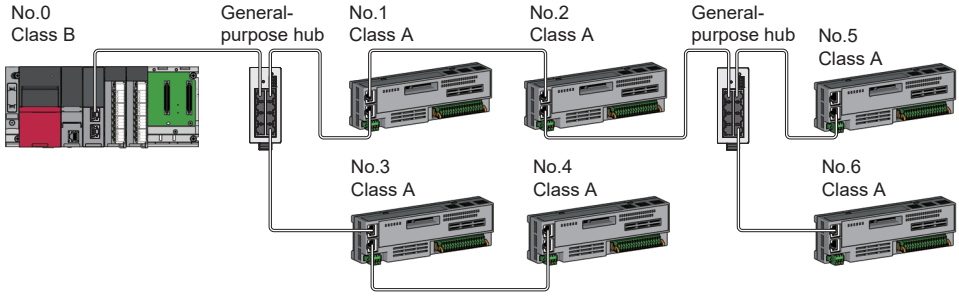
Line and star topologies can be mixed according to the following connection requirements.

- When connecting CC-Link IE TSN Class B devices in a star topology, use a TSN hub.



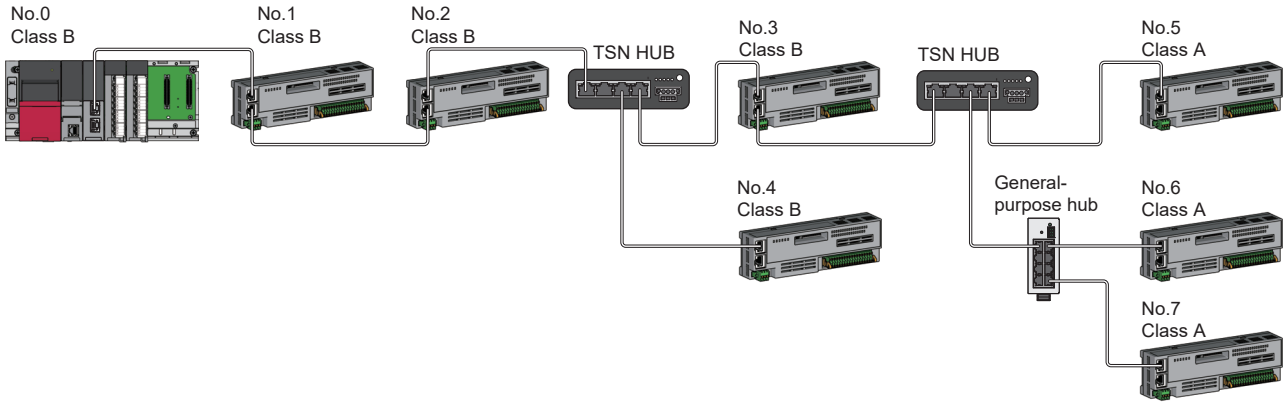
No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2 to No.5: Remote station
Class B: CC-Link IE TSN Class B device

- When connecting only CC-Link IE TSN Class A devices in a star topology, use a general-purpose hub.



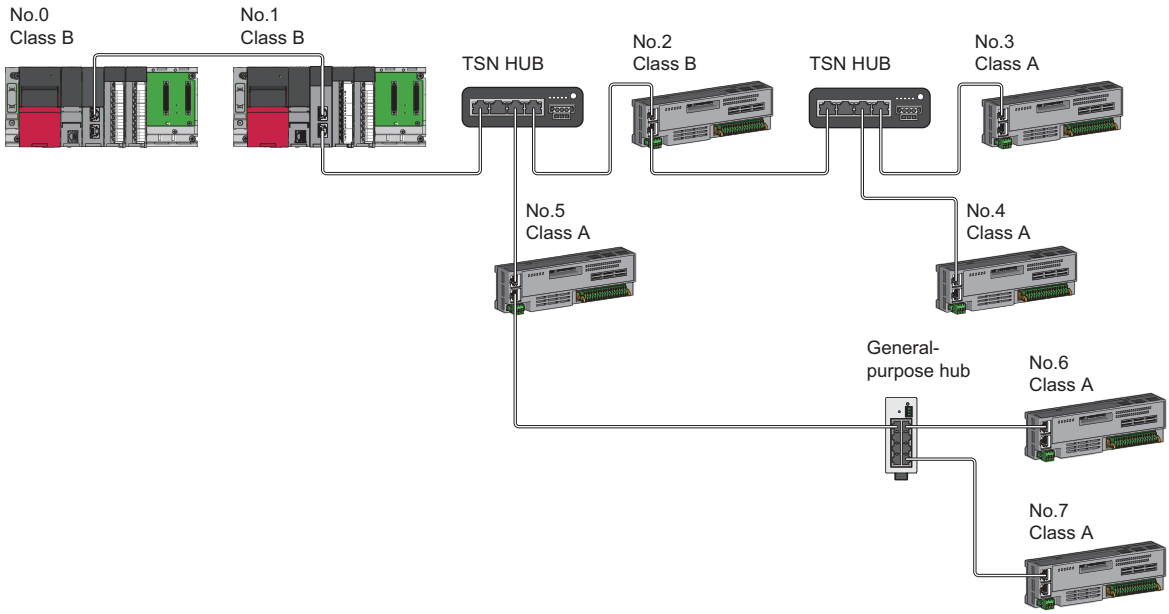
No.0: Master station (CC-Link IE TSN Plus module)
No.1 to No.6: Remote station
Class B: CC-Link IE TSN Class B device
Class A: CC-Link IE TSN Class A device

- In a configuration of mixture of CC-Link IE TSN Class B/A, connect CC-Link IE TSN Class A devices via a TSN hub when connecting CC-Link IE TSN Class B devices in a star topology.



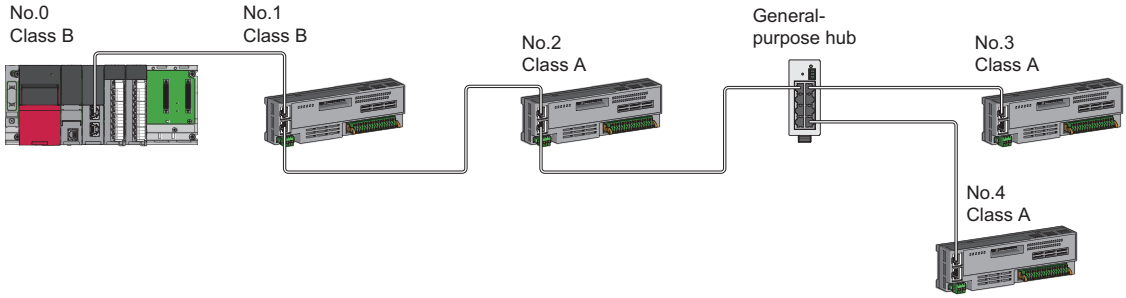
No.0: Master station (CC-Link IE TSN Plus module)
No.1 to No.7: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

• In a configuration of mixture of CC-Link IE TSN Class B/A, CC-Link IE TSN Class A devices can be connected from a TSN hub between CC-Link IE TSN Class B devices.

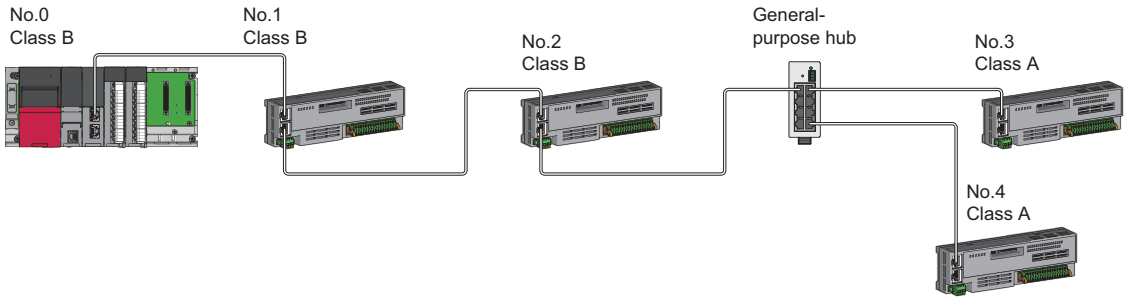


No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2 to No.7: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

• In a configuration of mixture of CC-Link IE TSN Class B/A, connect CC-Link IE TSN Class A devices directly or via a general-purpose hub when connecting CC-Link IE TSN Class B devices in a line topology.



No.0: Master station (CC-Link IE TSN Plus module)
No.1 to No.4: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device



No.0: Master station (CC-Link IE TSN Plus module)
No.1 to No.4: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

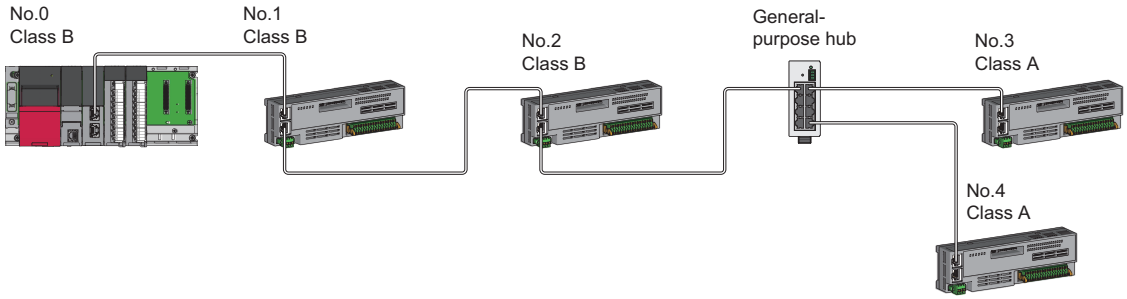
Precautions

In a system configuration of mixture of CC-Link IE TSN Class B/A, set whether to use a TSN hub in "TSN HUB Setting" in "Connection Device Information" under "Basic Settings". If the presence/absence of a TSN hub in the system configuration differs from the "TSN HUB Setting", the CC-Link IE TSN Class A device may not perform data link.

Ex.

Connecting CC-Link IE TSN Class B devices in line topology

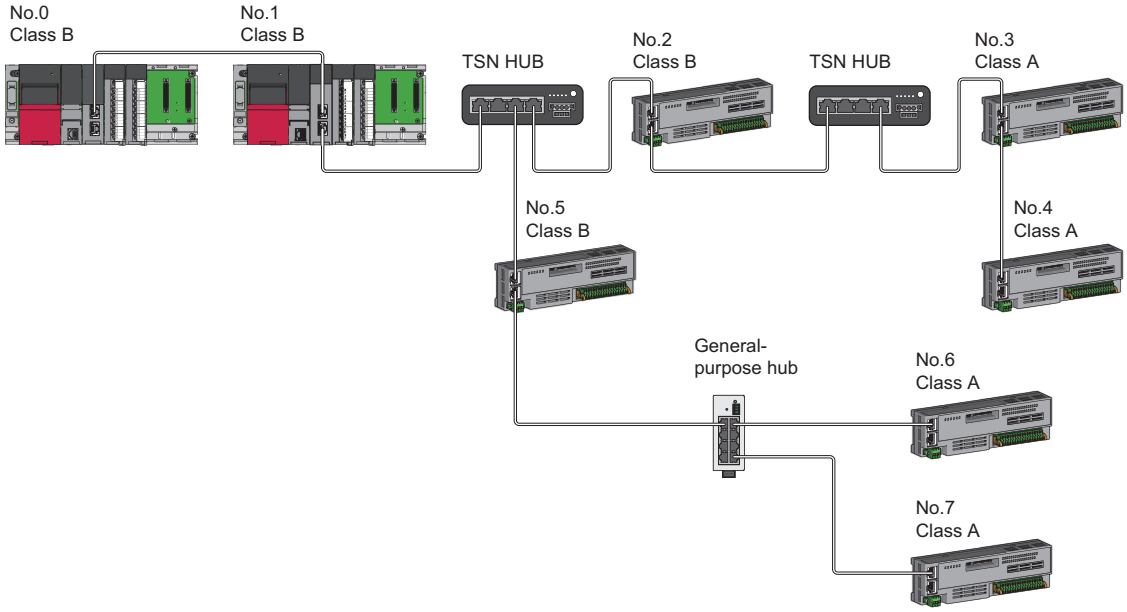
- Set "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" to "Not to Use TSN HUB".
- Connect CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices via a general-purpose hub.



Ex.

Connecting CC-Link IE TSN Class B devices in star topology

- Set "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" to "Use TSN HUB".
- Connect CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices via a TSN hub.



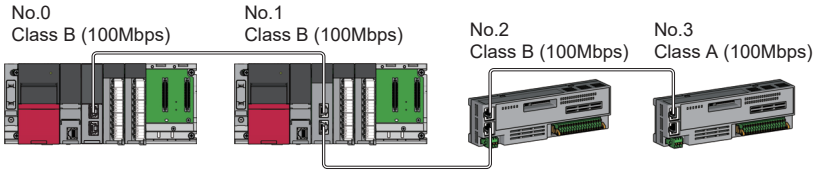
Connection with modules on CC-Link IE TSN with a communication speed of 100Mbps

This section describes the network topology when "Communication Speed" under "Application Settings" is set to "100Mbps".

■Line topology

The network is configured in a line topology.

- Adjust the communication speed of the module.
- When connecting modules with different communication speeds, connect the modules via a switching hub.

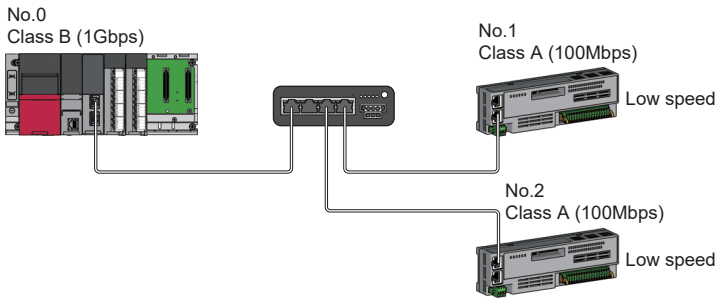


No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Star topology

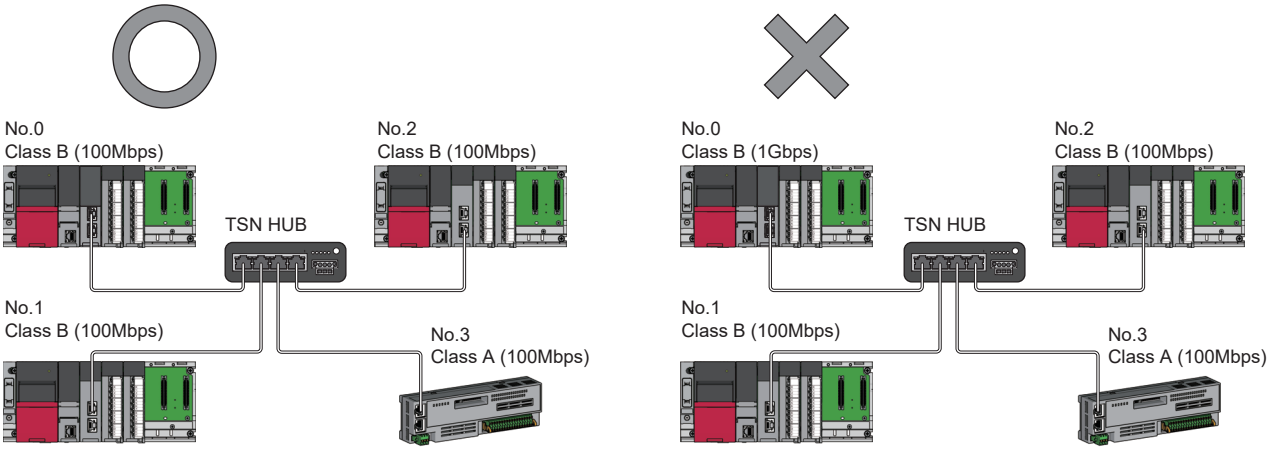
The network is configured in a star topology via a switching hub.

- When the master station with a communication speed of 1Gbps and a local station and remote station with a communication speed of 100Mbps exist in the structure, set "Communication Period Setting" to "Low-Speed" for the local station and remote station with a communication speed of 100Mbps.



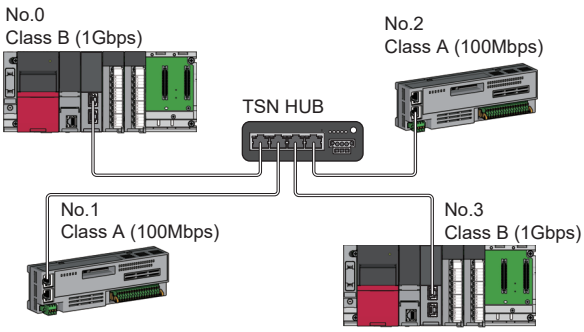
No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

- Connect the master station and local station at the same communication speed.



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

- When "Communication Mode" is set to "Multicast" and the communication speed of the master station is 1Gbps, communication may not be possible depending on the type of the device if device stations with different communication speeds of 1Gbps and 100Mbps coexist on the end side via the switching hub. The communication will be enabled by configuring settings with the TSN hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the device station with 100Mbps.

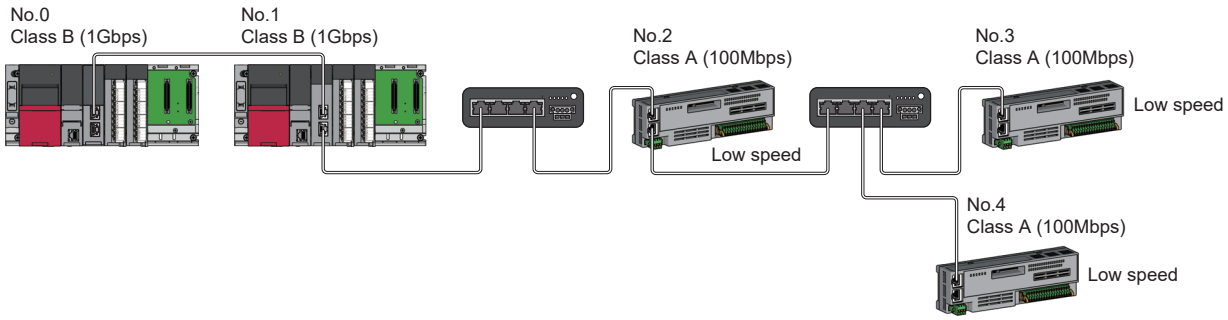


No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Remote station
No.3: Local station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Coexistence of line and star topologies

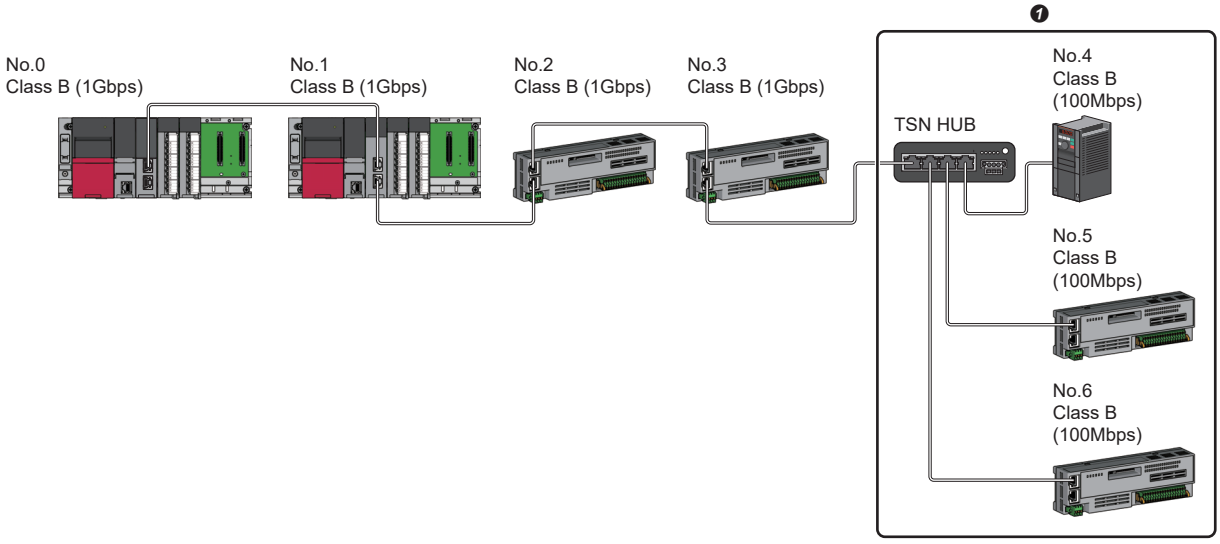
Line and star topologies can be mixed in the same network configuration.

- When the master station with a communication speed of 1Gbps and a local station and remote station with a communication speed of 100Mbps exist in the structure, set "Communication Period Setting" to "Low-Speed" for the local station and remote station with a communication speed of 100Mbps.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3, and No.4: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

- When the communication speed of the master station is 1Gbps, a connection cannot be established if the total cyclic data size of device stations on the 100Mbps device side exceeds 2K bytes. This includes the devices with a communication speed of 100Mbps that form a boundary between the communication speed of 1Gbps and 100Mbps.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2 to No.6: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device
❶ Set the total cyclic data size within 2K bytes.

Structure with modules on CC-Link IE TSN and Ethernet devices

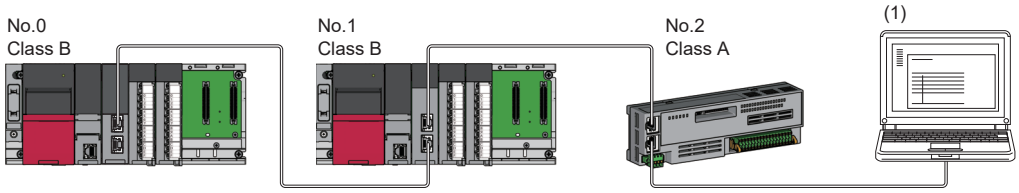
Connection with modules on CC-Link IE TSN and Ethernet devices

This section describes the system configurations when CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices coexist, or when the system consists of modules with CC-Link IE TSN (master station, local stations, remote stations) of CC-Link IE TSN Class A devices only and Ethernet devices.

Network topology	Reference
Line topology	Page 51 Line topology
Star topology	Page 51 Star topology
Coexistence of line and star topologies	Page 52 Coexistence of line and star topologies

■Line topology

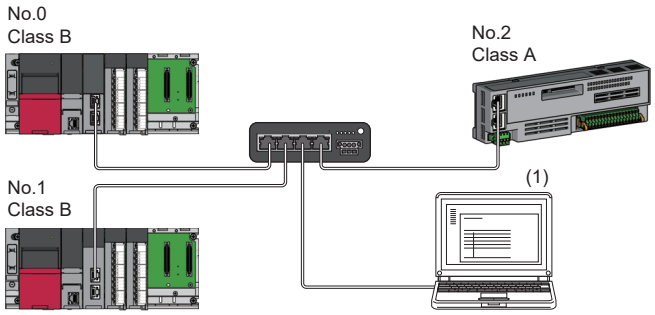
Connect Ethernet devices to the end of the network.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2: Remote station
(1) Ethernet device
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Star topology

Modules or Ethernet devices are connected in a star topology via a switching hub.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2: Remote station
(1) Ethernet device
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

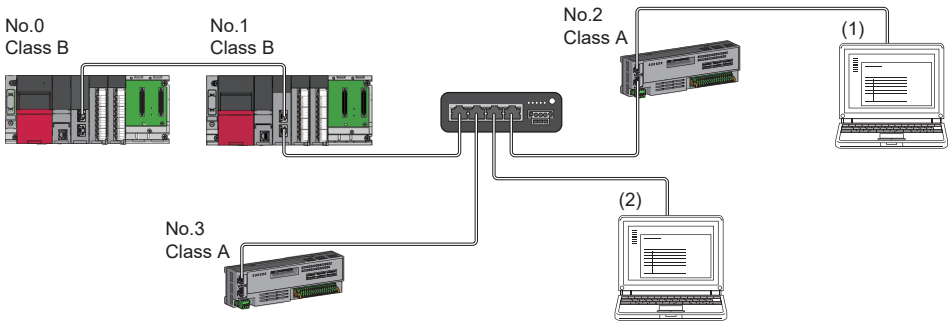
Point

Since cyclic data is sent to an Ethernet device when "Communication Mode" is set to "Multicast" and a local station is used with an Ethernet device on the end side via a switching hub, communication may not be possible depending on the type of an Ethernet device.
The communication will be enabled by configuring settings with the TSN hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the Ethernet device.

■Coexistence of line and star topologies

Line and star topologies can be mixed according to the following connection requirements.

- Connect Ethernet devices at the end of line topology.
- When connecting the Ethernet device in a star topology, connect the Ethernet device to a switching hub.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station
(1), (2): Ethernet device
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

2.3 Structure of CC-Link IE TSN and CC-Link IE Field Network

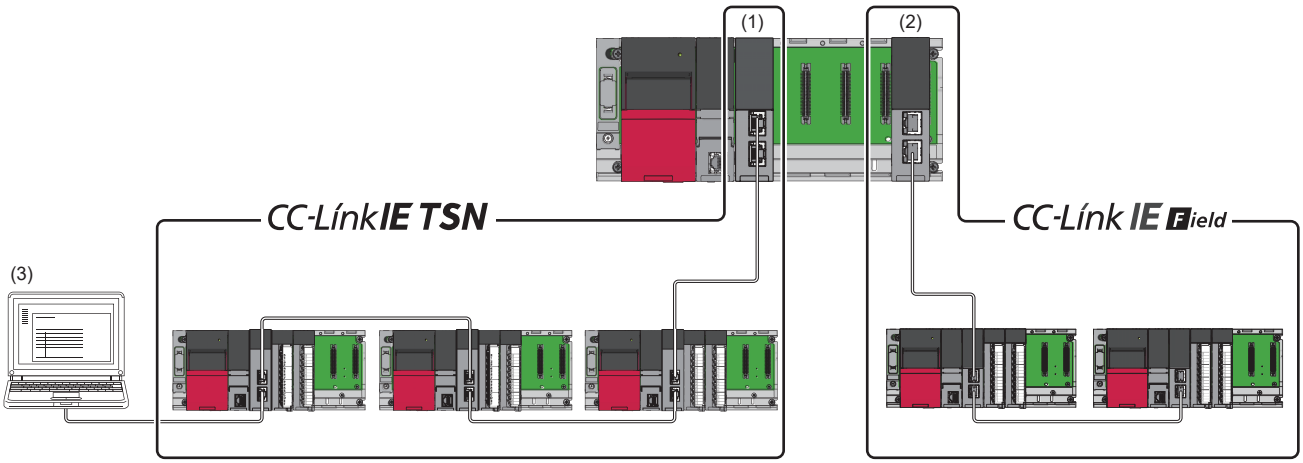
Set the CC-Link IE TSN Plus module and CC-Link IE Field Network master/local-equipped modules to different network numbers, and mount the master station of each network to the same base unit.

Connect Ethernet devices to the end of the network.

For details on the CC-Link IE Field Network, refer to the following.

MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)

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



(1) Master station (Network No.1)
(2) Master station (Network No.3)
(3) Ethernet device

Point

The communication data of the CC-Link IE TSN and CC-Link IE Field Network are transferred between master stations.

2.4 Structure When CC-Link IE TSN Communication Software Is Used

Connection specifications

The system configuration of CC-Link IE TSN Communication Software corresponds to that of a local station (CC-Link IE TSN Class A).

(☞ Page 595 Structure of CC-Link IE TSN Class B/A Devices (Protocol Version 1.0 Only) and Ethernet Devices)

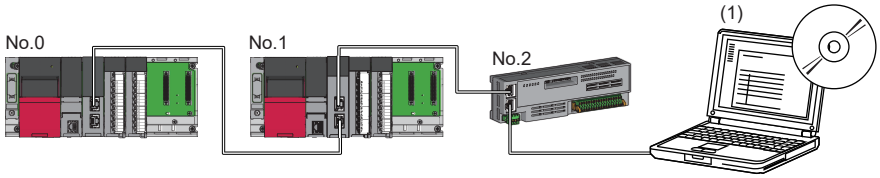
CC-Link IE TSN Communication Software can be connected to a port of the CC-Link IE TSN Class B device (supporting CC-Link IE TSN).

Do not connect to a port used by EtherNet/IP devices.

Up to two CC-Link IE TSN Communication Software can be connected.

■Line topology

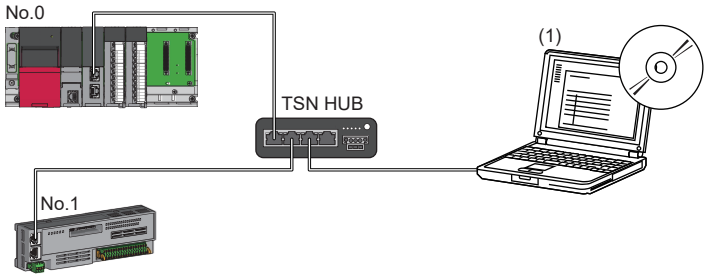
Connect a cable for CC-Link IE TSN Communication Software to the end of the network.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2: Remote station
(1) CC-Link IE TSN Communication Software

■Star topology

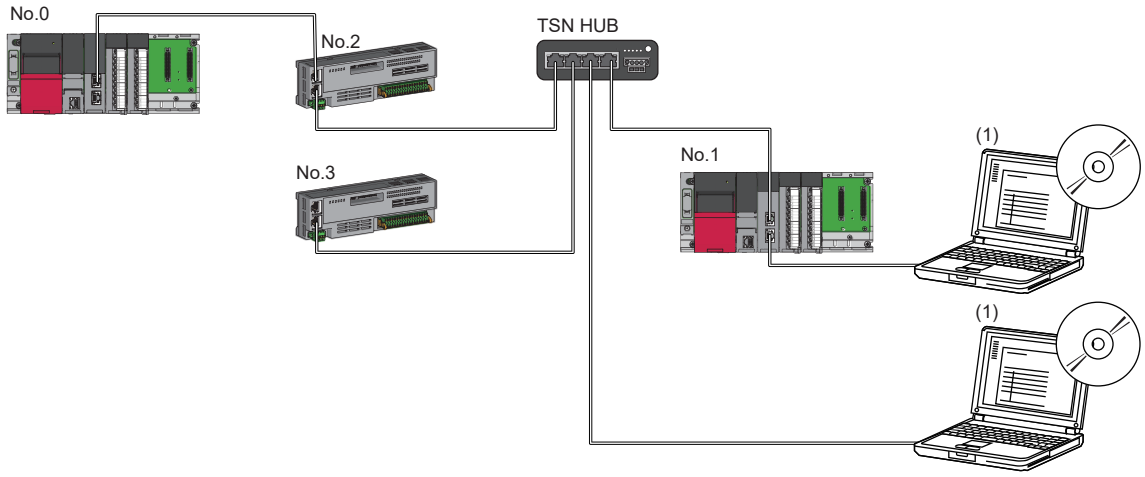
Connect a cable for CC-Link IE TSN Communication Software to a port of the TSN hub.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Remote station
(1) CC-Link IE TSN Communication Software

■Coexistence of line and star topologies

Connect a cable for CC-Link IE TSN Communication Software to a port of the TSN hub or the end of the network.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station
(1) CC-Link IE TSN Communication Software

2.5 Precautions for System Configuration

Devices connected to the same network

Do not connect the devices as described below. Doing so may cause the disconnection of all stations.

- A module on CC-Link IE TSN and a device having different network types (such as CC-Link IE Controller Network or CC-Link IE Field Network) other than an Ethernet device are connected to the same network.
- A module on CC-Link IE TSN and an Ethernet device such as a personal computer, both of which are on different networks, are connected to one switching hub.

Adding a device station with no IP address setting

In a line topology, do not connect the device station with no IP address setting at a place other than the end of the network. A data link may not be performed in the device stations after the device station with no IP address setting.

CC-Link IE TSN/CC-Link IE Field diagnostics

If the following operations are performed, the actual network configuration and the network map of the CC-Link IE TSN/CC-Link IE Field diagnostics may be a mismatch.

Network configuration	Operation
Star topology	• Powering off and on a device station or switching hub • Connecting/disconnecting an Ethernet cable connected to the switching hub • Disconnecting an Ethernet cable from a device station and connecting it to another device station or a switching hub • Disconnecting 10 or more stations, or half the number of device stations or more in the system • Changing the network topology when adding a device station
Line topology	• Simultaneously powering off or on multiple stations • Simultaneously connecting/disconnecting Ethernet cables to/from multiple stations (When a data link faulty station returns, a data link error will occur in all the stations.) • Disconnecting 10 or more stations, or half the number of device stations or more in the system • Changing the network topology when adding a device station

Point

The actual network configuration and network map can be matched by executing the network map update of the CC-Link IE TSN/CC-Link IE Field diagnostics. (☞ Page 398 CC-Link IE TSN/CC-Link IE Field Diagnostics)

Calculation of the total cyclic data size

The following shows the calculation formula of the total cyclic data size. The part of the variable surrounded by double quotes (" ") is the setting value of "Network Configuration Settings" under "Basic Settings".

Total cyclic data size = 256 + (146 × Number of local stations) + (106 × Number of remote stations) + (Number of "RX setting" points ÷ 8) + (Number of "RWr setting" points × 2) + (Number of "LB setting" points ÷ 8) + (Number of "LW setting" points × 2) [byte]

Using CC-Link IE TSN Plus modules with the RJ71GN11-T2

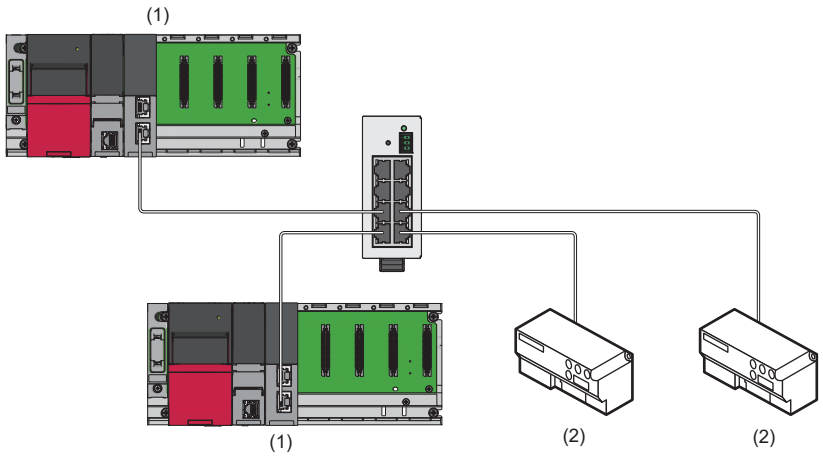
Do not use the CC-Link IE TSN Plus modules with the RJ71GN11-T2 with the firmware version "03" or later together.

When using them together, use the firmware update function to set the firmware version of the RJ71GN11-T2 to "04" or later.

3 EtherNet/IP SYSTEM CONFIGURATION

3.1 EtherNet/IP Configuration

EtherNet/IP consists of the CC-Link IE TSN Plus module (1) and EtherNet/IP devices (2).
Connect them using a switching hub and Ethernet cables. Ring topology is not possible.



Precautions

When using EtherNet/IP with the CC-Link IE TSN Plus module, only P2 can be connected. (Connection to P1 is not possible.)

Scanner and adapter

In EtherNet/IP, station types are separated into scanner and adapter.

Station type	Description
Scanner	A station type of EtherNet/IP that corresponds to the master station. The scanner has the control information and controls the overall network. Devices that have a connection of originator or target can be operated as the scanner.
Adapter	A station type of EtherNet/IP that corresponds to the device station. The adapter indicates stations other than the scanner. Devices that have a connection of target can be operated as the adapter.

3.2 Available Software Packages

To configure the EtherNet/IP settings, the engineering tool and EtherNet/IP Configuration tool are required.
The combinations of the EtherNet/IP Configuration tool version and engineering tool are as follows.

EtherNet/IP Configuration tool	Engineering tool (GX Works3)
Version 1.00A to Version 1.01B	Version 1.082L or later
Version 1.02C*1	Version 1.090U or later
Version 1.03D to Version 1.04E	Version 1.095Z or later

*1 To use EtherNet/IP Configuration tool version 1.02C or later, configure the system with the CC-Link IE TSN Plus module with the firmware version "03" or later.

EtherNet/IP Configuration tool

■Operating environment, installation/uninstallation

For the operating environment and installation/uninstallation of the EtherNet/IP Configuration tool, refer to the following.
EtherNet/IP Configuration Tool Installation Instructions

■Operation methods and functions

The EtherNet/IP Configuration tool is operated from "EtherNet/IP Configuration" of the engineering tool. For details, refer to the following.
☞ Page 121 "EtherNet/IP Configuration" window

Point

- EtherNet/IP Configuration tool version 1.02C or later is included with GX Works3.
- Separately install EtherNet/IP Configuration tool version 1.01B or earlier because it is not automatically installed at the installation of the engineering tool.
- If the engineering tool is installed when the EtherNet/IP Configuration tool has already been installed, the CC-Link IE TSN Plus module cannot be added in the engineering tool. Install the engineering tool, then the EtherNet/IP Configuration tool.
- Please consult your local Mitsubishi representative to obtain EtherNet/IP Configuration tool.

■EDS file

Download the EDS file of the CC-Link IE TSN Plus module from Mitsubishi Electric FA Global Site.
Obtain the EDS file of the EtherNet/IP device to be connected from the website of each device manufacturer.

Precautions

- An error may occur if a project file saved with GX Works3 version 1.090U or later (EtherNet/IP Configuration tool version 1.02C or later) is opened with a GX Works3 version older than 1.090U. In that case, upgrade the EtherNet/IP Configuration tool to version 1.02C or later. For how to check the version of the EtherNet/IP Configuration tool, refer to the following.

☞ Page 149 Checking the EtherNet/IP Configuration tool version

- To use a previous version of GX Works3 to open a project that includes a CC-Link IE TSN Plus module created with GX Works3 version 1.095Z or later, download an RJ71GN11-EIP EDS file of revision 2.1 or later and register it in the EtherNet/IP Configuration tool.
- To downgrade to version 1.02C or earlier of the EtherNet/IP Configuration tool, uninstall and reinstall the EtherNet/IP Configuration tool currently in use.

PART 2 SPECIFICATIONS

This part consists of the following chapter.

4 PERFORMANCE SPECIFICATIONS

4 PERFORMANCE SPECIFICATIONS

This chapter describes the performance specifications of the CC-Link IE TSN Plus module.

4.1 Performance Specifications of CC-Link IE TSN

The following table lists the performance specifications of CC-Link IE TSN for the CC-Link IE TSN Plus module.

Item			Description
Maximum number of link points per network[*1]		RX	16K points (16384 points, 2K bytes)
		RY	16K points (16384 points, 2K bytes)
		RWr	8K points (8192 points, 16K bytes)
		RWw	8K points (8192 points, 16K bytes)
		LB	32K points (32768 points, 4K bytes)
		LW	16K points (16384 points, 32K bytes)
Maximum number of link points per station	Master station and local stations	RX	16K points (16384 points, 2K bytes)
		RY	16K points (16384 points, 2K bytes)
		RWr	8K points (8192 points, 16K bytes)
		RWw	8K points (8192 points, 16K bytes)
		LB	32K points (32768 points, 4K bytes)
		LW	16K points (16384 points, 32K bytes)
Transient transmission capacity			Maximum 1920 bytes
Communication speed			• 1Gbps • 100Mbps
Minimum synchronization cycle			125.00μs
CC-Link IE TSN Class			CC-Link IE TSN Class B device
CC-Link IE TSN Protocol version			Protocol version 2.0/1.0[*3]
Maximum number of connectable CC-Link IE TSN Communication Software			2
Network topology			Line topology[*2], star topology, and coexistence of line and star topologies[*2]
Communication cable			Ethernet cable that satisfies standard (☞ Page 71 Wiring products)
Maximum station-to-station distance			100m
Overall cable distance	Line topology		12000m (when 121 stations are connected)
	Others		Depends on the system configuration
Maximum number of connectable stations			121 stations (master station: 1, device stations: 120, extension modules included)
Maximum number of networks			239
Communication method			Time sharing method
Multicast filter			Supported

*1 The maximum number of points for all link devices may not be used simultaneously depending on the number of device stations, or the number of points and assignments of the link devices that are set in the "Network Configuration Settings" of the "Basic Settings".

*2 The CC-Link IE TSN Plus module can only be connected at the end of the network.

*3 If the protocol version of the remote station is 1.0, the module may operate with the protocol version 1.0.

4.2 Performance Specifications of Ethernet

The following table lists the performance specifications of Ethernet for the CC-Link IE TSN Plus module.

Item			Description	
			Connection to P1	Connection to P2
Transmission specifications	Data transmission speed		• 1Gbps • 100Mbps	
	Communication mode	1000BASE-T	Full-duplex	
		100BASE-TX	Full-duplex	
	Interface		RJ45 connector (Auto MDI/MDI-X)	
	Maximum frame size		1518 bytes	
	Jumbo frame		Not available	
	Maximum segment length		100m (distance between a switching hub and a station)*1	
	Number of cascade connections		Consult the manufacturer of the switching hub used.	
	IP version		Compatible with IPv4	
Sending/receiving data storage memory	System connections	Connection with MELSOFT product	Up to 8*2	—
		Connection to SLMP-compatible devices	Up to 8*2	Up to 8*2
	User connections	Socket communications	2046 bytes × 8	10238 bytes × 8

*1 For maximum segment length (length between switching hubs), consult the manufacturer of the switching hub used.
*2 When one connection is for one device, up to eight devices can be connected.

Point

The operation of commercial devices used for the following applications is not guaranteed. Check the operation before using the module.

- Internet (general public line) (Internet-access service offered by an Internet service provider or a telecommunications carrier)
- Firewall device(s)
- Broadband router(s)
- Wireless LAN

4.3 Performance Specifications of EtherNet/IP

The following table lists the performance specifications of EtherNet/IP for the CC-Link IE TSN Plus module.

Item			Description
EtherNet/IP communications[*1]	Class1 communications	Communication format	Instance communications, tag communications
		Number of connections	• Instance communications: 256[*2] • Tag communications: 256[*2]
		Communication data size	1444 bytes (per connection)[*3]
		Connection type	Point-to-point, multicast
		RPI (communication cycle)	0.5ms to 60000ms (in increments of 0.5ms)
		PPS (communication processing performance)	12000PPS (PPS: Number of frames that can be processed per second)
	UCMM communications	Communication format	Message communications and tag communications
		Number of connections (number of simultaneous executions)	• Server: 96[*2*4] • Client: 32
		Communication data size	• Message communications: 504 bytes (including headers) • Tag communications: 498 bytes
		Connection type	Point-to-point
	Class3 communications	Communication format	Message communications and tag communications
		Number of connections	• Server: 96[*2*4] • Client: 256[*2]
		Communication data size	• Message communications: 1404 bytes (per connection) • Tag communications: 496 bytes (per connection)
		Connection type	Point-to-point
Ethernet	Network topology		Line topology (only the end can be connected) and star topology
	Maximum data size of all connections		65535 bytes
	Data transmission speed[*5]		100Mbps (100BASE-TX), 1Gbps (1000BASE-T)

*1 EtherNet/IP communication specifications are available only within the specifications of the communication destination.

*2 The total number of connections for Class1 communications, UCMM tag communications (server function), and Class3 communications is 256.
Therefore, the number of each connection varies depending on the number and size of separate communications.

*3 If the communication destination device does not support Large_Forward_Open (CIP option specification), the maximum communication data size is 504 bytes.

*4 The maximum number of simultaneous executions (the number of connections that can be received simultaneously) for the server function is 96 for the total of UCMM and Class3 communications server functions.

*5 The communication speed of 100Mbps is recommended.

Combinations of number of connections

The following table lists the total number of connections consumed by various combinations with each communication.

○: Consumed, ×: Not consumed

Item			Number of connections that can be set*1	Number of client simultaneous executions*2	Number of server simultaneous executions*3
Class1	Instance communications	Client	○	×	×
		Server	○	×	×
	Tag communications	Client	○	×	×
		Server	○	×	×
UCMM	Message communications	Client	×	○	×
		Server	×	×	○
	Tag communications	Client	×	○	×
		Server	○	×	○
Class3	Message communications	Client	○	×	×
		Server	×	×	○
	Tag communications	Client	○	×	×
		Server	○	×	○
Total			256	32	96

*1 It shows the maximum number of connections that can be set in "EtherNet/IP Configuration".

*2 It shows the number of requests that can be sent simultaneously. The number of requests is consumed when a request is sent, and released when a response is received.

*3 It shows the number of requests that can be received at a time. If requests are received in excess of the upper limit, the requests in excess of the upper limit are ignored.

4.4 Hardware Specifications

The following table shows the hardware specifications of the CC-Link IE TSN Plus module.

Item		Description
Number of occupied I/O points		32 points (I/O assignment: Intelligent 32 points)
Internal current consumption (5VDC)		1.54A
External dimensions	Height	106mm (Base unit mounting side: 98mm)
	Width	27.8mm
	Depth	110mm
Weight		0.26kg

PART 3 SETTINGS

This part consists of the following chapters.

5 PART NAMES

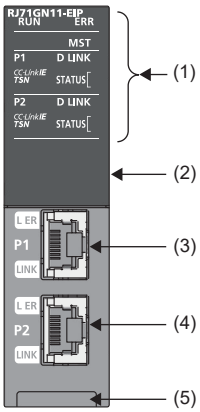
6 PROCEDURES BEFORE OPERATION

7 WIRING

8 PARAMETER SETTINGS

5 PART NAMES

This chapter describes the part names of the CC-Link IE TSN Plus module.



No.	Name		Description
(1)	RUN LED		Indicates the operating status. • On: Normal operation • Off: Error (☞ Page 390 When the RUN LED turns off)
	ERR LED		Indicates the error status of the module. (The LED is always off in offline mode.) (☞ Page 390 When the ERR LED turns on or is flashing) • On: Error or error detection on all stations (CC-Link IE TSN)*1*4 • Flashing (500ms interval): Data link faulty station detection (CC-Link IE TSN)*2 • Flashing (200ms interval): Error • Off: Normal operation
	MST LED		Indicates the operating status of CC-Link IE TSN. • On: Operating as a master station • Off: Operating as a local station
	P1	D LINK LED	Indicates the cyclic transmission status of CC-Link IE TSN. (The LED is always off in offline mode.) • On: Cyclic transmission being performed • Flashing: Cyclic transmission stopped • Off: Disconnected
		CC-LINK IE TSN LED	Indicates the operating status of the network to be used. • On: Operating in CC-Link IE TSN • Off: Not used
		STATUS LED	Always off
	P2	D LINK LED	Always off
		CC-LINK IE TSN LED	Always off
		STATUS LED*3	Indicates the operating status of EtherNet/IP. • On (green): Data communications being performed • On (red): Moderate error or serious error (☞ Page 393 When the STATUS LED turns on in red or is flashing in red) • Flashing (green): Failed to establish connection (☞ Page 393 When the STATUS LED is flashing in green) • Flashing (red): Minor error (☞ Page 393 When the STATUS LED turns on in red or is flashing in red) • Off: No error
(2)	Dot matrix LED		Indicates the station number of CC-Link IE TSN set for the module. • Station number or parameter not set: "— — —" • Master station: 0 • Local station: 1 to 120 ■In module communication test mode Displays the module communication test result. (☞ Page 397 Module Communication Test) ■In offline mode Displays "···".

No.	Name	Description
(3)	P1	Port connector for network. Connect an Ethernet cable. For wiring methods and wiring precautions, refer to the following. ☞ Page 70 WIRING
	L ER LED	Indicates the port status. (The LED is always off in offline mode.) • On: Abnormal data being received (☞ Page 392 When the L ER LED turns on) • Off: Normal data being received
	LINK LED	Indicates the link status. • On: Link-up • Flashing: Data being sent or received • Off: Link-down (☞ Page 392 When the LINK LED turns off)
(4)	P2	Same as P1
	L ER LED	Always off
	LINK LED	Same as P1
(5)	Production information marking	Shows the production information (16 digits) of the module.

*1 The LED flashes only at the master station. (Common for unicast and multicast modes)

*2 In unicast mode, the LED flashes only at the master station.
In multicast mode, the LED flashes at the master station and local station. However, the LED does not flash at the local station if a data link error occurs at the CC-Link IE TSN Class A remote station during data link. (The LED remains off.)

*3 At power-on, the LED turns on in green → red.

*4 For a local station, the LED may turn on and remain on until link refresh is performed with the CPU module normally ('Data link error status of own station' (SB0049) is turned off) after the system is started and the first cyclic transmission starts.

6 PROCEDURES BEFORE OPERATION

This chapter describes the procedures before operation.

Procedures for using CC-Link IE TSN

1. Network configuration

Configure the system and set the parameters which are required for start-up.

- Wiring (☞ Page 70 WIRING)
- Parameter settings (☞ Page 73 CC-Link IE TSN Parameter Settings)

2. Network diagnostics

Use CC-Link IE TSN/CC-Link IE Field diagnostics to check that cables are connected properly and that modules are communicating correctly with the set parameters.

For details, refer to the following.

☞ Page 398 CC-Link IE TSN/CC-Link IE Field Diagnostics

3. Programming

Create a program. For details, refer to the following.

☞ Page 229 PROGRAMMING

Point

- When multiple device stations and the master station are powered on simultaneously, the startup time of the device stations may vary. In such a case, the networks are connected in turn, resulting that the time may be longer to complete data links at all stations. Power on all device stations, and then, power on the master station to prevent this case.
- When not using EtherNet/IP, write the module extension parameter file with the default settings. If the module extension parameters do not exist, a moderate error will occur.

Procedures for using EtherNet/IP

1. Network configuration

Configure the system and set the parameters which are required for start-up.

- Wiring (☞ Page 70 WIRING)
- Parameter settings (☞ Page 114 EtherNet/IP Parameter Settings)

2. Network status check

Check the LED and buffer memory to check whether communication is normally performed. For details, refer to the following.

☞ Page 66 PART NAMES

☞ Page 411 Checking the Status of EtherNet/IP

3. Programming

Create a program. For details, refer to the following.

☞ Page 323 PROGRAMMING

MEMO

7 WIRING

This chapter describes the wiring methods, wiring products, and wiring precautions when the CC-Link IE TSN Plus module is used.

Wiring methods

The following describes connection and disconnection of the Ethernet cable.

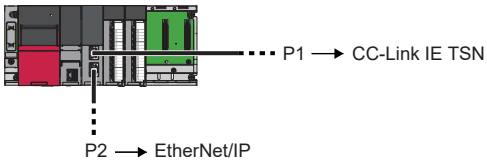
■Connecting the cable

1. Push the Ethernet cable connector into the CC-Link IE TSN Plus module until it clicks. Pay attention to the connector's direction.
2. Lightly pull it to check that it is securely connected.
3. Check whether the LINK LED of P1 or P2 connected with an Ethernet cable is on.*1

*1 The time between the cable connection and the LINK LED turning on may vary. The LINK LED usually turns on in a few seconds. Note, however, that the time may be extended further if the link-up processing is repeated depending on the status of the device on the line. If the LINK LED does not turn on, refer to the following and take corrective actions.
☞ Page 392 When the LINK LED turns off

Point

When using CC-Link IE TSN, connect the Ethernet cable to P1.
When using EtherNet/IP, connect the Ethernet cable to P2.



■Disconnecting the cable

1. Press the latch down and unplug the Ethernet cable.

■Precautions

Be sure to observe the precautions for wiring. Otherwise, some functions may not operate normally.

Item	Description
Common precautions	• Use the dedicated Ethernet cable shown in Page 71 Wiring products. • Place the Ethernet cable in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact. • Do not touch the core of the cable-side or module-side connector, and protect it from dirt or dust. If oil from your hand, dirt or dust is attached to the core, it can increase transmission loss, arising a problem in a data link. • Check that the Ethernet cable is not disconnected or not shorted and there is no problem with the connector connection. • Do not use Ethernet cables with broken latches. Doing so may cause the cable to unplug or malfunction. • Hold the connector part when connecting and disconnecting the Ethernet cable. Pulling the cable connected to the module may result in malfunction or damage to the module or cable. • The maximum station-to-station distance of the Ethernet cable is 100m. However, the length may be shorter depending on the operating environment of the cable. For details, contact the manufacturer of the cable used. • The bend radius of the Ethernet cable is limited. For details, check the specifications of the Ethernet cable to be used. • Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction. • When a protective film is attached to the top of the module, remove it for heat dissipation before system operation. • 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. • Communication with the Ethernet device may not be possible depending on the specifications of the connected Ethernet device or switching hub. If communication is not possible, reduce the communication data volume of the Ethernet device.

Item	Description
Precautions for using CC-Link IE TSN	• Before connecting the Ethernet cables, check also the CC-Link IE TSN Installation Manual available on the CC-Link Partner Association website (www.cc-link.org). Failure to follow the instructions in the manual may cause malfunctions. • In a line topology with CC-Link IE TSN, do not connect the device stations with no IP address or the device stations that are not part of the network configuration of the master station between the master station and device stations, or between device stations. Otherwise, a data link may not be performed between the master station and the device stations that are connected after the device station with no IP address or the device station that is not part of the network configuration of the master station. • When setting "Communication Speed" of the master station and local station of CC-Link IE TSN to 100Mbps to connect a device with a communication speed of 100Mbps, enable auto-negotiation of the device. • If an incorrectly configured ring topology is used in CC-Link IE TSN, an error can still be detected in the CC-Link IE TSN/CC-Link IE Field diagnostics and event history. However, if the system is configured with a switching hub, an error may not be detected.
Precautions for using EtherNet/IP	• The recommended maximum number of cascade connections is three. Four or more connections increase the possibility of packet loss caused by the switching hub.

Wiring products

The following describes the devices used for CC-Link IE TSN and EtherNet/IP.

■Ethernet cable

Use Ethernet cable that meets the following standards.

Communication speed	Ethernet cable	Connector	Type
1Gbps	Category 5e or higher, straight cable (shielded, STP)	RJ45 connector	The following conditioning cables: • IEEE 802.3 (1000BASE-T) • ANSI/TIA/EIA-568-B (Category 5e)
100Mbps	Category 5 or higher, straight cable (shielded, STP)		The following conditioning cables: • IEEE 802.3 (100BASE-TX) • ANSI/TIA/EIA-568-B (Category 5)

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

In addition, the connector processing of cable length is available for your preference. Please consult your local Mitsubishi representative.

Communication speed	Type	Model (Manufacturer)
1Gbps	Category 5e or higher, straight cable (double shielded, STP)	SC-E5EW series (Mitsubishi Electric System & Service Co., Ltd.)

Point

A communication error may occur due to high-frequency noise from devices other than a programmable controller in a given connection environment. The following describes countermeasures to be taken on the CC-Link IE TSN Plus module side to avoid high-frequency noise influence.

Wiring

- Use a duplex shield type cable.
- Do not bundle the cable with the main circuit or power cable or do not place it near those lines.
- Place the cable in a duct.

■Switching hub (when the system configured with CC-Link IE TSN)

Use the following industrial switching hubs.

For the restrictions on the switching hub, refer to the manual for the product used.

Term	Description	CC-Link IE TSN Class
TSN HUB	For the models and usage methods of the switching hubs, refer to the CC-Link Partner Association website (www.cc-link.org).	CC-Link IE TSN Class B device
NZ2MHG-TSNT□	A CC-Link IE TSN-compatible industrial managed switch classified as a TSN hub CC-Link IE TSN Industrial Managed Ethernet Switch User's Manual	
General-purpose hub*1	For the models and usage methods of the switching hubs, refer to the CC-Link Partner Association website (www.cc-link.org).	CC-Link IE TSN Class A device

*1 When connecting a CC-Link IE TSN Class A device to a general-purpose hub, set the VLAN function of the general-purpose hub to "Disabled". If it is set to "Enabled", cyclic transmission cannot be performed with CC-Link IE TSN Class A devices supporting the protocol version 2.0.

A switching hub can be used for cascade connection.
When the switching hub is used for cascade connection, check the specifications of the switching hub used.

Point

Since there are different restrictions for system configuration using a TSN hub and system configuration using a general-purpose hub, setting with an engineering tool is required. (☞ Page 26 CC-Link IE TSN SYSTEM CONFIGURATION)

■Switching hub (when the system configured with EtherNet/IP)

When using a switching hub for EtherNet/IP, refer to the following and use a switching hub that supports the transmission speed of communications. (Use of a switching hub with the IGMP snooping function is recommended.)
www.odva.org

TSN hub

A dedicated TSN hub may be required depending on parameter settings or the network topology used to connect modules on CC-Link IE TSN.
Read the following carefully.
☞ Page 28 Structure of CC-Link IE TSN Class B Devices and Ethernet Devices
☞ Page 71 Switching hub (when the system configured with CC-Link IE TSN)

8 PARAMETER SETTINGS

8.1 CC-Link IE TSN Parameter Settings

This chapter describes the parameter settings required for communications with other stations of CC-Link IE TSN.

Procedure for setting parameters

1. Add the CC-Link IE TSN Plus module (RJ71GN11-EIP) to the engineering tool.

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

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

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Port1 Module Parameter (CC-Link IE TSN)]

3. After setting the parameters, click the [Apply] button.

4. Write parameters to the CPU module using the engineering tool.

[Online] ⇨ [Write to PLC]

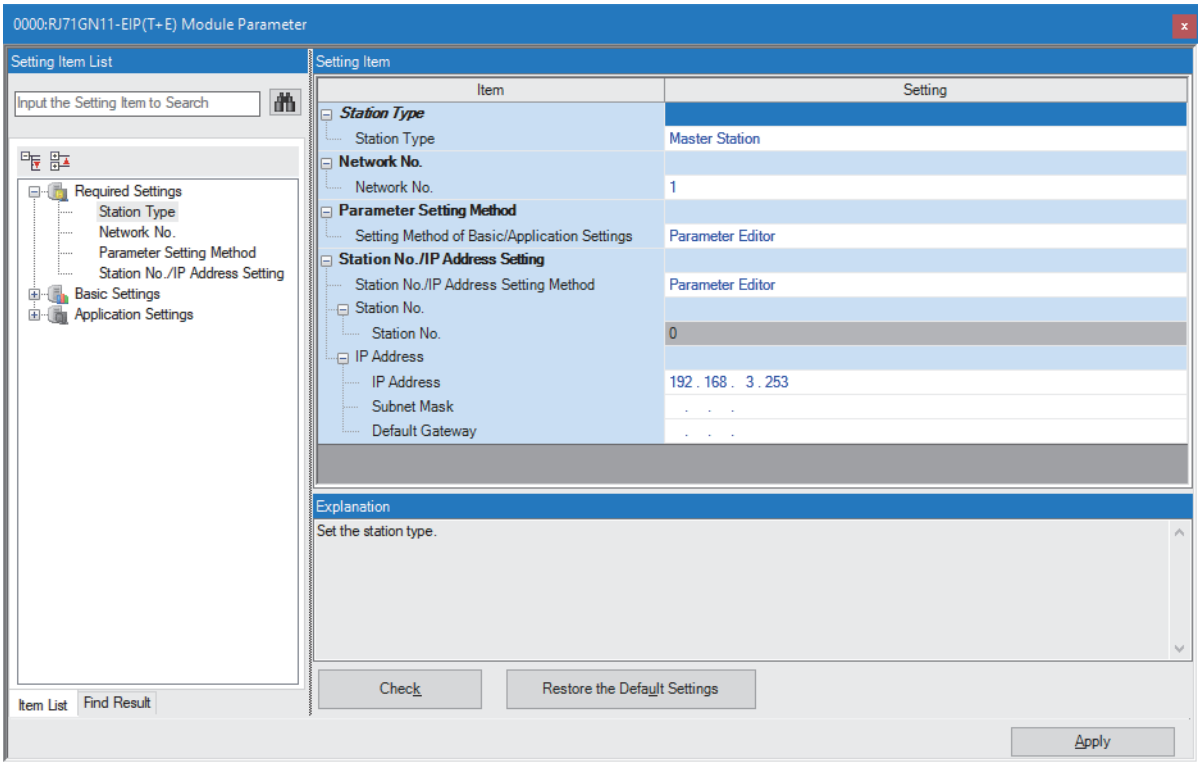
5. The parameters are reflected by resetting the CPU module or powering off and on the system.

Point

The settings displayed on the required settings, basic settings, and application settings pages (default: ☐) are the values that are displayed when the [Restore the Default Settings] button on each window of the engineering tool is clicked.

Required Settings

Set items such as the station type and IP address of the CC-Link IE TSN Plus module.



○: Can be set, ×: Cannot be set

Item	Description	Availability		Reference
		Master station	Local station	
Station Type	Set the station type of the CC-Link IE TSN Plus module.	○	○	Page 74 Station Type
Network No.	Set the network number of the CC-Link IE TSN Plus module.	○	○	Page 75 Network No.
Parameter Setting Method	Select whether to set "Basic Settings" and "Application Settings" items using the engineering tool or in program.	○	○	Page 75 Parameter Setting Method
Station No./IP Address Settings	Set the station number or IP address of the CC-Link IE TSN Plus module.	○*1	○	Page 75 Station No./IP Address Setting

*1 Only "IP Address" can be set.

Station Type

Set the station type of the CC-Link IE TSN Plus module.

Item	Description	Setting range
Station Type	Set whether the CC-Link IE TSN Plus module is used as the master station or local station. Only one master station can be set in a network.	• Master Station • Local Station (Default: Station type set in the "Add New Module" window.)

Network No.

Set the network number of the own station of the CC-Link IE TSN Plus module.

Item	Description	Setting range
Network No.	Set the network number of the CC-Link IE TSN Plus module.	1 to 239 (Default: 1)

Precautions

Set a network number that does not overlap any other network numbers.
In particular, when using an Ethernet-equipped module (CPU module) at default, the IP address is 192.168.3.39 and the network number is the third octet of the IP address, thus 3. Because setting the network number of the CC-Link IE TSN Plus module to 3 causes an overlap, set another network number.

Parameter Setting Method

Set the setting method of "Basic Settings" and "Application Settings".

Item	Description	Setting range
Setting Method of Basic/ Application Settings	Set the setting method of "Basic Settings" and "Application Settings".	Parameter Editor (fixed)

Station No./IP Address Setting

Set the items such as the station number and IP address of the own station of the CC-Link IE TSN Plus module.

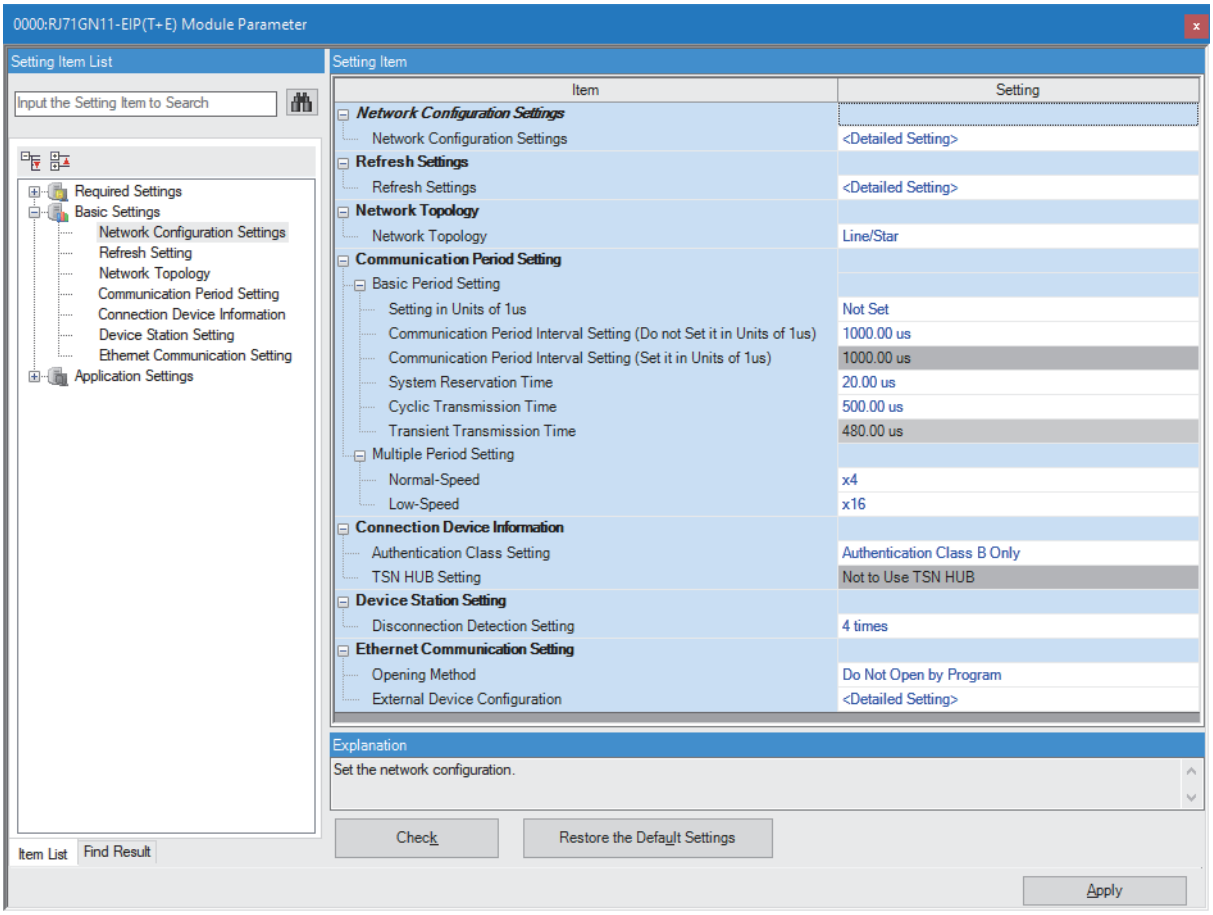
Item	Description	Setting range
Station No./IP Address Setting Method	Select the setting methods of the station number and IP address.	Parameter Editor (fixed)
Station No.	Set the station number of the CC-Link IE TSN Plus module. This item can be set only for a local station. Set a station number different from those used in the same network.	• Master station: Fixed to "0" • Local station: 1 to 120 (Default: 1)
IP Address	Set the IP address of the own station. Set an IP address different from those used in other stations. (☞ Page 212 IP address duplication detection) Do not set the following values. • The third and fourth octets are all 0 or all 1. • The host address bits are all 0 or all 1 • Reserved address	0.0.0.1 to 223.255.255.254 (Default: Master station 192.168.3.253, other than the master station 192.168.3.1)
Subnet Mask	Set the subnet mask. Set the same value for the master station and device station. If the subnet mask is empty, the address class (class A, class B, class C) is determined from the setting of "IP Address", and operation is done with the subnet mask according to the address class. The subnet mask for each class is as follows. • Class A: 255.0.0.0 • Class B: 255.255.0.0 • Class C: 255.255.255.0 The IP address for each class is as follows. • Class A: 0.x.x.x to 127.x.x.x • Class B: 128.x.x.x to 191.x.x.x • Class C: 192.x.x.x to 223.x.x.x The host address for each class is the 0 section shown below. • Class A: 255.0.0.0 • Class B: 255.255.0.0 • Class C: 255.255.255.0	• Empty • 0.0.0.1 to 255.255.255.255 (Default: empty)
Default Gateway	Set the default gateway.	• Empty • 0.0.0.1 to 223.255.255.254 (Default: empty)

Precautions

The IP address to be set should have a different segment from the IP address to be set on the EtherNet/IP side. (☞ Page 115 IP Address)

Basic Settings

Set the items such as the network configuration and refresh settings of the CC-Link IE TSN Plus module.



In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

○: Can be set, ×: Cannot be set

Item	Description	Availability		Reference
		Master station	Local station	
Network Configuration Settings	Set parameters of device stations (the number of points and assignment of link devices) in the master station.	○	×	Page 96 "CC-Link IE TSN Configuration" window
Refresh Setting	Assign link refresh ranges between the devices described below. • SB, SW of CC-Link IE TSN ↔ Module label of the CPU module • SB, SW, link devices (RX, RY, RWr, RWw, LB, LW) of CC-Link IE TSN ↔ Devices of the CPU module	○	○	Page 77 Refresh Setting
Network Topology	Select the network topology type according to the actual network configuration.	○	×	Page 79 Network Topology
Communication Period Setting	Set the basic cycle setting and multiple cycle setting.	○	×	Page 80 Communication Period Setting
Connection Device Information	Set the CC-Link IE TSN Class of connected devices and whether to use the TSN hub.	○	×	Page 81 Connection Device Information
Device Station Setting	Set the number of consecutive communication failures until a device station is considered disconnected.	○	×	Page 81 Device Station Setting
Ethernet Communication Setting	Set items related to communication with Ethernet devices.	○	○	Page 81 Ethernet Communication Setting

Refresh Setting

Assign link refresh ranges between the devices described below.

- SB, SW of the CC-Link IE TSN Plus module ↔ Module label of the CPU module
- SB, SW, link devices (RX, RY, RWr, RWw, LB, LW) of the CC-Link IE TSN Plus module ↔ Devices of the CPU module

■Setting method

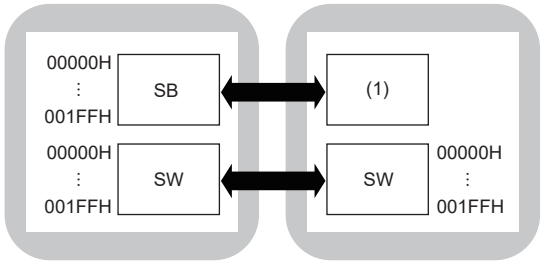
The procedure for the refresh settings is shown below.

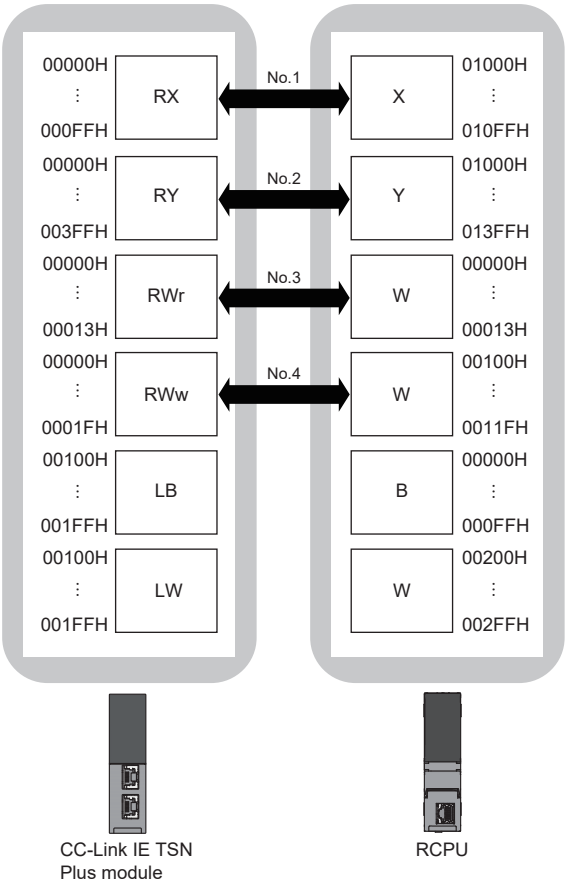
1. Set the required items.

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	4096	00000	00FFF	⇔	Module Label				
-	SW	512	00000	001FF	⇔	Specify Device	SW	512	00000	001FF
1	RX	256	00000	000FF	⇔	Specify Device	X	256	01000	010FF
2	RY	1024	00000	003FF	⇔	Specify Device	Y	1024	01000	013FF
3	RWr	32	00000	0001F	⇔	Specify Device	W	32	00000	0001F
4	RWw	32	00000	0001F	⇔	Specify Device	W	32	00100	0011F
5	LB	256	00100	001FF	⇔	Specify Device	B	256	00000	000FF
6	LW	256	00100	001FF	⇔	Specify Device	W	256	00200	002FF

2. Click the [Apply] button to finish the refresh settings.

■Setting items

Item		Description	Setting range
Device Assignment Method		Right-click in the setting window and select a link device assignment method from the "Device Assignment Method" menu. • Start/End: Enter the start and end numbers of link devices. • Points/Start: Enter the numbers of points and start numbers of link devices.	• Start/End • Points/Start (Default: Start/End)
—	Link Side	Set the link refresh ranges of the link special relay (SB) and link special register (SW). One range can be set for each SB and SW. (☞ Page 167 Link refresh) Ex. 	■Device Name • SB (fixed) • SW (fixed) ■Points • SB: 16 to 4096 • SW: 1 to 4096 (Default: 4096) ■Start • SB: 0H to FF0H (set in increments of 16 points) • SW: 0H to FFFH (set in increments of 1 point) (Default: 00000H) ■End • SB: FH to FFFH (set in increments of 16 points) • SW: 0H to FFFH (set in increments of 1 point) (Default: 00FFFH)
	CPU Side	 (1) Module label	■Target • Module Label • Specify Device (Default: Module Label) ■Device Name • Module Label: — • Specify Device (link side is SB): SB, M, L, B, D, R, ZR, RD • Specify Device (link side is SW): SW, M, L, B, D, R, ZR, RD (Default: Grayout) ■Points, End • Module Label: — • Specify Device: Displayed according to setting of "Start". (Default: Grayout) ■Start • Module Label: — • Specify Device: Device range of CPU modules (Set bit devices in increments of 16 points and word devices in increments of 4 points.) (Default: Grayout)

Item		Description	Setting range
1 to 256	Link Side	Set the link refresh ranges of link devices (RX, RY, RWr, RWw, LB, LW). Up to 256 ranges can be set. (☞ Page 167 Link refresh) Ex.  	■Device Name • RX, RY, RWr, RWw, LB, LW (Default: empty) ■Points • RX, RY: 16 to 16384 • RWr, RWw: 4 to 8192 • LB: 16 to 32768 • LW: 1 to 16384 (Default: Grayout) ■Start • RX, RY: 0H to 3FF0H (set in increments of 16 points) • RWr, RWw: 0H to 1FFCH (set in increments of 4 points) • LB: 0H to 7FF0H (set in increments of 16 points) • LW: 0H to 3FFFH (Default: Grayout) ■End • RX, RY: FH to 3FFFH (set in increments of 16 points) • RWr, RWw: 3H to 1FFFH (set in increments of 4 points) • LB: FH to 7FFFH (set in increments of 16 points) • LW: 0H to 3FFFH (Default: Grayout)
	CPU Side		■Target • Specify Device (Default: Grayout) ■Device Name • Specify Device (link side is RX): X, M, L, B, D, W, R, ZR, RD • Specify Device (link side is RY): Y, M, L, B, D, W, R, ZR, RD • Specify Device (link side is RWr, RWw): M, L, B, D, W, R, ZR, RD • Specify Device (link side is LB, LW): X, Y, M, L, B, D, W, R, ZR, RD (Default: Grayout) ■Points, End • Module Label: — • Specify Device: Displayed according to setting of "Start". (Default: Grayout) ■Start • Module Label: — • Specify Device: Device range of CPU modules (Set bit devices in increments of 16 points and word devices in increments of 4 points.) (Default: Grayout)

Point

The link devices of the CC-Link IE TSN Plus module can be accessed from a program. (☞ Page 169 Direct access to link devices)

Precautions

■Device set to "CPU Side"

Set a device range not to overlap the one used for the following:

- "Refresh Setting" in "Basic Settings" of other network modules
- "Link Refresh Settings" in "Basic Settings" of a CC-Link master/local module
- I/O numbers used for I/O modules and intelligent function modules
- "Refresh settings" of intelligent function modules
- Module label being used (when performing refresh settings in "Refresh Settings" under "Basic Settings")
- "Refresh Setting between Multiple CPUs" of "CPU Parameter" for a multiple CPU system

■Link refresh range

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

■ Changing link device assignment in "Network Configuration Settings" of "Basic Settings"

Correct the set range in "Refresh Setting" of "Basic Settings".

Network Topology

Select the network topology type according to the actual network configuration.

Item	Description	Setting range
Network Topology	Select the network topology type according to the actual network configuration.	Line topology, star topology, or coexistence of star and line topologies (fixed)

Communication Period Setting

Set the basic cycle setting and multiple cycle setting.

- Basic cycle setting requires calculation of the communication cycle interval and cyclic transmission time. (☞ Page 568 Communication cycle intervals)
- Multiple cycle setting is used when communication cycles coexist. (☞ Page 180 Communication cycles coexistence)

Item		Description	Setting range
Basic Period Setting	Setting in Units of 1μs	Select whether to set the basic cycle in increments of 1μs.	• Set • Not set (Default: Not set)
	Communication Period Interval Setting (Do Not Set it in Units of 1μs)*1	Select the setting range of the communication cycle interval.	• 125.00μs • 250.00μs • 500.00μs • 1000.00μs • 2000.00μs • 4000.00μs • 8000.00μs (Default: 1000.00μs)
	Communication Period Interval Setting (Set it in Units of 1μs)*1	Enter a value of the communication cycle interval.	125.00μs to 10000.00μs (in increments of 1μs) (Default: 1000.00μs)
	System Reservation Time	Necessary time for the system to guarantee the communication cycle interval. When "Communication Speed" of the master station is set to 100Mbps, select 200μs.	• 20.00μs • 200.00μs (Default: 20.00μs)
	Cyclic Transmission Time	Set the time to be allocated to cyclic transmission in communication cycle intervals.	5.00μs to 9966.00μs (in increments of 1μs) (Default: 500.00μs)
	Transient Transmission Time	The value of "Communication Period Interval Setting" minus "Cyclic Transmission Time" and "System Reservation Time" is displayed.	14.00μs to 9975.00μs (in increments of 1μs) (Default: 480.00μs)
Multiple Period Setting	Normal-Speed	Select the "Normal-Speed" cycle for a basic cycle. Setting is not required and can be left as "×4".	Fixed to ×4
	Low-Speed	Select the "Low-Speed" cycle for a basic cycle.	• ×16 • ×32 • ×64 • ×128 (Default: ×16)

*1 To use the CC-Link IE TSN network synchronous communication function, set the same value as the value set in "Fixed Scan Interval Setting" of "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronization Setting" in the "Inter-module Synchronization Setting" tab of "System Parameter".

Point

- When the TSN hub is used, set the timeslot information from the setting values in "Basic Period Setting". The timeslot information can be checked with the buffer memory. (☞ Page 509 Timeslot information)
- Set "Communication Period Setting" according to the communication cycle supported by the device stations.

Connection Device Information

Set the information of the connected device.

Item	Description	Setting range
CC-Link IE TSN Class Setting	Sets the CC-Link IE TSN Class of connected devices.	• CC-Link IE TSN Class B Only • Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only (Default: CC-Link IE TSN Class B Only)
TSN HUB Setting	Sets whether to use a TSN hub when a CC-Link IE TSN Class B device and CC-Link IE TSN A device coexist. When connecting a TSN hub, set "Use TSN HUB".	• Not to Use TSN HUB • Use TSN HUB (Default: Not to Use TSN HUB)

Precautions

To connect a TSN hub when a CC-Link IE TSN Class B device and CC-Link IE TSN Class A device coexist, set "TSN HUB Setting" to "Use TSN HUB".

Device Station Setting

Set items related to the device station.

Item	Description	Setting range
Disconnection Detection Setting	Set the number of consecutive communication failures until a device station is considered disconnected.	• 2 times • 4 times • 8 times (Default: 4 times)

Ethernet Communication Setting

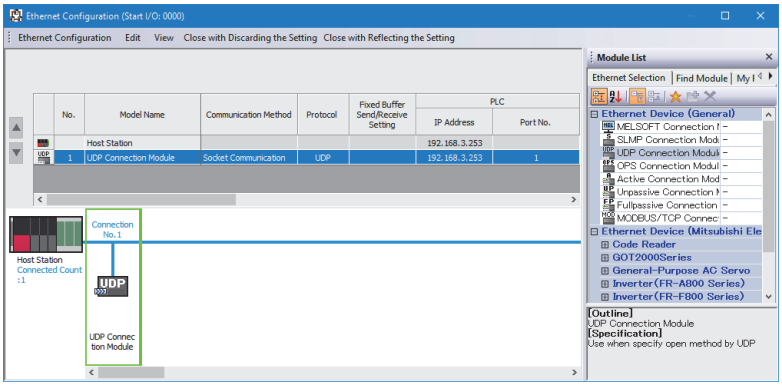
Set items related to communication with Ethernet devices.

Item	Description	Setting range
Opening Method	Select how to open a connection when using UDP/IP communications or Passive open of TCP/IP communications. • When "Do Not Open by Program" is selected, a connection is open when the system receives the Active request. Program for open/close processing is not required. • When "Open by Program" is selected, the open/close processing is performed by a program. The module cannot communicate when the CPU module is in STOP state.	• Do Not Open by Program • Open by Program (Default: Do Not Open by Program)
External Device Configuration	Set the method and protocol used for communicating with external devices. (☞ Page 81 Setting method)	—

■Setting method

The procedure for setting the external device to be connected is shown below.

1. Select the external device to be connected in "Module List" and drag it to "List of devices" or "Device map area".



2. Set the required items. (The required items vary depending on the selected external device.)
3. Select [Close with Reflecting the Setting] to finish the external device configuration settings.

[Ethernet Configuration] ⇨ [Check] ⇨ [System Configuration]

■Setting items

Item		Description	Setting range
No.		Connection number for distinguishing settings for each user connection.	The number is set in the following range starting with 1. • P1: 1 to 8 • P2: 1 to 8
Model Name		The name of the external device is displayed.	—
Communication Method		Set the method for communication with the external device. Communication methods other than "Socket communications" cannot be set for the CC-Link IE TSN Plus module.	• Broadcast Send • Broadcast Receive • Fixed Buffer (Procedure Exist) • Fixed Buffer (No Procedure) • Random Access Buffer • Predefined Protocol • Socket Communication • MELSOFT Connection • SLMP • OPS Connection • MODBUS/TCP
Protocol		Select the communication protocol for the external device.	• TCP • UDP
Fixed Buffer Send/Receive Setting		For communications using the fixed buffer, select whether to use the buffer for sending or for receiving in a connection to the external device. (This item cannot be set for the CC-Link IE TSN Plus module.)	• Send • Receive • Pairing (Receive) • Pairing (Send)
PLC	IP Address	Displays the IP address set in "Station No./IP Address Setting" in "Required Settings".	—
	Port No.	Set the port number to be used for communication with the external device.	■P1 1 to 4999, 5012 to 45236, 45240 to 61439, 61443 to 61447, 61449 to 61459, 61465 to 61499, 61502 to 61999 ■P2 1 to 2221, 2223 to 4999, 5012 to 44817, 44819 to 49511 (Default: empty)
Sensor/Device	MAC Address	Displays the MAC address of the external device.	—
	Host Name	Displays the name used to identify the external device.	—
	IP Address	Set the IP address of the external device.	0.0.0.1 to 223.255.255.254, 255.255.255.255 (Default: empty)
	Port No.	Set the port number of the external device. Set "65535" to set all the port numbers as the target of data receive.	1 to 65534, 65535 (Default: empty)
	Subnet Mask	Displays the subnet mask of the external device.	—
	Default Gateway	Displays the default gateway of the external device.	—
Existence Confirmation		Select the method of alive check that is performed when the Ethernet-equipped module has not communicated with the external device for a certain period of time. When the module cannot communicate with the external device, the connection will be closed. (☞ Page 83 Existence Confirmation)	• KeepAlive • UDP • Do not confirm existence

Point

Comment can be set on the "Properties" window displayed by right-clicking the module in "List of devices" or "Device map area" and selecting "Properties". The following can be performed depending on the selected device.

- Changing the image
- Creating association with a file or application

■Existence Confirmation

When the CC-Link IE TSN Plus module has not communicated with the external device for a certain period of time while the connection is open, this function checks whether the external device is alive by sending an alive check message to the device and waiting for the response.

The following table lists the details on alive check.

Item	Applicable protocol	Description
KeepAlive	TCP/IP	This method is used for a connection opened using TCP/IP. The Ethernet-equipped module performs an alive check by sending an alive check ACK message to the external device with which communications have not been performed for a certain period of time and waiting to see whether the response is received. If the open state does not continue, the connection is automatically closed.*1
UDP	UDP/IP	This method is used for a connection opened using UDP/IP. The module performs an alive check by sending a PING command (ICMP echo request/response function) to the external device with which communication has not been performed for a certain period of time waiting to see whether the response is received.*2
Do not confirm existence	TCP/IP, UDP/IP	Alive check is not performed.

*1 The connection may be disconnected if the external device does not support the TCP KeepAlive function (response to a KeepAlive ACK message).

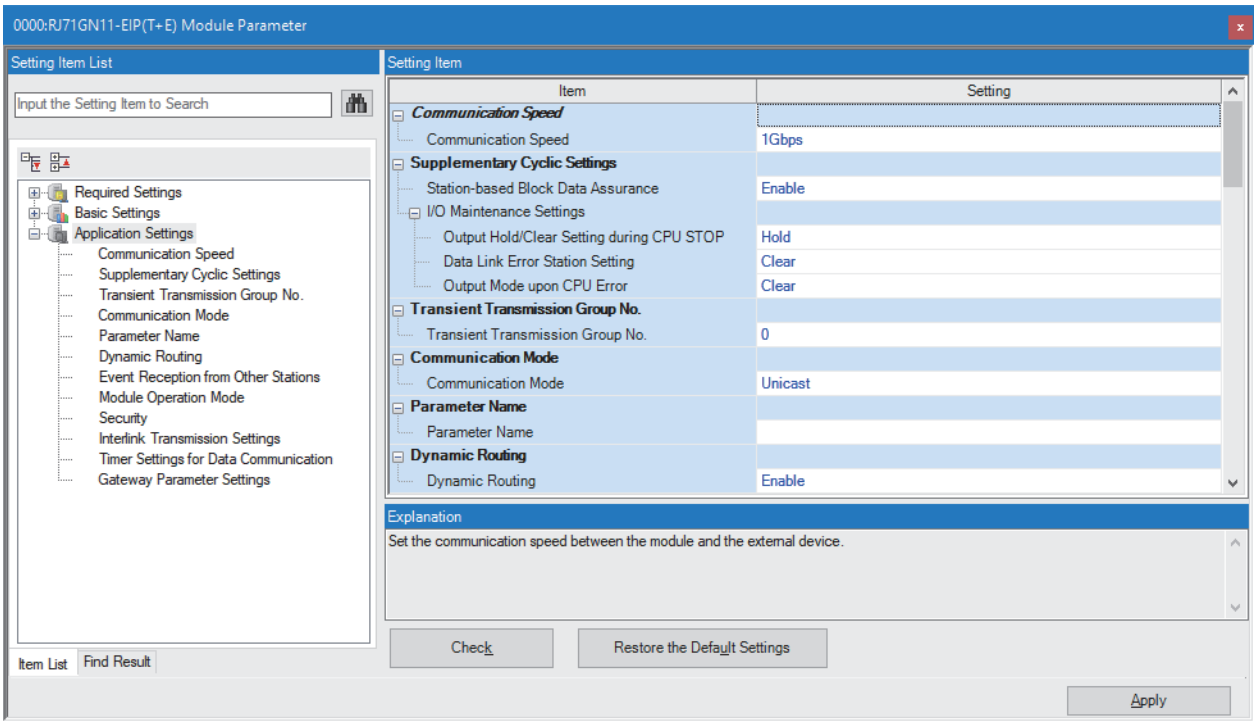
*2 The CC-Link IE TSN Plus module automatically sends an echo response packet when it receives a PING echo request command. (It sends a response to the received PING command even if the connection used in the data communications with the external device is closed.)

If a response message cannot be received from the external device (or if an error has been detected) using the alive check function, the following are performed.

- The corresponding connection will be forcibly closed. (The line is disconnected.) Open the connection again using a user program.
- Open completion signal is turned off, and the error code is stored in the buffer memory areas.

Application Settings

Set the supplementary cyclic settings, transient transmission group number, and other settings for the CC-Link IE TSN Plus module.



○: Can be set, ×: Cannot be set

Item	Description	Availability		Reference
		Master station	Local station	
Communication Speed	Set the communication speed.	○	○	Page 85 Communication Speed
Supplementary Cyclic Settings	Set the station-based block data assurance and I/O maintenance settings.	○	○*1	Page 85 Supplementary Cyclic Settings
Transient Transmission Group No.	Set the transient transmission group number.	○	○	Page 85 Transient Transmission Group No.
Communication Mode	Set the communication mode.	○	×	Page 85 Communication Mode
Parameter Name	Set a name for the module parameter if desired.	○	○	Page 85 Parameter Name
Dynamic Routing	Select whether to enable the dynamic routing function.	○	○	Page 86 Dynamic Routing
Event Reception from Other Stations	Select whether to obtain the events occurring in the other stations.	○	×	Page 86 Event Reception from Other Stations
Module Operation Mode	Set the module operation mode.	○	○	Page 86 Module Operation Mode
Security	Set the security measures for access to the Ethernet device.	○	○	Page 87 Security
Interlink Transmission Settings	Set link device ranges when cyclic data are transferred from a station in the own network to a station in a different network.	○	×	Page 87 Interlink Transmission Settings
Timer Settings for Data Communication	Set the timer used for the following communications. • Connection with MELSOFT product • Communications using the SLMP • Socket communications	○	○	Page 91 Timer Settings for Data Communication
Gateway Parameter Settings	Set this item to communicate with an external device on Ethernet via a router and gateway.	○	○	Page 93 Gateway Parameter Settings

*1 "Station-based Block Data Assurance" cannot be set.

Communication Speed

Set the communication speed.

Item	Description	Setting range
Communication Speed	Select the communication speed.	• 1Gbps • 100Mbps (Default: 1Gbps)

For details on the connection of modules or devices based on the communication speed setting, refer to the following.

☞ Page 26 CC-Link IE TSN SYSTEM CONFIGURATION

Supplementary Cyclic Settings

Set the station-based block data assurance and I/O maintenance settings.

Item		Description	Setting range
Station-based Block Data Assurance		Select whether to ensure a data integrity of the data blocks being refreshed between the CPU module and the CC-Link IE TSN Plus module. (☞ Page 172 Cyclic data assurance)	• Enable • Disable (Default: Enable)
I/O Maintenance Settings	Output Hold/Clear Setting during CPU STOP	Select whether to hold or clear output when the status of the CPU module changes from RUN to STOP. Set it on the sending side. (☞ Page 182 I/O maintenance settings)	• Hold • Clear (Default: Hold)
	Data Link Error Station Setting	Select whether to clear or hold input from a disconnected station. Set it on the receiving side. (☞ Page 182 I/O maintenance settings)	• Clear • Hold (Default: Clear)
	Output Mode upon CPU Error	Select whether to hold or clear output when a stop error occurs in the CPU module. Set it on the sending side. (☞ Page 182 I/O maintenance settings)	• Clear • Hold (Default: Clear)

Transient Transmission Group No.

Set the transient transmission group number.

Item	Description	Setting range
Transient Transmission Group No.	Set the group number to perform transient transmission using group specification.	0 to 32 (0: No group specification) (Default: 0)

Communication Mode

Set the communication mode.

Item	Description	Setting range
Communication Mode	Set the communication mode.	• Unicast • Multicast (Default: Unicast)

Parameter Name

Set a name for the module parameter if desired.

Item	Description	Setting range
Parameter Name	Set a name for the module parameter if desired.	Up to 8 one-byte or two-byte characters (Default: empty)

Dynamic Routing

Select whether to enable the dynamic routing function. (☞ Page 191 Communications using the engineering tool)

Item	Description	Setting range
Dynamic Routing	When communicating with different networks, select whether to enable the dynamic routing function.	• Enable • Disable (Default: Enable)

Point

- When the dynamic routing function is enabled, the route is selected according to the status of the communication path at that time. Even if the dynamic routing function is enabled, if the system contains devices that do not support dynamic routing (MELSEC-Q/L/QnA/A series products), it is necessary to configure static routing on the devices that do not support dynamic routing.
- When the dynamic routing function is disabled, the communication route set in the static routing configuration is used to communicate with different networks.

Precautions

When enabling dynamic routing, do not connect the CPU module (built-in Ethernet port part) and the CC-Link IE TSN Plus module on the same Ethernet using a switching hub or other means.

Event Reception from Other Stations

Select whether to obtain the events occurring in the other stations.

Item	Description	Setting range
Event Reception from Other Stations	Select whether to obtain the events occurring in the other stations.	• Enable • Disable (Default: Enable)

Module Operation Mode

Set the module operation mode of the CC-Link IE TSN Plus module.

Item	Description	Setting range
Module Operation Mode	Online • Select this mode to connect the CC-Link IE TSN Plus module to the network to perform data link with other stations. Offline • Select this mode to disconnect the CC-Link IE TSN Plus module from the network and not perform data link with other stations. Module Communication Test • Select this mode to check the hardware of the CC-Link IE TSN Plus module. Select this mode to check the module hardware when communication is unstable. (☞ Page 397 Module Communication Test)	• Online • Offline*1 • Module Communication Test (Default: Online)

*1 EtherNet/IP communications will turn offline.

Restriction

The following functions are disabled when "Module Operation Mode" is set to "Offline" or "Module Communication Test". (☞ Page 152 FUNCTIONS)

- Cyclic transmission
- Transient transmission
- RAS in general
- Event issuance for the interrupt program
- CC-Link IE TSN network synchronous communication

In line topology, data link is not performed for stations connected after a station in offline mode.

Security

Set the security measures for access to the Ethernet device.

Item		Description	Setting range
IP Filter Settings	IP Filter	Set whether to use the IP filter.	• Disable • Enable (Default: Disable)
	IP Filter Settings	Set the IP addresses to be allowed or denied.	—

■IP Filter Settings

Up to 32 IP addresses can be set as an IP address to be allowed or denied by the IP filter.

Range specification and specification of the IP addresses to be excluded from the set range as a single setting are possible.

Item	Description	Setting range
Access from IP address below	Select whether to allow or deny the access from the specified IP addresses.	• Allow • Deny (Default: Allow)
Range Setting	Select this item when specifying the IP addresses by range.	(Default: Clear)
IP Address	Set the IP addresses to be allowed or denied. When selecting "Range Setting", enter the start IP address (left field) and end IP address (right field) of the range.	0.0.0.1 to 223.255.255.254 (Default: empty)
IP Address Excluded from Range	When selecting "Range Setting", set the IP address to be excluded from the set range. Up to 32 IP addresses can be set.	0.0.0.1 to 223.255.255.254 (Default: empty)

Interlink Transmission Settings

Set link device ranges when cyclic data are transferred from a station in the own network to a station in a different network.

■Modules that can support interlink transmission

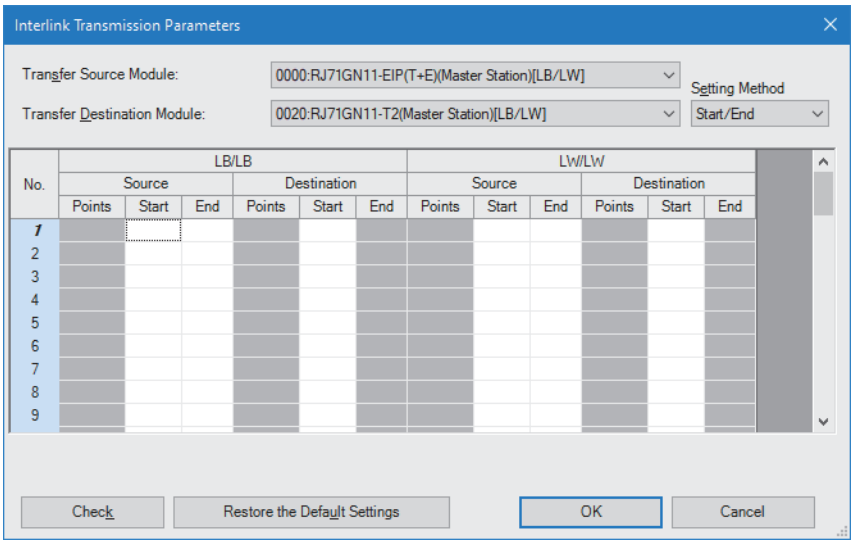
The following modules support interlink transmission.

- RJ71GN11-EIP (master station)
- RJ71GN11-T2 (master station)
- CC-Link IE Controller Network-equipped module (control station, normal station)
- CC-Link IE Field Network-equipped module (master station and submaster station)
- RJ71LP21-25 (control station and normal station)

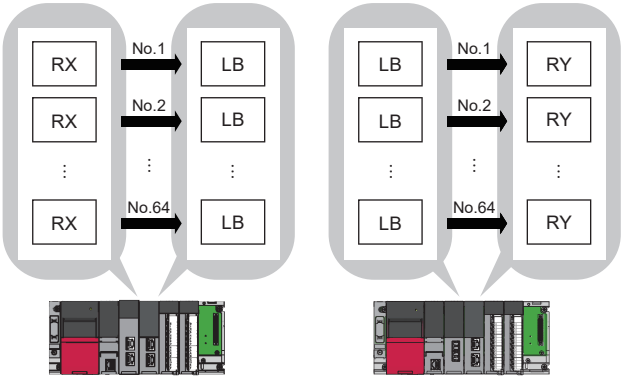
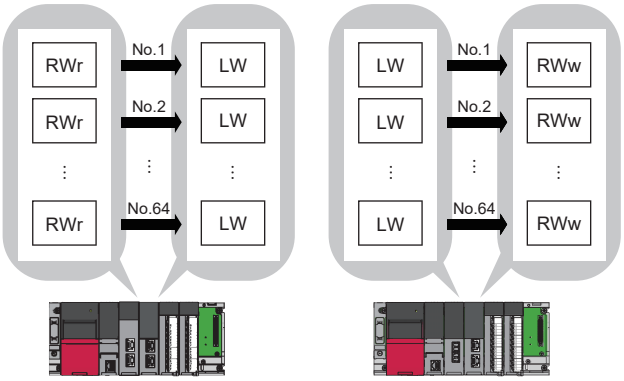
■Setting method

The procedure for the interlink transmission settings is shown below.

1. Select combination of modules in the "Transfer Source Module" and "Transfer Destination Module" boxes and enter setting values.



2. Click the [OK] button to finish the interlink transmission settings.

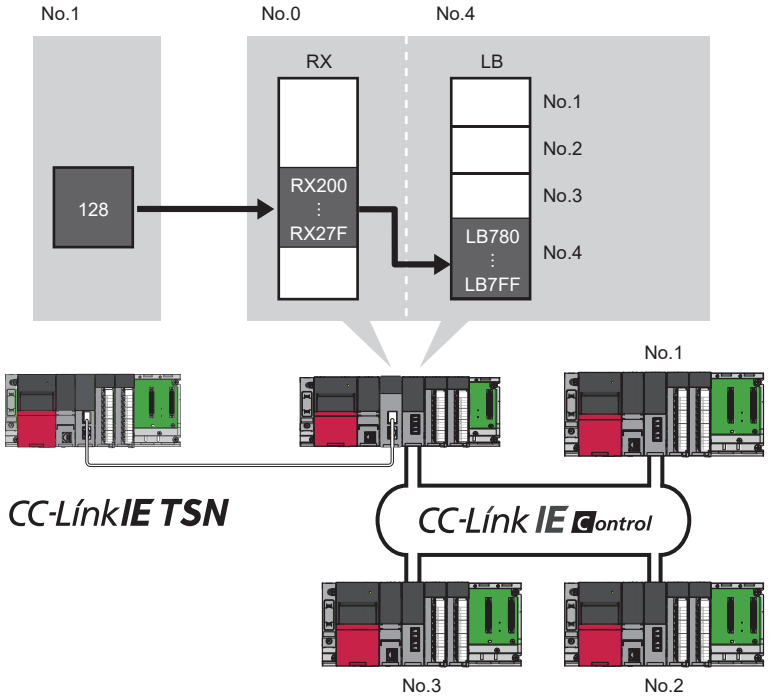
Item		Description	Setting range
Transfer Source Module		Select the combination of transfer source and transfer destination modules.	The setting varies depending on the set module.
Transfer Destination Module			
Setting method		Right-click in the "Interlink Transmission Parameters" window and select a link device setting method from the "Setting Method" menu. • Start/End: Enter the start and end numbers of link devices. • Points/Start: Enter the numbers of points and start numbers of link devices.	• Start/End • Points/Start (Default: Start/End)
RX/LB LB/RY	Source Destination	Enter the link device range of the transfer source and destination modules. Up to 64 interlink transmission ranges can be set. RX and RY points can be assigned in increments of 16 (Start: □□□0H, End: □□□FH). 	RX: 0H to 3FFFH RY: 0H to 3FFFH (Default: empty)
RWr/LW LW/RWw	Source Destination	Enter the link device range of the transfer source and destination modules. Up to 64 interlink transmission ranges can be set. RWr and RWw points can be assigned in increments of 4. 	RWr: 0H to 1FFFH RWw: 0H to 1FFFH (Default: empty)

Point

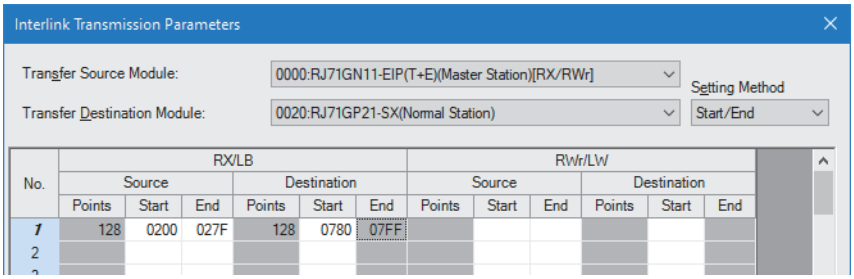
Link devices set for "Source" can be overlapped. Doing so will allow transfer of the same link devices to multiple network modules.

■Setting example

The following is a setting example to perform interlink transmission from the master station on CC-Link IE TSN to stations on CC-Link IE Controller Network. In this example, 128-point data input from the device station (station No.1) is transferred.



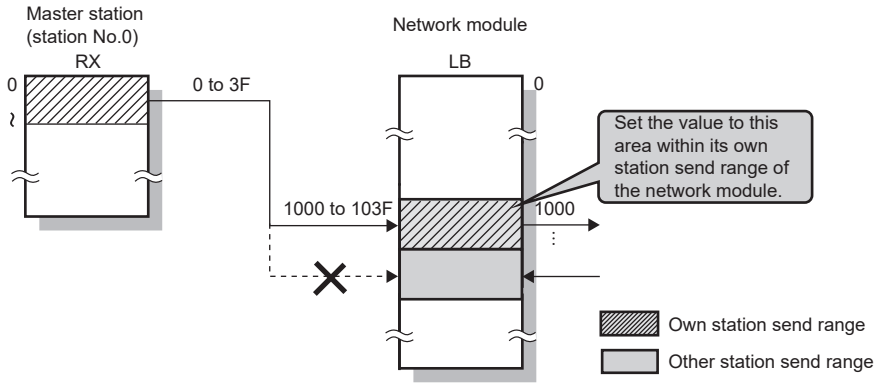
1. Select "0000: RJ71GN11-EIP (T+E) (Master Station) [RX/RWr]" for "Transfer Source Module" and "0020: RJ71GP21-SX (Normal Station)" for "Transfer Destination Module", and enter the transfer ranges of link devices.



2. Click the [OK] button.

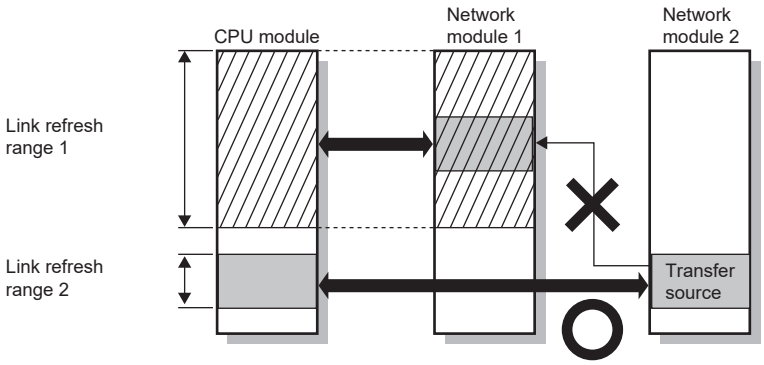
Point

If the transfer destination network module is on a network other than CC-Link IE TSN, set the transfer destination link devices within the own station send range of the network module. If the link devices are set within the send range of another station, the transferred data are overwritten with the send data of another station.



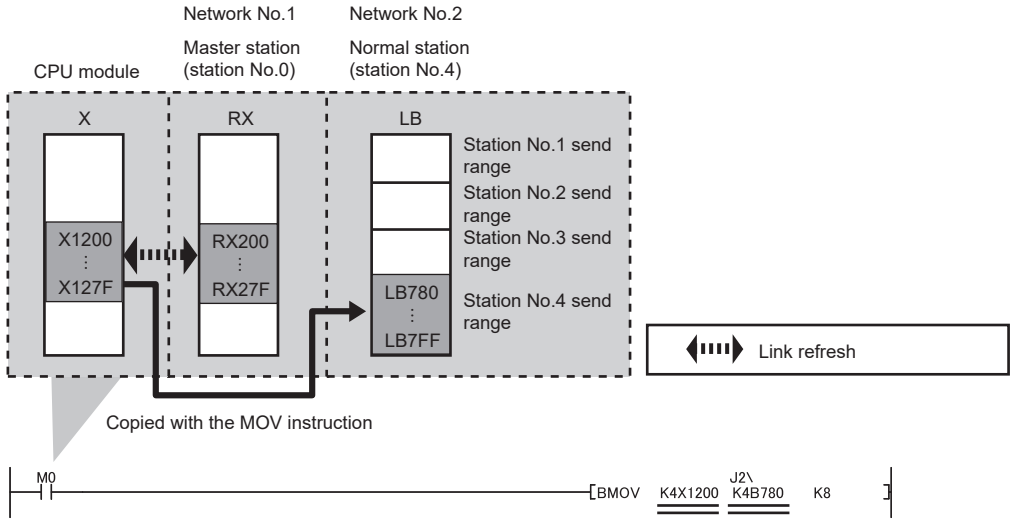
Precautions

- Do not use link devices set for link refresh range as a transfer destination. If doing so, transfer destination link devices will be overwritten by link refresh. To use transfer destination link device data in the CPU module, set the transfer source link device as the link refresh range.



- To set the interlink transmission range to 65 or more, use link direct devices in a program to perform interlink transmission.

Ex.



A link direct device cannot be specified for both the first and second arguments. Specify a CPU device by link refresh for either one.

- When interlink transmission is performed in a multiple CPU system and when different control CPUs are set for the network modules, interlink transmission cannot be performed using interlink transmission parameters or a program. Perform interlink transmission using data communication by the CPU buffer memory. (MELSEC iQ-R CPU Module User's Manual (Application))

Timer Settings for Data Communication

Set the timer used for the following communications.

- Connection with MELSOFT product
- Communications using the SLMP
- Socket communications

When changing the timer settings for data communication, refer to the precautions before setting. (☞ Page 92 Precautions for settings)

Item		Description	Setting range
Change/Set Timer Value		Select whether to change timer values from the default. The timer operates with its default value when "No" is selected.	• No • Yes (Default: No)
TCP Resend Timer		Set the waiting time to resend ACK if it is not returned when a connection is opened or data is sent in TCP/IP. This timer is also used as the minimum set time for arrival monitoring for data link instructions.	Unit [s]: 1 to 16383 Unit [ms]: 100 to 16383000*1 (Default: 10s)
Destination Alive Check Start Interval Timer		Set the time interval between the reception of the last message from the external device and the start of alive check.	Unit [s]: 1 to 16383 Unit [ms]: 100 to 16383000*1 (Default: 600s)
Destination Alive Check Interval Timer		Set the time interval for performing alive check again when no response is returned from the external device of alive check target.	Unit [s]: 1 to 16383 Unit [ms]: 100 to 16383000*1 (Default: 10s)
Destination Alive Check Resend Count		Set the number of times to perform alive check when no response is returned from the external device of alive check target.	1 to 99999 (Default: 3)
Advanced Settings	Response Monitoring Timer	Set the following time. • The time interval between the first message and last message when receiving the divided messages	Unit [s]: 1 to 16383 Unit [ms]: 100 to 16383000*1 (Default: 30s)
	TCP ULP Timer	Set the time-to-live of the send packet in TCP/IP communications. For example, when the TCP resend timer value is set to 10 seconds and the TCP ULP timer value is set to 30 seconds, data will be resent every 10 seconds if no response is returned from the external device after data sending, and timeout error occurs if no response is returned within 30 seconds.	Unit [s]: 1 to 16383 Unit [ms]: 100 to 16383000*1 (Default: 30s)
	TCP End Timer	When closing the TCP/IP connection by the own station, set the monitoring time for waiting for a FIN from the external device after the own station sends a FIN and an ACK is returned from the external device. If a FIN is not received from the external device within the time specified by the TCP end timer value, an RST is sent to the external device and the connection is forcibly closed.	Unit [s]: 1 to 16383 Unit [ms]: 100 to 16383000*1 (Default: 20s)
	TCP Zero Window Timer	The window means the receive buffer on the receive side. If the receive buffer on the receive side has no free space (window size = 0), data sending is waited until the receive side has free receive buffer space. At this time, the sending side sends packets for checking the send window to the receive side according to the TCP zero window timer value to check the receiving status.	Unit [s]: 1 to 16383 Unit [ms]: 100 to 16383000*1 (Default: 10s)
	IP Assembly Timer	The communication data may be divided at the IP level before being sent due to the buffer limitation of the sending station or the receiving station. Set the waiting time for the divided data in such a case.	Unit [s]: 1 to 16383 Unit [ms]: 100 to 16383000*1 (Default: 5s)

*1 Set in increments of 100ms.

■Precautions for settings

- Set the timer values of the CC-Link IE TSN Plus module so that the following formula is met. When connecting Mitsubishi products to the line, configure the same settings for both modules.

(Response monitoring timer value) ≥ (TCP ULP timer value) ≥ (TCP end timer value) ≥ (TCP resend timer value) ≥ (IP assembly timer value)

(TCP resend timer value) = (TCP zero window timer value)

- Set the timer values so that the following formula is met. The frequency of a communication error, such as a transmission timeout, may be higher if the timer values do not meet the formula.

(TCP ULP timer value on the external device) > (TCP resend timer value on the CC-Link IE TSN Plus module)

(Monitoring timer value of the application software on the external device) > {(TCP ULP timer value on the CC-Link IE TSN Plus module) × n^{*1}}

*1 "n" is the number of TCP segment transmission and is calculated by the following formula.

$$n = \text{A value that } \left(\frac{\text{Message size sent by the CC-Link IE TSN Plus module}}{\text{Maximum Segment size}} \right) \text{ is rounded up to the nearest integer}$$

Ex.

The number of TCP segment transmission when communications are performed on the same line

The Maximum Segment Size is 1460 bytes on the same line (without a router) and the number of TCP segment transmissions is as follows.

- n = 1 when the size of the message sent by the CC-Link IE TSN Plus module is 1460 bytes or less
- n = 2 when the size of the message sent by the CC-Link IE TSN Plus module is less than 1460 bytes

Ex.

The number of TCP segment transmission when communications are performed on a different line

The Maximum Segment Size is at least 536 bytes on another line (via a dial-up router or other communication device) and the number of TCP segment transmissions is as follows.

- n = 1 when the size of the message sent by the CC-Link IE TSN Plus module is 536 bytes or less
- n = 2 when the size of the message sent by the CC-Link IE TSN Plus module is greater than 536 bytes and no more than 1072 bytes
- n = 3 when the size of the message sent by the CC-Link IE TSN Plus module is greater than 1072 bytes and no more than 1608 bytes

■Retry count

When a communication failure occurs due to a problem such as noise, change the value so that the number of retries may increase.

The number of retries is obtained using the following formula. (When using the default values, 3 = 30 ÷ 10)

- Number of retries = TCP ULP timer value ÷ TCP resend timer value

When not performing the retry process (when setting 0 time), configure the setting so that the following formula is met. (Set the same value for the timer values.)

- TCP ULP timer value = TCP end timer value = TCP resend timer value

Gateway Parameter Settings

With gateway parameter settings, the Ethernet-equipped module can communicate with external devices on other Ethernet networks via a router and gateway. One default router and up to eight routers can be set.

Item		Description	Setting range
Gateway Other Than Default Gateway		Set to communicate with an external device on the other Ethernet via a router.	• Use • Not Use (Default: Not Use)
Gateway Information	No.1 to No.8	Set the information of the gateway other than the default gateway. • Gateway IP Address (☞ Page 93 Gateway IP Address) • Subnet Address (☞ Page 94 Subnet Address)	—

Point

Set the default gateway when communicating via the default gateway. (☞ Page 75 Station No./IP Address Setting, ☞ Page 115 IP Address)

■Gateway IP Address

When communicating with an external device on another Ethernet network through a gateway other than the default gateway, set the IP address of the gateway. (Setting range: 0.0.0.1 to 223.255.255.254)

Set a value that satisfies the following conditions.

- The class of the IP address is A, B, or C.
- The subnet address of the gateway is the same as that of the CC-Link IE TSN Plus module on the own station.
- The host address part is not a sequence of "0" or "1".

Point

- When the CC-Link IE TSN Plus module communicates with an external device on another Ethernet network by Passive open, communication is possible without gateway parameter settings.
- In a system where the Proxy router is used, the gateway parameter settings are not required.

■Subnet Address

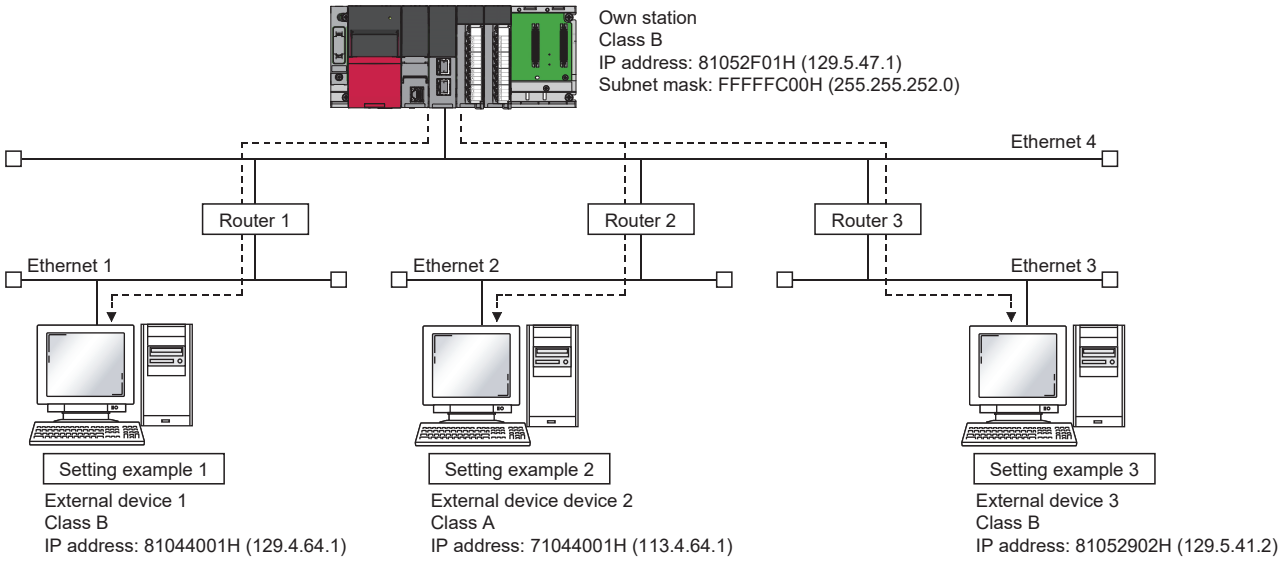
When communicating with an external device on another Ethernet network through a gateway other than the default gateway, set the network address[*1] or subnet address[*2] of the external device. (Setting range: 0.0.0.1 to 255.255.255.254)

Set a value that satisfies the following conditions.

- The class of the IP address is A, B, or C.
- The host address bits are all "0".

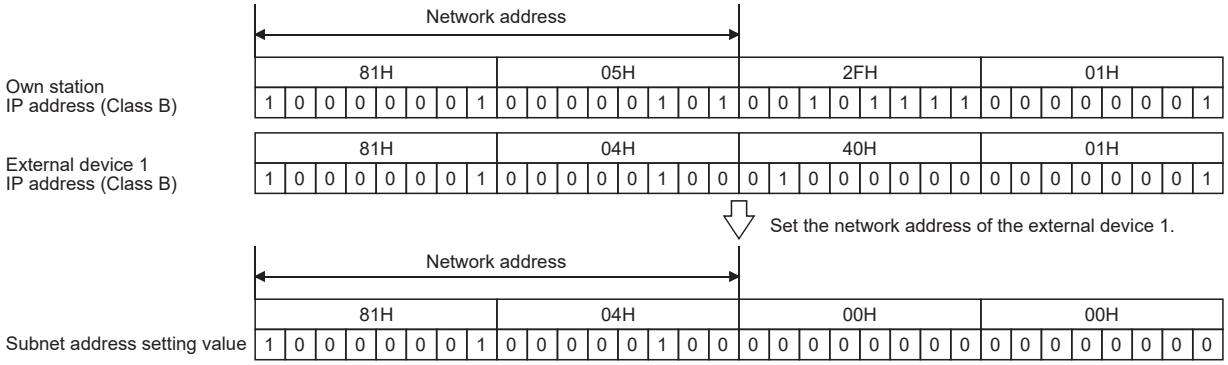
*1 Set the network address of the external device when its class (network address) is different from that of the CC-Link IE TSN Plus module on the own station.

*2 Set the network address of the external device when its class (network address) is the same as that of the CC-Link IE TSN Plus module on the own station.



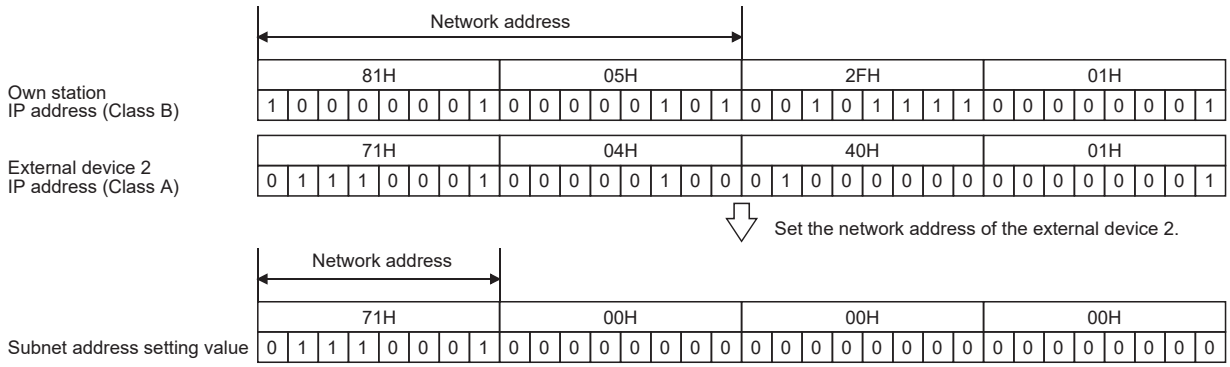
Ex.

When the network addresses differ between the CC-Link IE TSN Plus module on the own station and the external device



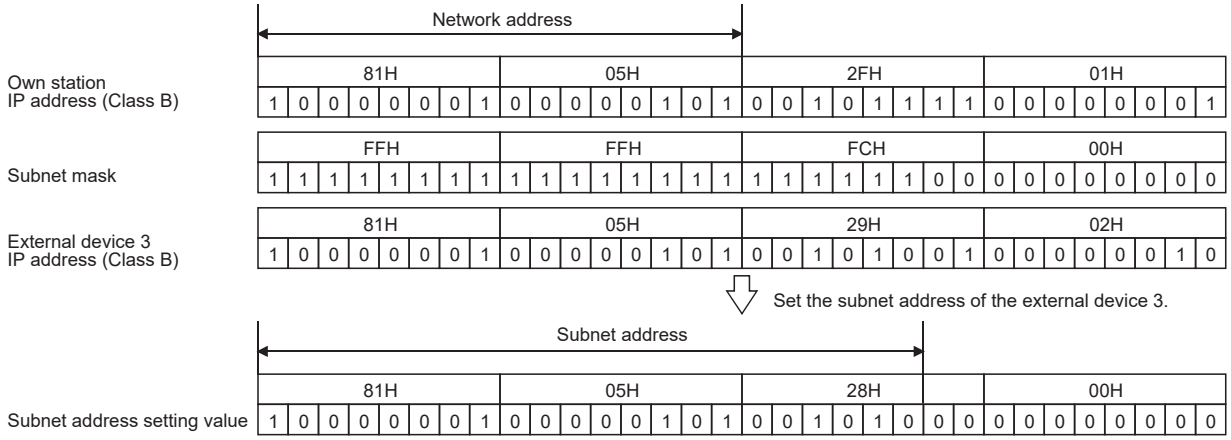
Ex.

When the classes differ between the CC-Link IE TSN Plus module on the own station and the external device



Ex.

When the network address of the CC-Link IE TSN Plus module on the own station and that of the external device are the same



"CC-Link IE TSN Configuration" window

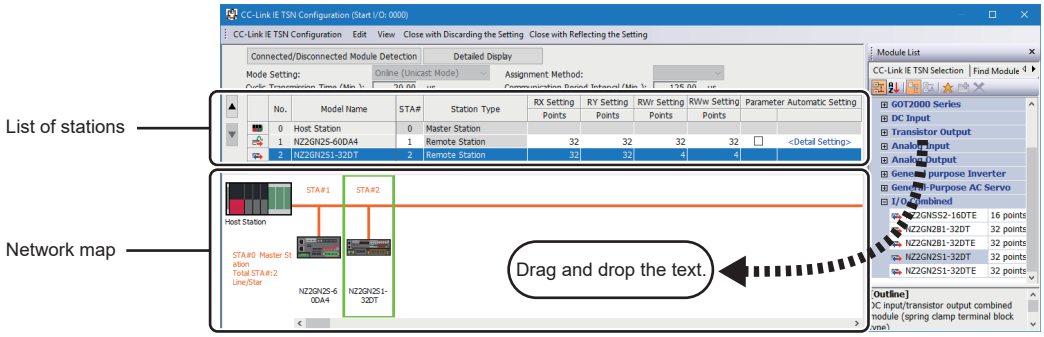
Perform the parameter setting of device stations, the detection of connected/disconnected devices, or others.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target device ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]

Parameter setting of device stations

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

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



2. Set the required items.

3. Check the system configuration.

[CC-Link IE TSN Configuration] ⇨ [Check] ⇨ [System Configuration]

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

MELSOFT Navigator MessageNo.

4. Select [Close with Reflecting the Setting] and close the "CC-Link IE TSN Configuration" window.

■Setting items

- Simple Display: Click the [Simple Display] button to display a narrow portion of items. Use for operation with default settings or the minimum required settings. (Default)
- Detailed Display: Click the [Detailed display] button to display all items.

Simple display	Detailed display	Description	Setting range
Mode Setting		The settings for "Module Operation Mode" and "Communication Mode" is displayed. For details on the settings, refer to the following. • Module Operation Mode: ☞ Page 86 Module Operation Mode • Communication Mode: ☞ Page 85 Communication Mode	—
—	Assignment Method	Select a link device assignment method. • Points/Start: Enter the numbers of points and start numbers of link devices. • Start/End: Enter the start and end numbers of link devices.	• Points/Start • Start/End (Default: Points/Start)

Simple display	Detailed display	Description	Setting range
Cyclic Transmission Time (Min.)		The cyclic transmission time that is calculated by the number of device stations and the number of link device points is displayed. Use the displayed value as a guide.*1*3 The displayed value differs depending on "TSN HUB Setting" of "Connection Device Information" under "Basic Settings" even when the number of device stations and link device points are the same. For details, refer to the following. ☞ Page 568 Communication cycle intervals The displayed value can be used for "Cyclic Transmission Time" in "Communication Period Setting" under "Basic Settings" of the module parameter. If the cyclic transmission is not performed while the displayed value is set, set a value obtained by the following formula: Value displayed in Cyclic Transmission Time (Min.) + Greatest value among the two values shown below. • 10% of the calculated minimum cyclic transmission time • When the communication speed of the master station is set to 1Gbps: Number of device stations × 2μs • When the communication speed of the master station is set to 100Mbps: Number of device stations × 20μs When the communication speed of the master station is 1Gbps in unicast mode or multicast mode with version 1.085P or earlier of the engineering tool (if a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists), the time cannot be checked. Check it with "Cyclic transmission time (calculation value)" (SW0073). ☞ Page 553 List of Link Special Register (SW)	—
Communication Period Interval (Min.)		The communication period interval that is calculated by the number of device stations and the number of link device points is displayed. Use the displayed value as a guide.*1*3 The displayed value differs depending on "TSN HUB Setting" of "Connection Device Information" under "Basic Settings" even when the number of device stations and link device points are the same. For details, refer to the following. ☞ Page 568 Communication cycle intervals The displayed value can be used for "Communication Period Interval Setting" in "Communication Period Setting" under "Basic Settings" of the module parameter. If cyclic transmission is not performed by configuring the setting with the displayed value, set a value obtained by adding 10% as follows. Calculation formula: B + A × 0.1 A: Cyclic transmission time (minimum value) B: Communication cycle interval (minimum value) When the communication speed of the master station is 1Gbps in unicast mode or multicast mode with version 1.085P or earlier of the engineering tool (if a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists), the interval cannot be checked. Check it with 'Communication cycle interval (calculation value)' (SW0072). ☞ Page 553 List of Link Special Register (SW)	—
No.		The total number of device stations set in the "CC-Link IE TSN Configuration" window is displayed.	—
Model Name		The module model name is displayed. To set a module where the profile is not registered, select it from the "General CC-Link IE TSN Module" list or register the profile before setting the model name. For how to register a profile, refer to the following. 📖 GX Works3 Operating Manual	—
STA#		Enter the station number of each device station connected to the network. Station numbers do not need to be set consecutively, but must be unique.	• Master station: Fixed to "0" • Device station: 1 to 120 (Default: Serial number of added stations)
Station Type		Set the station types. Select the station types same as those of the modules connected to the network.	• Master Station • Local Station • Remote Station (Default: Varies depending on the set module)
—	Motion Control Station	Use the profile to allow selection of target stations for motion control.	• Checked: Motion control target • Not checked: Not motion control target (Default: Not checked)
Number of input/output bit points*4	RX Setting RY Setting	Assign RX/RY points in increments of 16. (☞ Page 157 Communications using RX, RY, RWr, and RWw) Modules with settings provided by the profile are automatically set from selected models. (Excluding modules with a number of points that is not fixed)	• Number of points: 16 to 16384 • Start: 0H to 3FF0H • End: FH to 3FFFH (Default: Varies depending on the set module)

Simple display	Detailed display	Description	Setting range
Number of input/output word points[*4]	RWw Setting RWr Setting	Assign RWw/RWr points in increments of 4. (☞ Page 157 Communications using RX, RY, RWr, and RWw) Modules with settings provided by the profile are automatically set from selected models. (Excluding modules with a number of points that is not fixed)	• Number of points: 4 to 8192 • Start: 0H to 1FFCH • End: 3H to 1FFFH (Default: Varies depending on the set module)
—	LB Setting	Assign LB points in increments of 16 and LW points in increments of 1. (☞ Page 162 Communications using LB and LW) Modules with settings provided by the profile are automatically set from selected models. (Excluding modules with a number of points that is not fixed)	• Number of points: 16 to 32768 • Start: 0H to 7FF0H • End: FH to 7FFFH (Default: Varies depending on the set module)
	LW Setting		• Number of points: 1 to 16384 • Start: 0H to 3FFFH • End: 0H to 3FFFH (Default: Varies depending on the set module)
Parameter Automatic Setting		Set whether to set the parameters of each device station automatically. This cannot be set for extension modules. However, the parameter automatic setting of extension modules is interlocked with the settings of the connected main module.	• Checked: Distribute parameters • Not checked: Do not distribute parameters (Default: Not checked)
PDO Mapping Setting		Set the PDO mapping to the station that supports CANopen communications. (☞ Page 109 PDO mapping setting)	—
IP Address		Set the IP address of a station that performs cyclic transmission.	0.0.0.1 to 223.255.255.254 (00.00.00.01 to DF.FF.FF.FE) (Default: The first to third octets have the same values as the master station, the fourth octet has a serial number from 1 to 254)
Subnet Mask		Set a subnet mask to identify a network address. Set the same value for the master station and device station. Even if a device station has a different subnet mask from the master station, it does not result in an input error. If 255.255.255.255 is set, leave it empty.	• 0.0.0.1 to 255.255.255.255 (00.00.00.01 to FF.FF.FF.FF) • Empty (0.0.0.0) (Default: empty[*2])
Default Gateway		Set the default gateway address to connect to the external network. If 223.255.255.255 is set, leave it empty.	• 0.0.0.1 to 223.255.255.254 (00.00.00.01 to DF.FF.FF.FE) • Empty (0.0.0.0) (Default: empty)
Reserved/Error Invalid Station		Set the device station as a reserved station or error invalid station. • No Setting: The device station is connected to the network. • Reserved Station: The device station is reserved for future expansion. By using a reserved station, link device assignment will not change even if the device station is added (reservation is canceled). Therefore, modification of the program is not required. Physical connection of the device station on the network is not required. • Error Invalid Station: Even if a device station is disconnected during data link, the master station will not detect the device station as a faulty station.	• No Setting • Reserved Station • Error Invalid Station (Default: No setting, master station is fixed as empty)
Network Synchronous Communication		Set whether to synchronize each device station with network synchronous communication.	• Synchronous • Asynchronous (Default: Asynchronous)
Communication Period Setting		When multiple communication cycles are set, set the cycle of each device station. (☞ Page 180 Communication cycles coexistence)	• Basic Period • Normal-Speed • Low-Speed (Default: Basic Period)
Station Information		■Alias Enter the name of a device if required. The name entered is displayed in "Network Status" of the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window. For the extension module of the remote station, the name is not displayed in the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window, even if entered.	Up to 32 one-byte characters (one-byte or two-byte) (Default: empty)
		■Comment Information entered in "Comment1" on the "Properties" window displayed by right-clicking the module in the list of stations or the network map is displayed.	Up to 32 one-byte characters (one-byte or two-byte) (Default: empty)
		■Station-specific mode setting Set the station-specific mode of the device station. (Only when the device station supports the station-specific mode)	The setting varies depending on the set module.

Simple display	Detailed display	Description	Setting range
CC-Link IE TSN Class		Set the CC-Link IE TSN Class of the device for each device station.*4	• CC-Link IE TSN Class B • CC-Link IE TSN Class A (Default: Varies depending on the device)

*1 When the settings cannot be determined with the module parameter and "Network Configuration Settings," a hyphen or incorrect calculation result may be displayed.

*2 If a setting is present for "Subnet Mask" under "Station No./IP Address Setting Method" in "Required Settings", this value shall be set as the default.

*3 If "CC-Link IE TSN Class Setting" of a general CC-Link IE TSN module added to list of stations in "Network Configuration Settings" is set to CC-Link IE TSN Class A and the communication period interval and minimum value for cyclic transmission time are set to "Communication Period Interval Setting" and "Cyclic Transmission Time", the cyclic transmission may not be possible. In this case, select the actual device to be used from "Module List" and add it to list of stations, or refer to the manual for the device to be used to check the maximum response time for the time managed polling method and calculate and set the communication period interval and cyclic transmission time.

*4 If the number of assigned link device points exceeds the number of assignable points at a station whose CC-Link IE TSN Class is CC-Link IE TSN Class A, a link device point number error (error code: 3160H) will occur. For the number of link device points that can be assigned to a CC-Link IE TSN Class A device station, refer to the following.
☞ Page 99 Number of link device points that can be assigned to a CC-Link IE TSN Class A device station

Point

Because a portion of the setting items are not displayed in simple display, when there are deficiencies in setting items that are not displayed, the "Output" window may display a warning or error by selecting [Close with Reflecting the Setting].
If a warning is displayed, switch to detailed display and correct the items.

■Number of link device points that can be assigned to a CC-Link IE TSN Class A device station

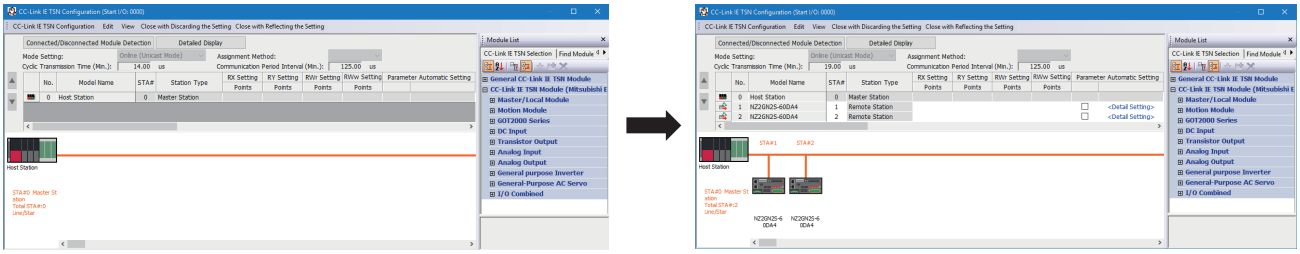
The number of link device points assigned to a CC-Link IE TSN Class A device station must satisfy the following two conditional formulas.

- (Number of points of "RY setting" ÷ 8) + (Number of points of "RWw setting" × 2) ≤ 1916
- (Number of points of "RX setting" ÷ 8) + (Number of points of "RWr setting" × 2) ≤ 1876

Connected/Disconnected Module Detection

Connected device stations are detected and displayed on the "CC-Link IE TSN Configuration" window.
Parameters can be easily created at network system startup or when changing the network system configuration.
If this function is executed immediately after a device station is connected, the information of the connected device may not be correctly read out. In that case, retry the operation.

1. Click the [Connected/Disconnected Module Detection] button.
2. When the [Execute] button is clicked according to the instruction on the window, connected device stations are detected and displayed on the "CC-Link IE TSN Configuration" window.



3. Check items in the list of stations and change them as necessary. (☞ Page 96 Setting items)
4. Select [Close with Reflecting the Setting] and close the "CC-Link IE TSN Configuration" window.

Point

Detection of connected/disconnected devices cannot be executed in the following cases.

- CC-Link IE TSN Plus module is not in online mode. (☞ Page 86 Module Operation Mode)
- "Link Direct Device Setting" of the CPU parameter is not "Extended Mode (iQ-R Series Mode)".
- When multiple CC-Link IE TSN Plus modules are mounted on the base unit, and the module that has the smallest slot number is a local station, the local station is not in the online mode, or that station is in data link error.
- The actual system configuration is incorrect. (An overlapping IP address or others)
- The version of the engineering tool is "1.082L" or earlier, and the data link of the master station is abnormal.
- The firmware version of the CC-Link IE TSN Plus module is "01", and the data link of the master station is abnormal.

■Connection/Disconnection/Replacement

When the [Connected/Disconnected Module Detection] button is clicked while the saved CC-Link IE TSN configuration is displayed, IP addresses of detected device stations are compared with the saved IP addresses of device stations and displayed as follows by connection/disconnection/replacement.

IP address verification result	Operation	Display	When station numbers of detected device stations are not set
Detected device stations are in the saved CC-Link IE TSN structure.	Replace	When parameters between a detected device station and a saved CC-Link IE TSN structure mismatch, the parameters are replaced with the parameters of the detected device station. When the model name, model version, and station type are mismatched, the following settings are inherited. • "Motion Control Station" • "RX Setting", "RY Setting", "RWr Setting", "RWw Setting", "LB Setting", "LW Setting" • "IP Address" of the master station • "Subnet Mask" • "Default Gateway" • "Reserved/Error Invalid Station" (Note that if "Reserved Station" is set, the setting will change to the default.) • "Network Synchronous Communication" • "Communication Period Setting" If only the station number is mismatched, only the station number is reflected, and all the settings are inherited. (Note that if the station number of the detected device has not been set, the station number of the device before replacement is inherited.)	The station number takes over the station number of the saved CC-Link IE TSN structure.
Device stations in the saved CC-Link IE TSN structure are not detected.	Disconnect	• Modules other than extension modules: Setting of "Reserved/Error Invalid Station" is changed to "Reserved Station". • Extension modules: Are deleted.	—
Detected device stations are not in the saved CC-Link IE TSN structure.	Connect	Detected device stations are added. (Settings other than "IP Address", "STA#", and "Station Type" are default) When adding a device, the defaults other than IP address, station number, and station type are set. (Note that if the station number of the detected device has not been set, the station number is also set to the default.)*1 Added device stations are displayed in the list of stations in the following order. • Modules other than extension modules: In the order of IP addresses, following disconnected device stations. • Extension modules: In the order of sub-IDs, following connected main modules and extension modules.	A station number is automatically numbered as the youngest unused station number in the range from 1 to 120. The order of automatic numbering is the same as the displayed order in the list of stations (see left).

*1 A station number is automatically numbered as the youngest unused station number in the range from 1 to 120. If the numbers do not match between the automatically numbered station and the station numbered by the detected device station, take either of the following actions.

· Change the station number in "Network Configuration Settings" of the master station to the same value as the station number set by the device station.

· Change the station number of the device station to the same value as the station number set in "Network Configuration Settings" of the master station.

■Precautions

- When the station number is set in the device station using the CC-Link IE TSN structure and parameters are written in CPU modules, the station number of the device station is held in the master station. When parameters are not to be written in CPU modules, they are saved in the CC-Link IE TSN structure as device stations with the station number not set.
- If the actual system configuration is incorrect, executing this function may not automatically set some or all device stations. Check that the system configuration is correct before execution.

Point

Register the profile of the device to be detected in advance.
If the profile is not registered, the following may be displayed.

- "Model Name" is "General Remote Station", "General Local Station", or "General Extension Module".
- "Station Type" is "Remote Station", "Local Station", or "Extension Module".

For how to register a profile, refer to the following.
GX Works3 Operating Manual

Restriction

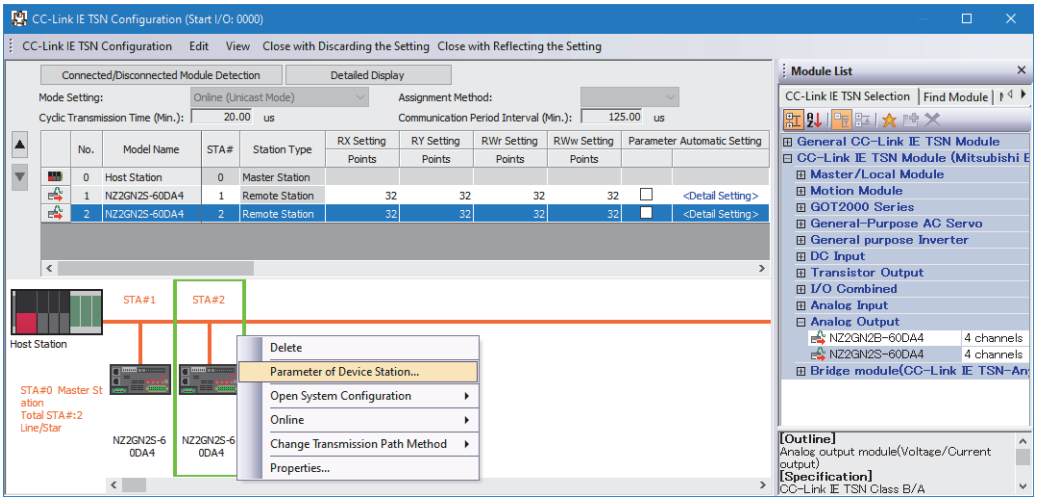
- Even when the profile is registered, if modules that are not available for detection of connected/disconnected devices are used, "Model Name" and "Station Type" are not displayed correctly.
- This function is not available for local stations.

Parameter Processing of Device Station

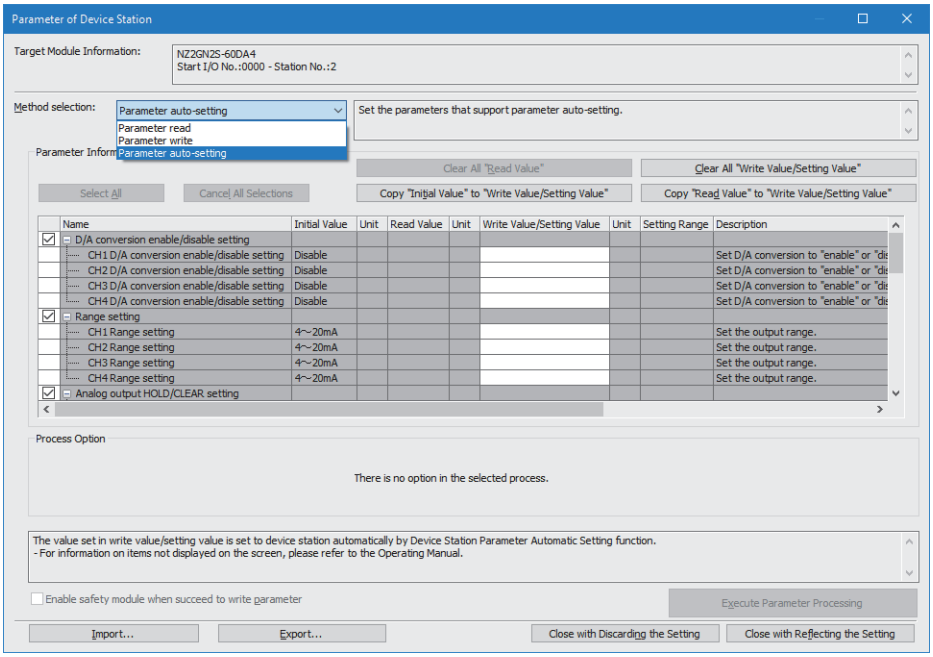
The processing is to read and save the parameters from the device station, and to write the saved parameters to the device station.

Also, it automatically sets parameters of the device station from the master station. (☞ Page 224 Device station parameter automatic setting)

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target device ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]



Select and right-click the device station, and select "Parameter of Device Station" to display the "Parameter of Device Station" window.



Item		Description
Target Module Information		Information for the selected device stations is displayed.
Method selection		Select processing to be executed for selected device stations. • Parameter auto-setting: Automatically set contents of "Write Value/Setting Value" to the device station. (☞ Page 224 Device station parameter automatic setting) • Parameter read: Read parameters from the selected device station. • Parameter write: Write parameters to the selected device station.
Parameter Information	[Clear All "Read Value"] button	Click to clear all setting details that were read using "Parameter read".
	[Clear All "Write Value/Setting Value"] button	Click to clear all setting details that are written using "Parameter write".
Processing option		When there are options for processing selected by "Method Selection", setting items are displayed.

Item	Description
[Import] button	Read contents of parameter processing created in a CSV file.
[Export] button	Output contents of parameter processing set in this window to a CSV file.

■Procedure for clearing a saved parameter

When returning the saved parameters of a not-required device station to the not-set status, perform the following procedure.

1. If the saved parameters are to be saved, output them in a CSV file using the [Export] button.
2. Delete not-required device stations from the list of stations.
3. Select the same module as the deleted device station in "Module List", and drag it to the list of stations or the network map.

■Conditions for clearing a saved parameter

Saved parameters of a device station can be cleared under the following conditions.

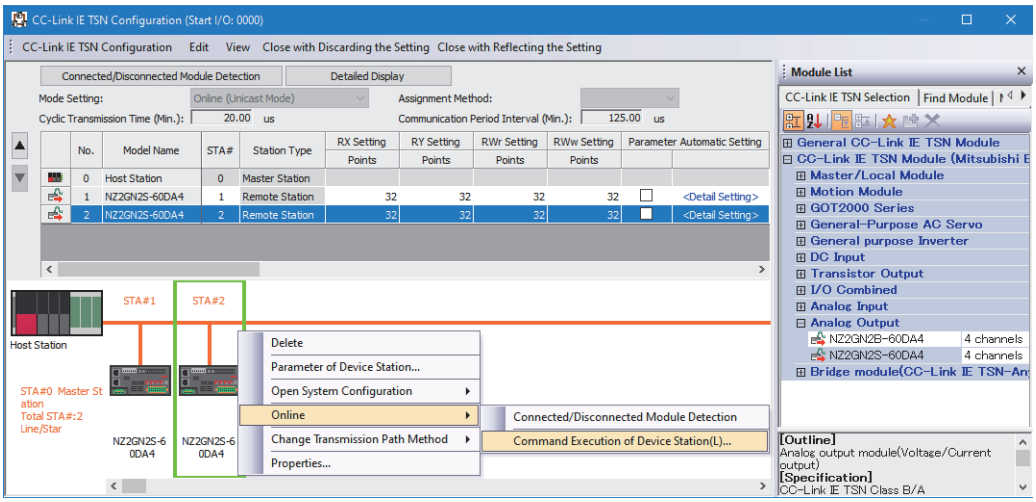
When saved parameters are cleared, execute "Parameter auto-setting" or "Parameter read" in the "Parameter of Device Station" window and read the parameters of the device station.

Item	Operation	Description
"CC-Link IE TSN Configuration" window	Open the "CC-Link IE TSN Configuration" window.	When there is not a device station with the station number that matches saved parameters in the "CC-Link IE TSN Configuration" window, saved parameters of the relevant device station are skipped. Skipped parameters of the device station are cleared.
	Reflect setting and close the window.	Saved parameters of a device station that is not in the actual system configuration are cleared.
	Execute detection of connected/disconnected devices.	All saved parameters are cleared.
	Change the function version in the "Properties" window.	When the "Properties" window is closed, saved parameters are cleared.
"Parameter of Device Station" window	Open the "Parameter of Device Station" window.	Saved parameters that mismatch the relevant device station are skipped. Clicking the [Close with Reflecting the Setting] button in the above state clears the skipped saved parameters.
Module Parameter	Manually delete "Network Configuration Settings" to apply.	Parameters of "Network Configuration Settings" return to default.
	Change the "Setting Method of Basic/Application Settings" under "Parameter Setting Method" in "Required Settings" from "Parameter Editor" to "Program".	
	Change "Station Type" or set parameters that do not exist.	
System Parameter	Divert system parameters from another project.	Parameters of the device station are not diverted.
Module Configuration	Delete a module and check.	Parameters are deleted together with the module.
Navigation window	Delete a module.	
Read from PLC	Read module parameters that have a different network configuration and the same start I/O number.	Parameters are overwritten.
Navigation window	Import the data of a simple motion module to take network settings.	
MELSOFT Navigator	Reflect the parameter.	Saved parameters are cleared.

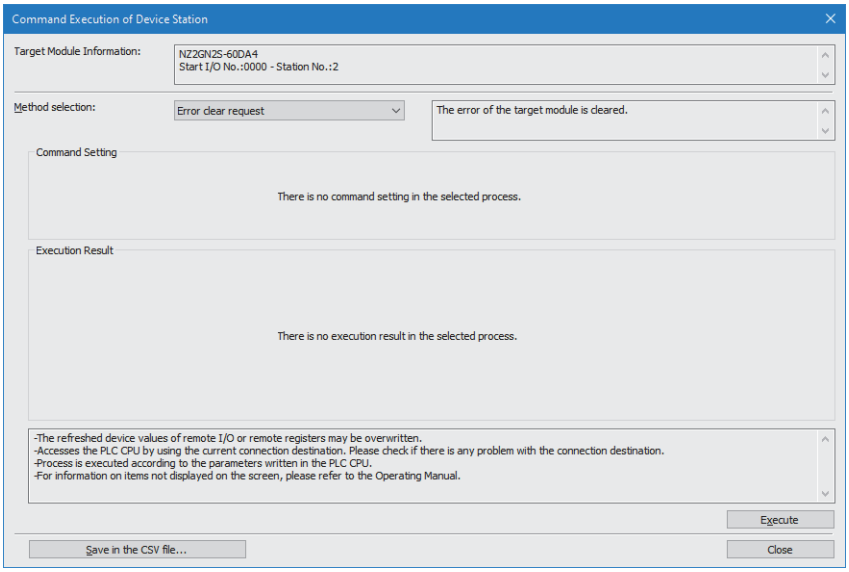
Command execution to device stations

Commands to a device station (Error clear request, Error history clear request) are executed.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target device ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]



Select and right-click the device station, and select "Command Execution of Device Station" from "Online" to display the "Command Execution of Device Station" window.



Item	Description
Target Module Information	Information for the selected device stations is displayed.
Method selection	Select processing to be executed for selected device stations. • Error clear request • Error history clear request
Command setting	When there are command settings for processing selected by "Method selection", setting items are displayed.
Execution Result	Execution results of the processing selected in "Method selection" are displayed.
[Save in the CSV file] button	Outputs the contents of this window to a CSV file.

IP address setting of the device station

Set the IP address of the device station connected to the master station.

Restriction

When setting the IP address of the device station and performing indicator display, check the following.

- CC-Link IE TSN Plus module (☞ Page 614 Added and Enhanced Functions)
- Engineering tool (☞ Page 614 Added and Enhanced Functions)
- Device station (📖User's manual for the device station used)

Point

Register the profile of the device to be detected in advance.

If the profile is not registered, the following may be displayed.

- "Model Name" is "General Remote Station", "General Local Station", or "General Extension Module".
- "Station Type" is "Remote Station", "Local Station", or "Extension Module".

For how to register a profile, refer to the following.

📖 GX Works3 Operating Manual

Extension-side devices that do not have an IP address are not detected and are therefore not displayed.

■IP address setting

Set the IP address of the device station connected to the master station.

■Indicator display

This setting allows starting and stopping the indicator display of device stations connected to the master station.

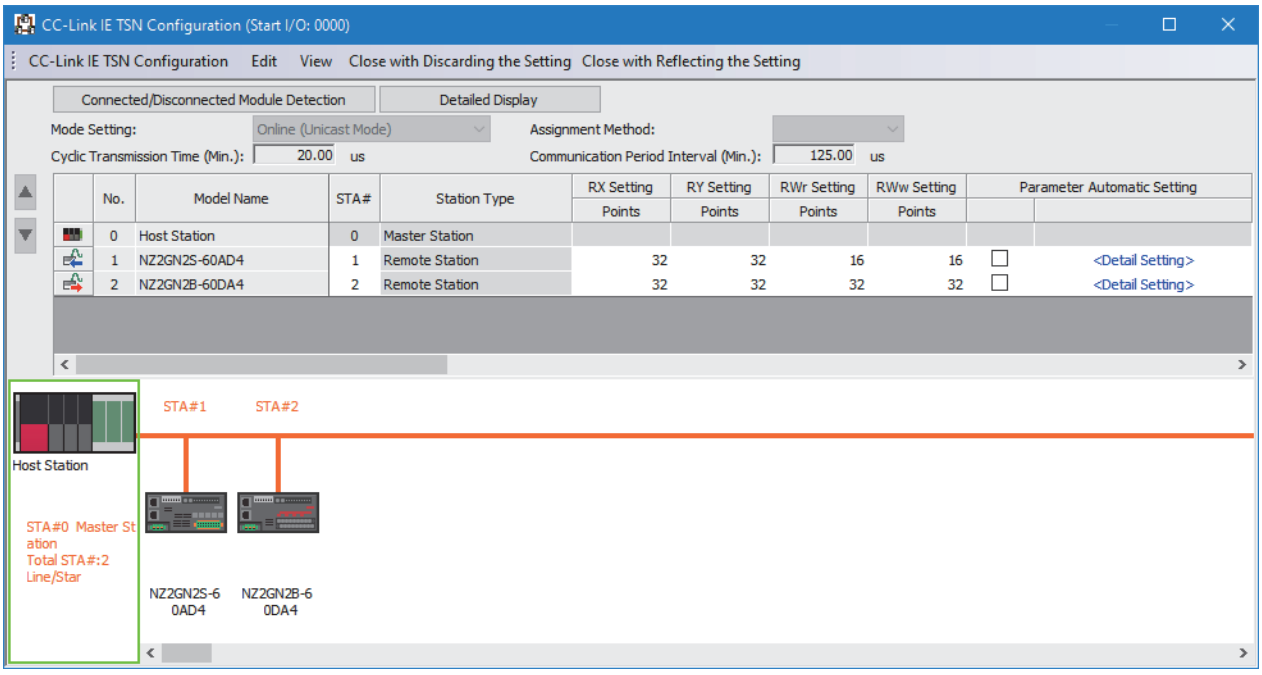
The device station that started indicator display can be checked on the LED indicator. For the status of the LED indicator, refer to the user's manual for the device station used.

The indicator display allows checking which device station is in the actual network configuration.

■Setting method

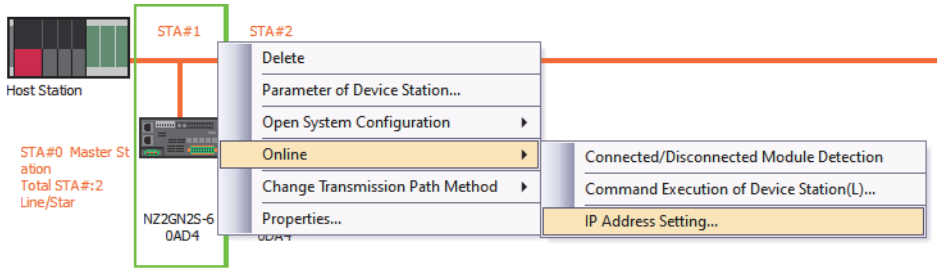
1. Open the "CC-Link IE TSN Configuration" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target device ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



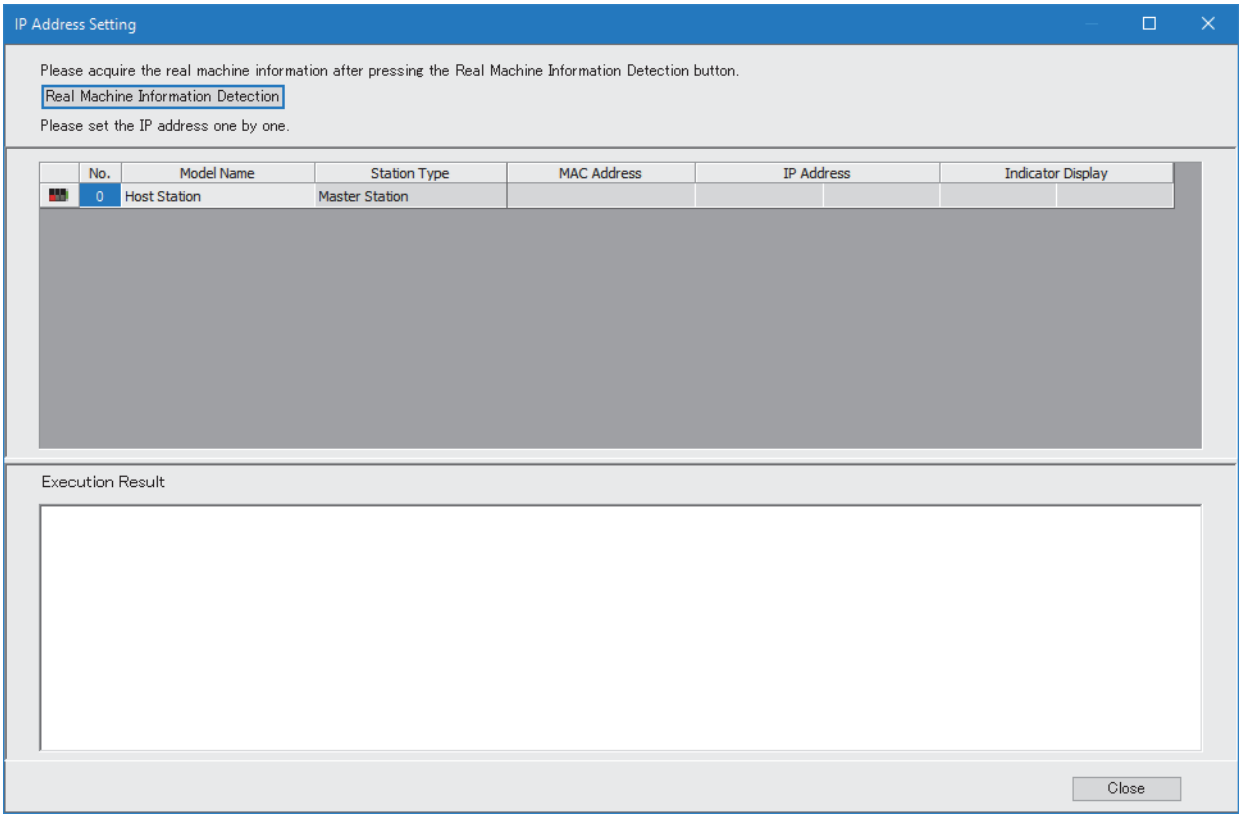
2. Open the "IP Address Setting" window.

Select the device station and right-click ⇨ [Online] ⇨ [IP Address Setting].



3. Click the [Real Machine Information Detection] button.

Check whether the device station is in a state where the IP address can be set or the indicator display can be started.



4. Follow the displayed message and click the [Execute] button.

Point

In the following cases, actual device information cannot be detected.

- "Module Operation Mode" in "Application Settings" in "Port1 Module Parameter (CC-Link IE TSN)" of the CC-Link IE TSN Plus module is not set to online mode.
- In the CPU parameters of the CPU modules, "Link Direct Device Setting" of "Memory/Device Setting" is not "Extended Mode (iQ-R Series Mode)".
- When multiple CC-Link IE TSN Plus modules are mounted on the base unit, and the module that has the smallest slot number is a local station, "Module Operation Mode" in "Application Settings" in "Port1 Module Parameter (CC-Link IE TSN)" of the local station is not in the online mode, or that station is in data link error.
- There is a problem with the actual system configuration, such as duplication of IP addresses between the master station and device stations.

5. Follow the displayed message and click the [OK] button.
6. The actual device information of the device station connected to the master station is displayed. The execution results are displayed at the bottom of the window.
7. Set the IP address and perform indicator display.

Point

For the operation procedures for IP address setting and indicator display, refer to the following.
User's manual for the device station used

■Precautions

- If, after clicking the [Real Machine Information Detection] button, the system configuration is changed and IP address setting of device stations or indicator display is performed, normal completion may not occur. If the system configuration has been changed, click the [Real Machine Information Detection] button again and then perform device station IP address setting or indicator display.
- If indicator display has been started, be sure to stop indicator display or power off and on the device station. The LED indication on the device station will continue indicating that the indicator is running until indicator display is stopped or the device station is powered off and on.

PDO mapping setting

Set the PDO mapping to the station that supports CANopen communications.

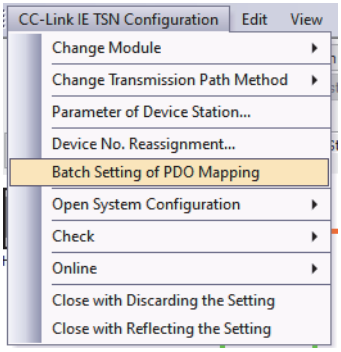
When an extension module such as the multi-axis servo amplifier having PDO mapping information is connected to the RJ71GN11-T2, the maximum number of connectable modules varies depending on the number of axes.

Ex.

When a multi-axis servo amplifier with three axes is connected, the RJ71GN11-T2 can connect up to 40 stations which is determined by divided 120 (the maximum number of connectable stations) by 3 (the number of axes).

■"Batch Setting of PDO Mapping"

Set the default PDO mapping to the target device stations at once.



1. Click "Batch Setting of PDO Mapping".

   [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [CC-Link IE TSN Configuration] ⇨ [Batch Setting of PDO Mapping]

2. Check the confirmation message appeared, then click the [OK] button.
3. When the completion window of "Batch Setting of PDO Mapping" is appeared, click the [OK] button.

Point

The PDO mapping is not set to the target device stations in the following cases:

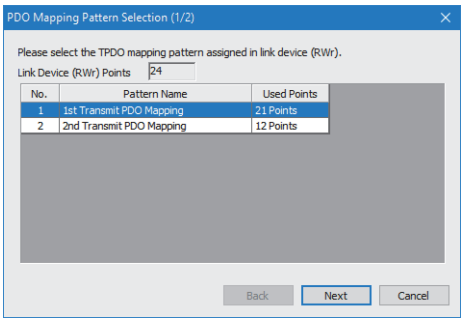
- A station that can be set the PDO mapping does not exist.
- The numbers of points of "RWr Setting" and "RWw Setting" are less than the points used in the default pattern.
- The setting is performed when "RWr Setting" and "RWw Setting" are blanks, and the checkbox of "Batch set default pattern only when PDO mapping is unset device station." is not selected.

■"PDO Mapping Setting"

Set the PDO mapping of the target device stations individually.

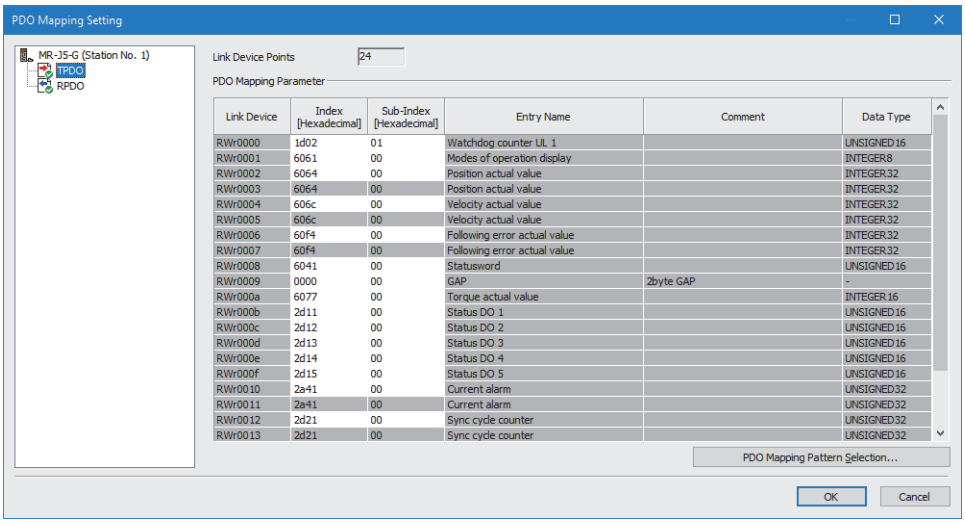
[Basic Settings] ⇨ [Network Configuration Settings] ⇨ [PDO Mapping Setting] ⇨ Double-click [Detail Setting] of the target device station.

1. Select a PDO mapping pattern of TPDO assigned in the link device (RWr). Click the [Next] button.



2. Select a PDO mapping pattern of RPDO assigned in the link device (RWw). Click the [OK] button.

3. Check the selected PDO mapping pattern.



4. Click the [OK] button to close "PDO Mapping Setting".

Point

The PDO mapping is not set to the target device stations in the following cases:

- The number of points in "RWr Setting" is one or more points and an entry is not assigned in TPDO.
- The number of points in "RWw Setting" is one or more points and an entry is not assigned in RPDO.
- A line where "Sub-Index" is blank though a value has been entered in "Index" exists.
- Entries are assigned out of the link device range.
- The same entry is assigned to the multiple link devices.

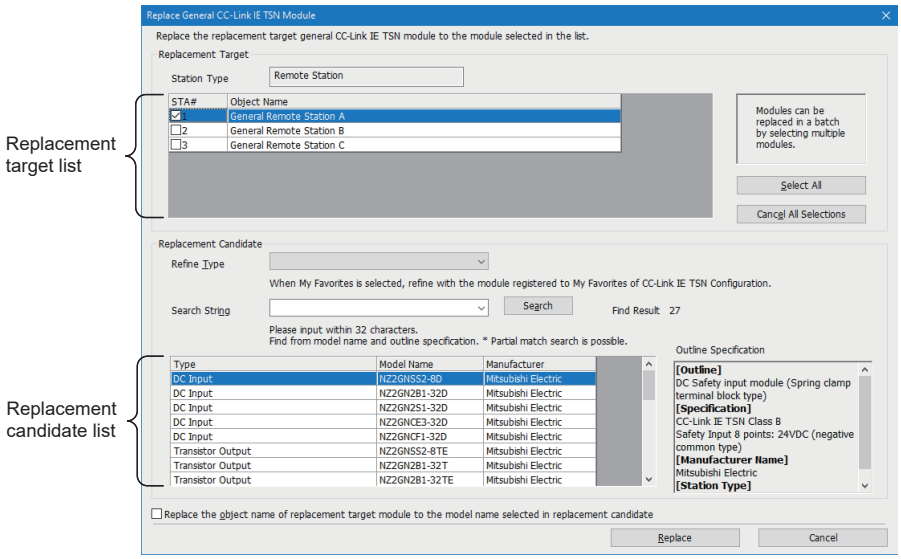
Change of module

This section describes how to replace a general CC-Link IE TSN module with a module (device station) and vice versa.

■Replacement of CC-Link IE TSN module

Replace a general CC-Link IE TSN module with a module (device station).

Right-click a general CC-Link IE TSN module from the list of stations on the "CC-Link IE TSN Configuration" window. ⇨ [Change Module] ⇨ Click [Replace General CC-Link IE TSN Module].



Item		Description
Replacement Target	Station Type	The station type of the general CC-Link IE TSN module selected from the list of stations on the "CC-Link IE TSN Configuration" window is displayed.
	Replacement target list	General CC-Link IE TSN modules whose station types are the same as the general CC-Link IE TSN modules selected from the list of stations on the "CC-Link IE TSN Configuration" window are displayed. By selecting the checkboxes, multiple general CC-Link IE TSN modules can be replaced.
	[Select All] button	Selects all checkboxes in the replacement target list.
	[Cancel All Selections] button	Deselects all checkboxes in the replacement target list.
Replacement Candidate	Refine Type	Narrows the replacement candidates in the list by types.
	Search String	Searches the input character string from models and outline specifications.
	[Search] button	The replacement candidate list is displayed on conditions that set by "Refine Type" and "Search String".
	Replacement candidate list	The modules to be replaced are displayed.
	Outline Specification	The outline specifications of the module selected in the replacement candidate list are displayed.
	Replace the object name of replacement target module with the model name selected from replacement candidate	By selecting the checkbox, the object name of the replacement target module is replaced with the module model name selected from the replacement candidate.
	[Replace] button	Replaces the module selected in the replacement target list with the module selected in the replacement candidate list.
	[Cancel] button	Cancels the replacement processing and close the window.

■Change of a device station

Replace a module (device station) with a general CC-Link IE TSN module of the same station type.

Right-click a device station in the list of stations on the "CC-Link IE TSN Configuration" window. ⇨ [Change Module] ⇨ Click [Change to General CC-Link IE TSN Module].

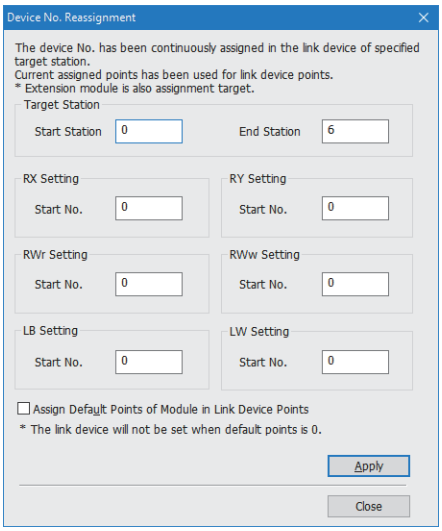
Device number reassignment

Assign the device numbers successively to the link device of the specified target station.

For the number of link device points, the points assigned in the list of stations on the "CC-Link IE TSN Configuration" window are used.

1. Display "Device No. Reassignment".

[CC-Link IE TSN Configuration] ⇨ [Device No. Reassignment]



2. Enter the values in the "Device No. Reassignment" and click the [Apply] button.

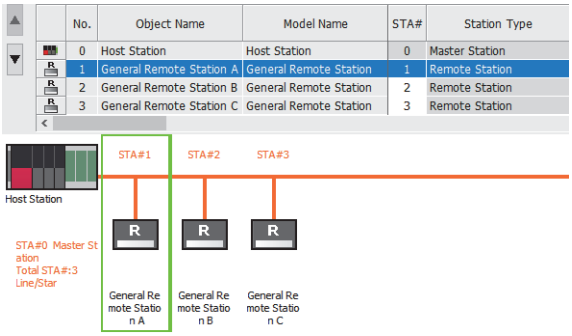
Point

When the [Apply] button is clicked with the checkbox of "Assign Default Points of Module in Link Device Points" selected, the default points of each module are reassigned. However, if a default number of points is 0, the number of points of corresponding link device is not assigned.

Object name display

The object name of the module displayed in the list of stations on the "CC-Link IE TSN Configuration" is displayed.

[View] ⇨ [Object Name Display]

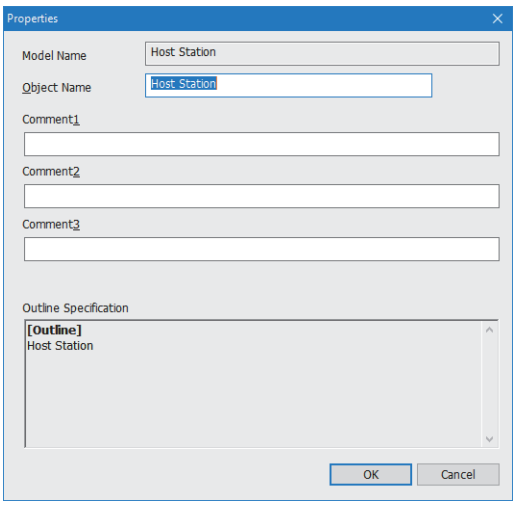


■Change of object name

Object names can be changed to any desired names.

Changing object names helps users to identify each module on the "CC-Link IE TSN Configuration" window.

1. In the network map on the "CC-Link IE TSN Configuration" window, right-click the module whose object name is changed and click "Properties".



2. Change "Object Name".

3. Click the [OK] button.

8.2 EtherNet/IP Parameter Settings

This section describes the parameter settings required for communications with EtherNet/IP devices.

Procedure for setting parameters

1. Add the CC-Link IE TSN Plus module (RJ71GN11-EIP) to the engineering tool.

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

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

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Port2 Module Parameter (EtherNet/IP)]

3. After setting the parameters, click the [Apply] button.

4. Set the EtherNet/IP communication parameters in "EtherNet/IP Configuration".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Port2 Module Extended Parameter]

5. Write parameters to the CPU module using the engineering tool.

[Online] ⇨ [Write to PLC]

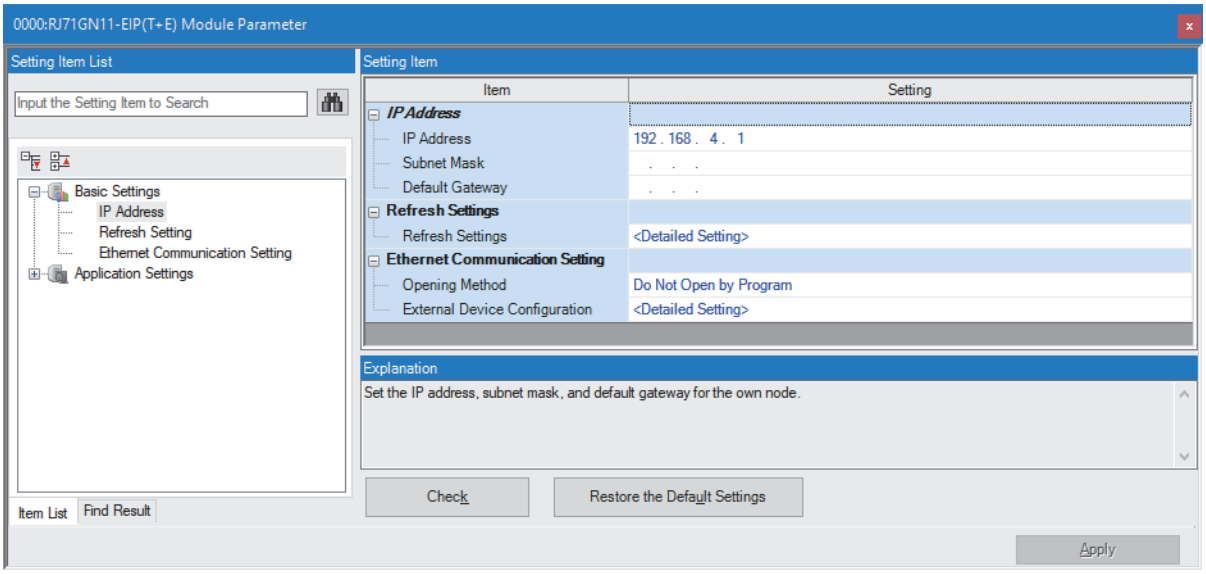
6. The parameters are reflected by resetting the CPU module or powering off and on the system.

Point

Please download the EtherNet/IP Configuration tool from Mitsubishi Electric FA Global Site.

Basic Settings

Set the items such as the own node of the CC-Link IE TSN Plus module.



Item	Description	Reference
IP Address	Set the items such as the IP address of the CC-Link IE TSN Plus module.	Page 115 IP Address
Refresh Settings	Set the buffer memory of the CC-Link IE TSN Plus module to be refreshed.	Page 116 Refresh Setting
Ethernet Communication Setting	Set items related to communication with Ethernet devices.	Page 81 Ethernet Communication Setting

IP Address

Set the items such as the IP address of the CC-Link IE TSN Plus module.

Item		Description	Setting range
IP Address	IP Address	Set the IP address of the CC-Link IE TSN Plus module. Set the class and subnet address of the CC-Link IE TSN Plus module to the same settings as those of the EtherNet/IP devices that communicate with the CC-Link IE TSN Plus module. Contact the network administrator before setting the IP address.	0.0.0.1 to 223.255.255.254 (Default: 192.168.4.1)
	Subnet Mask	Set the subnet mask of the CC-Link IE TSN Plus module. When setting the IP address of the default gateway and performing communication with an EtherNet/IP device in another network through a router, set the subnet mask pattern of the default gateway. All the devices in the same subnetwork should have a common subnet mask. The subnet mask setting is not required for communication in a single network.	• Blank • 128.0.0.0 to 255.255.255.252 (Default: Blank)
	Default Gateway	Set the default gateway of the CC-Link IE TSN Plus module. Set the IP address of the relay device (default gateway) to access the EtherNet/IP device in another network. Set a value that satisfies the following conditions as the IP address of the default gateway. • The class of the IP address is A, B, or C. • The subnet address of the gateway is the same as that of the CC-Link IE TSN Plus module. • The host address part is not a sequence of "0" or "1".	• Blank • 0.0.0.1 to 223.255.255.254 (Default: empty)

■Precautions

The IP address to be set should have a different segment from the IP address to be set on the CC-Link IE TSN side. (☞ Page 75 Station No./IP Address Setting)

Refresh Setting

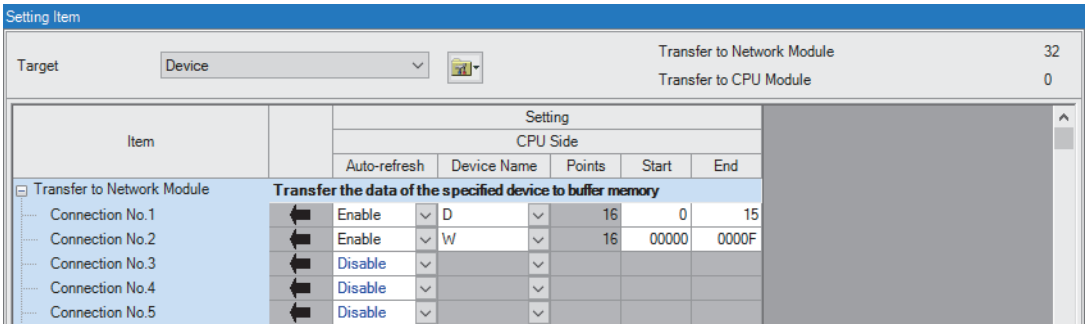
Set the buffer memory of the CC-Link IE TSN Plus module to be refreshed.

This refresh setting eliminates the need for reading and writing by the program.

■Setting method

1. Start the module parameter.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings] ⇨ [Refresh Setting]



2. Click "Target" and set the refresh destination.

• When" Target" is "Device"

Double-click the item to be set and enter the target device.

• When "Target" is "Do not Use Auto-refresh"

All auto refreshes are disabled.

Point

The CPU module devices to be set in the refresh settings should not overlap with the devices used in the following.

• Refresh settings for modules other than the CC-Link IE TSN Plus module

• Refresh settings between multiple CPUs for CPU modules

• I/O numbers used for I/O modules and intelligent function modules

By using the auto-refresh batch setting and the points batch setting, the number of device points to be set in the refresh settings can be automatically matched, and this prevents data inconsistency of send/receive data.

☞ Page 117 Refresh settings using the auto-refresh batch setting and the points batch setting

Restriction

• The number of device points to be set in the refresh settings should match the communication size set in "EtherNet/IP Configuration". If the number of set device points is less than the communication size, data inconsistency of send/receive data cannot be prevented. Also, if the number of set device points exceeds the communication size, data other than the receive data may be read into the device or the data written to the device may not be sent.

• When the refresh is enabled, the refresh target values will be valid at the timing set in the engineering tool. At that time, buffer memory areas are overwritten with the refresh target values. To change the refresh target values in the buffer memory areas, create a program that changes the values in the refresh target module labels and devices.

■Refresh processing time

The refresh processing time [μs] is an element that configures the scan time of the CPU module. For the scan time, refer to the following.

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

The following shows the formula to calculate the refresh processing time [μs] with the refresh settings enabled.

- Refresh processing time [μs] = Refresh read (refresh transferred to the CPU module) time + Refresh write (refresh transferred to an intelligent function module) time

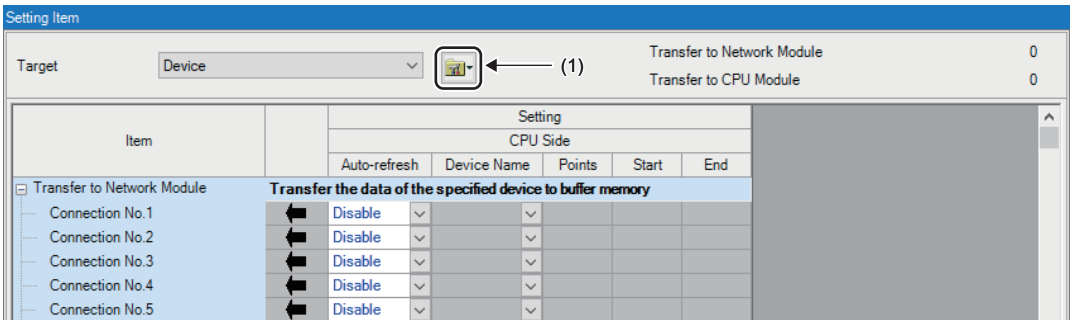
Calculate the refresh read time and refresh write time from the number of items where the refresh settings have been set and the number of transfers (words). For the calculation method, refer to the following.

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

■Refresh settings using the auto-refresh batch setting and the points batch setting

1. Start the module parameter.

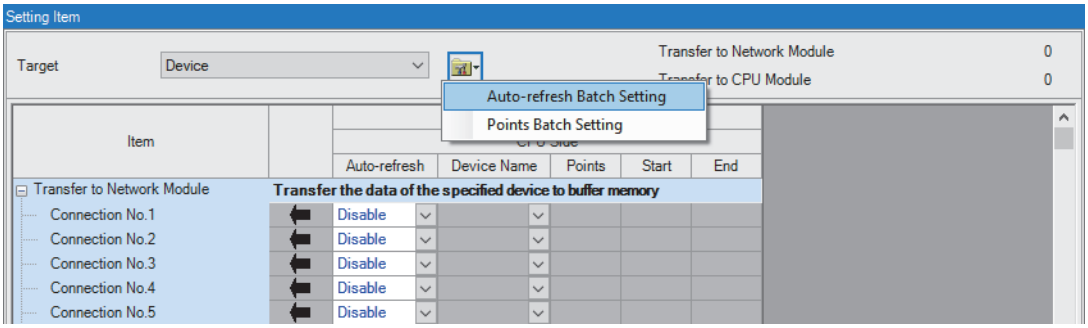
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings] ⇨ [Refresh Setting]



(1) Toolbox

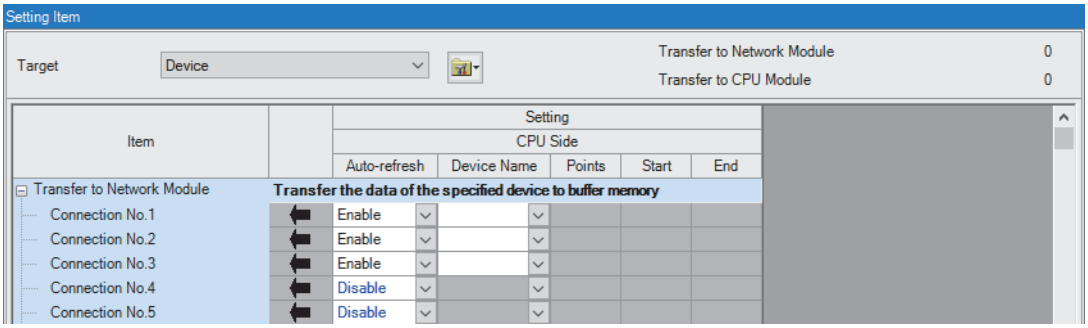
2. Set "Target" to "Device".

3. Select "Auto-refresh Batch Setting" from the toolbox.



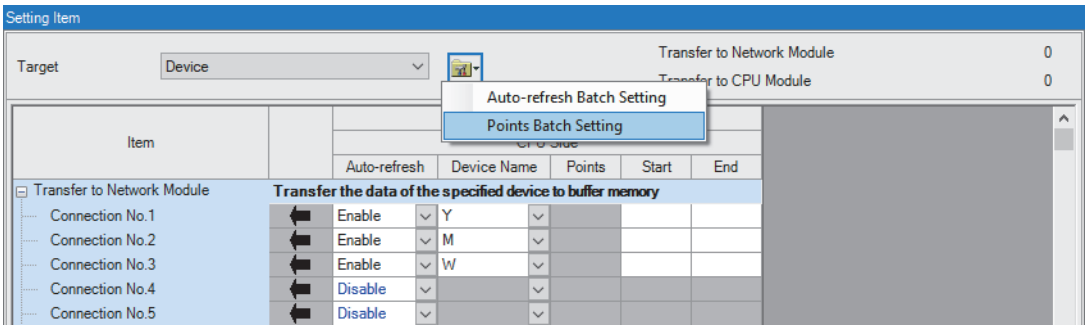
4. Click the [Yes] button.

By using "Auto-refresh Batch Setting", connection data which is available for auto refresh is read from "EtherNet/IP Configuration" and is reflected to "Auto-refresh".



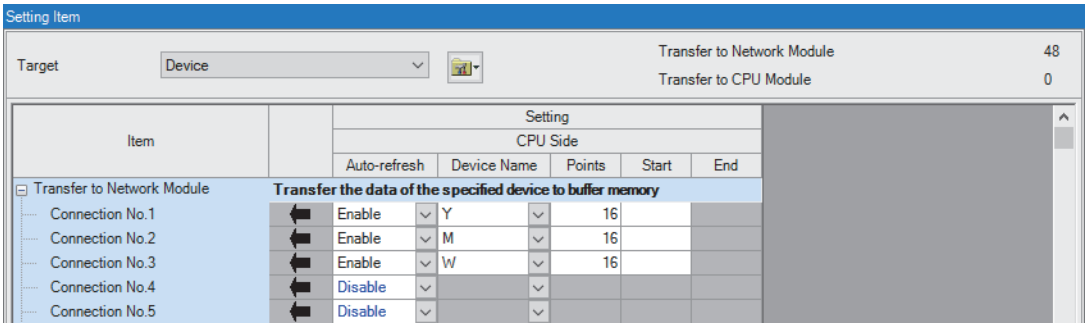
5. Set "Device Name".

6. Select "Points Batch Setting" from the toolbox.



7. Click the [Yes] button.

By using "Points Batch Setting", connection data for which "Auto-refresh Batch Setting" is set to "Enable" from "EtherNet/IP Configuration" and is reflected to "Points".



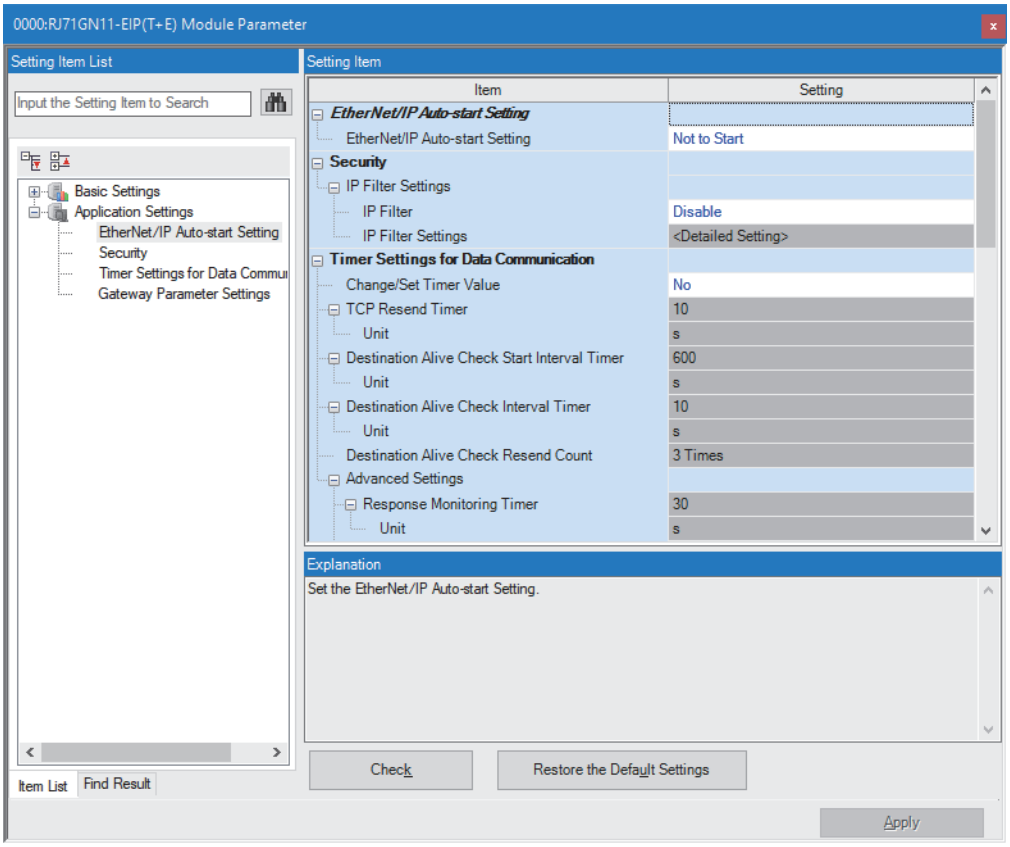
Point

- When a value in "Start" is specified before using "Points Batch Setting", the connection data is reflected to "End" as well as "Points".
- By using "Points Batch Setting", the device setting method will be changed from "Start/End" to "Start/Points".

8. Set "Start".

Application Settings

Set the items such as the EtherNet/IP communication automatic start setting of the CC-Link IE TSN Plus module.



Item	Description	Reference
EtherNet/IP Auto-start setting	Set the EtherNet/IP communication automatic start setting.	Page 119 EtherNet/IP Auto-start setting
Security	Set the security function.	Page 120 Security
Timer Settings for Data Communication	Set the timer for exchanging data with socket communications.	Page 120 Timer Settings for Data Communication
Gateway Parameter Settings	Set this item to communicate with an external device on Ethernet via a router and gateway.	Page 120 Gateway Parameter Settings

EtherNet/IP Auto-start setting

Set the EtherNet/IP communication automatic start setting.

Item	Description	Setting range
EtherNet/IP Auto-start setting	Set "Start" to start EtherNet/IP communications when the power is turned on or the operating status of the CPU module is switched from STOP to RUN. (☞ Page 321 EtherNet/IP Communication Automatic Start Function)	• Not to Start • Start (Default: Not to Start)

Security

Set the security function.

Item		Description	Setting range
IP Filter Settings	IP Filter	Set whether to use the IP filter.	• Disable • Enable (Default: Disable)
	IP Filter Settings	Set the IP addresses to be allowed or denied.	—

■IP Filter Settings

Up to 32 IP addresses can be set as an IP address to be allowed or denied by the IP filter.

Range specification and specification of the IP addresses to be excluded from the set range are also possible.

Item	Description	Setting range
Access from IP address below	Select whether to allow or deny the access from the specified IP addresses.	• Allow • Deny (Default: Allow)
Range Setting	Select this item when specifying the IP addresses by range.	(Default: Clear)
IP Address	Set the IP address to be allowed or denied. When selecting "Range Setting", enter the start IP address (left field) and end IP address (right field) of the range.	0.0.0.1 to 223.255.255.254 (Default: empty)
IP Address Excluded from Range	When selecting "Range Setting", set the IP address to be excluded from the set range. Up to 32 IP addresses can be set.	0.0.0.1 to 223.255.255.254 (Default: empty)

Timer Settings for Data Communication

Set the timer used for the following communications.

- Communications using the SLMP
- Socket communications

For the setting details, refer to the following.

☞ Page 91 Timer Settings for Data Communication

Gateway Parameter Settings

With gateway parameter settings, the Ethernet-equipped module can communicate with external devices on other Ethernet networks via a router and gateway.

For the setting details, refer to the following.

☞ Page 93 Gateway Parameter Settings

"EtherNet/IP Configuration" window

Set the communications parameters of the EtherNet/IP device.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Port2 Module Extended Parameter]

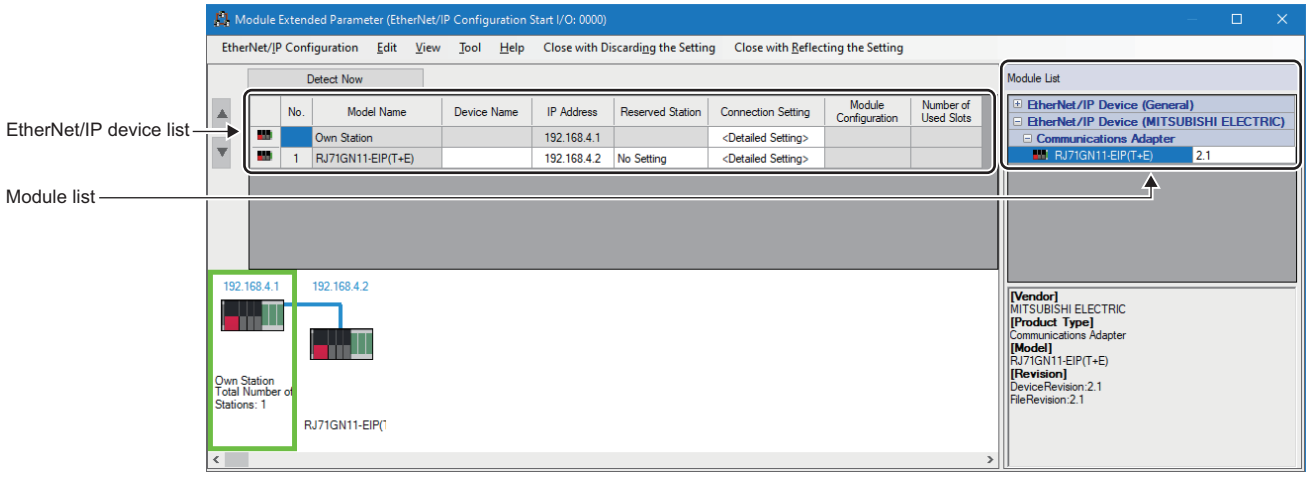
Point

Please download the EtherNet/IP Configuration tool from Mitsubishi Electric FA Global Site.

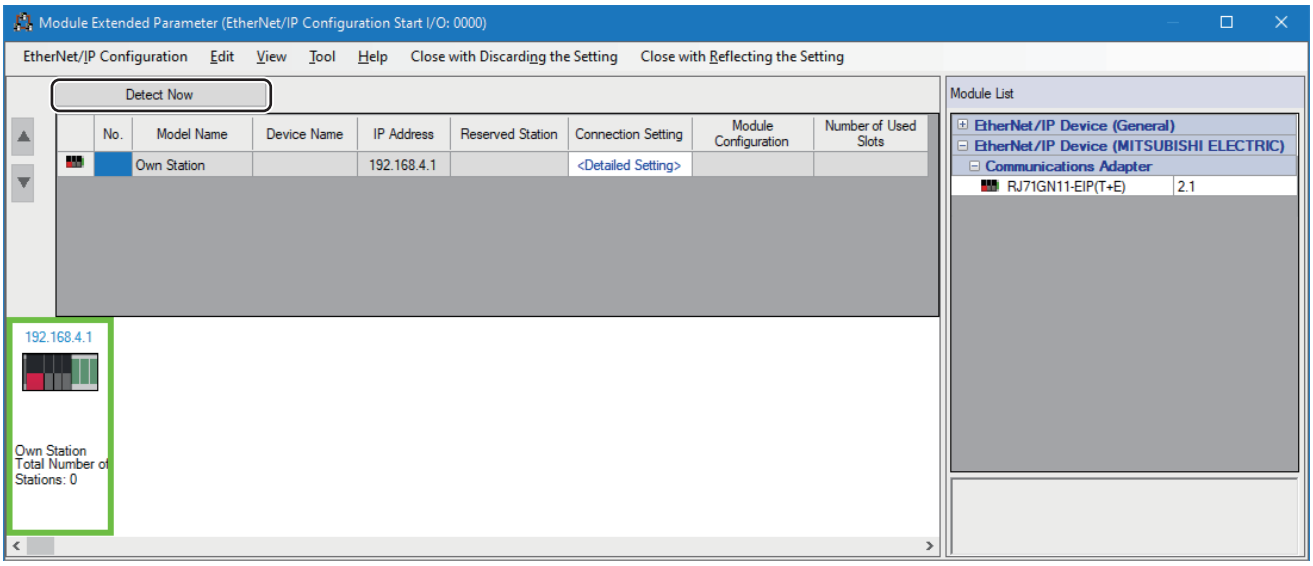
Parameter settings for EtherNet/IP devices

Set the parameters of the EtherNet/IP device for the CC-Link IE TSN Plus module.

1. Register the EDS file of the EtherNet/IP device to be set. (☞ Page 141 Adding/deleting the EDS file)
2. To configure EtherNet/IP devices manually, select a module from "Module List" and drag it to the list of EtherNet/IP devices.



3. To detect and set the EtherNet/IP devices connected to the CC-Link IE TSN Plus module, click the [Detect Now] button. (☞ Page 123 Automatic detection of EtherNet/IP devices)



4. Sets the parameters of the EtherNet/IP device. The parameters differ depending on the communication method to be used.

- Class1 instance communications (☞ Page 143 Setting the Class1 instance communications)
- Class1 tag communications (☞ Page 145 Setting the Class1 tag communications)
- UCMM tag communications (☞ Page 147 Setting the UCMM tag communications)
- Class3 message communications (☞ Page 148 Setting the Class3 message communications)
- Class3 tag communications (☞ Page 149 Setting the Class3 tag communications)

5. Check the system configuration.

[EtherNet/IP Configuration] ⇨ [Check] ⇨ [System Configuration]

6. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

■Setting items

Item	Description	Setting range
No.	Displays the row number. For the own station, this field is blank.	—
Model Name	Displays the model of the EtherNet/IP device. For the own station, "Own station" is displayed.	—
Device Name	Enter the name of a device if required. For the own station, this item cannot be entered.	Up to 32 characters (one-byte or two-byte) (Default: empty)
IP Address	Displays the IP address of the EtherNet/IP device. For the own station, it displays the IP address set in "IP Address". When a module is added from "Module List", the first to third octets are the same as the values of the own station, and the fourth octet is the minimum value that is not used.	0.0.0.1 to 223.255.255.254 (Default: Refer to the left.)
Reserved Station	Set the EtherNet/IP device to the reserved station. For the own station, this item cannot be set. • No setting: The EtherNet/IP device is connected to the network. • Reserved station: The EtherNet/IP device is reserved in the parameters for future expansion. By using a reserved station, buffer memory area assignment will not change even if the EtherNet/IP device is added (reservation is canceled). Therefore, modification of the program is not required. Physical connection of the EtherNet/IP device on the network is not required.	• No Setting • Reserved Station (Default: No Setting)
Connection Setting	Set the connection for the EtherNet/IP communications.	☞ Page 125 Connection Detailed Setting
Module Configuration setting	Set the module for EtherNet/IP communications. This item cannot be set for the own station or modules to which modules cannot be installed.	☞ Page 140 Module Configuration setting
Number of Used Slots	Displays the number of slots to be used set in "Module Configuration Setting".	—

Point

When a module is added to the EtherNet/IP device list, the registration of some EDS files may be required for the module.

If the registration of the EDS files are not satisfied, the module cannot be added to the EtherNet/IP device list. Check the source of the EDS files to be downloaded, register the necessary EDS files.

Automatic detection of EtherNet/IP devices

This function detects EtherNet/IP devices on the same network connected to the CC-Link IE TSN Plus module and automatically adds them to the list of EtherNet/IP configuration devices.
This function makes it easier to set parameters when a network system is set up or the network system configuration is changed.

■Operation method

Automatic detection of EtherNet/IP devices can be executed by clicking the [Detect Now] button on the "EtherNet/IP Configuration" window.

■Condition

This function can be executed by satisfying the following conditions.

Condition	Details
The IP address on the P2 side of the CC-Link IE TSN Plus module is set in the CPU module of the own station. (☞ Page 115 IP Address)	Write the following parameters of the CC-Link IE TSN Plus module to the CPU module of the own station using the engineering tool. • Module parameter • Module extension parameter (EtherNet/IP Configuration)*1
The port on the P2 side of the CC-Link IE TSN Plus module is connected to the EtherNet/IP device with an Ethernet cable.	Connect the EtherNet/IP device to be detected by this function to the port on the P2 side of the CC-Link IE TSN Plus module. To use a switching hub, connect the EtherNet/IP device within the range of broadcast frames from the own station.

*1 If the module extension parameter is not written, a moderate error will occur.

■EtherNet/IP devices that can be detected

Connected EtherNet/IP devices are detected within the range of broadcast frames from the own station. (256 modules maximum)
However, for chassis-based EtherNet/IP devices, the EtherNet/IP communication module is detected, but other connected modules in the chassis are not, so add them manually.*1

*1 There are two types of chassis-based EtherNet/IP devices (chassis-attached modules), as follows.
· Type in which modules such as I/O modules are connected next to a CPU module as a base
· Type in which CPU modules and modules responsible for communication I/O are mounted on the base unit
However, since EtherNet/IP devices cannot be determined by their appearance, determine them by the content of the Modular area in the EDS file. (For details, refer to the EtherNet/IP specifications.)

■To detect CC-Link IE TSN Plus modules

To detect CC-Link IE TSN Plus modules with this function, check that 'EtherNet/IP communication start status' (Un\G7340097) is set to 1 (operating). (The same applies for detection of CC-Link IE TSN Plus modules with the EtherNet/IP device detection function executed from other products.)*1
Automatic detection of EtherNet/IP devices uses the ListIdentity command to detect the EtherNet/IP devices on the network.*2
Therefore, the CC-Link IE TSN Plus module must be set in start status for EtherNet/IP communications.

*1 For how to set 'EtherNet/IP communication start status' (Un\G7340097) to 1 (operating), refer to the following.
☞ Page 321 EtherNet/IP Communication Automatic Start Function
*2 For details on the ListIdentity command, refer to the EtherNet/IP specifications.

Point

Devices cannot be detected if they cannot respond to the ListIdentity command for EtherNet/IP communications due to reasons such as the following.
• The device does not support the ListIdentity command.
• The device is disconnected from the EtherNet/IP network.
• EtherNet/IP communications have not started up.
• EtherNet/IP communications are stopped.
• The IP address of the EtherNet/IP device overlaps with that of another device.
To check if an external device can respond to the ListIdentity command, refer to the manual of that device.

■Precautions

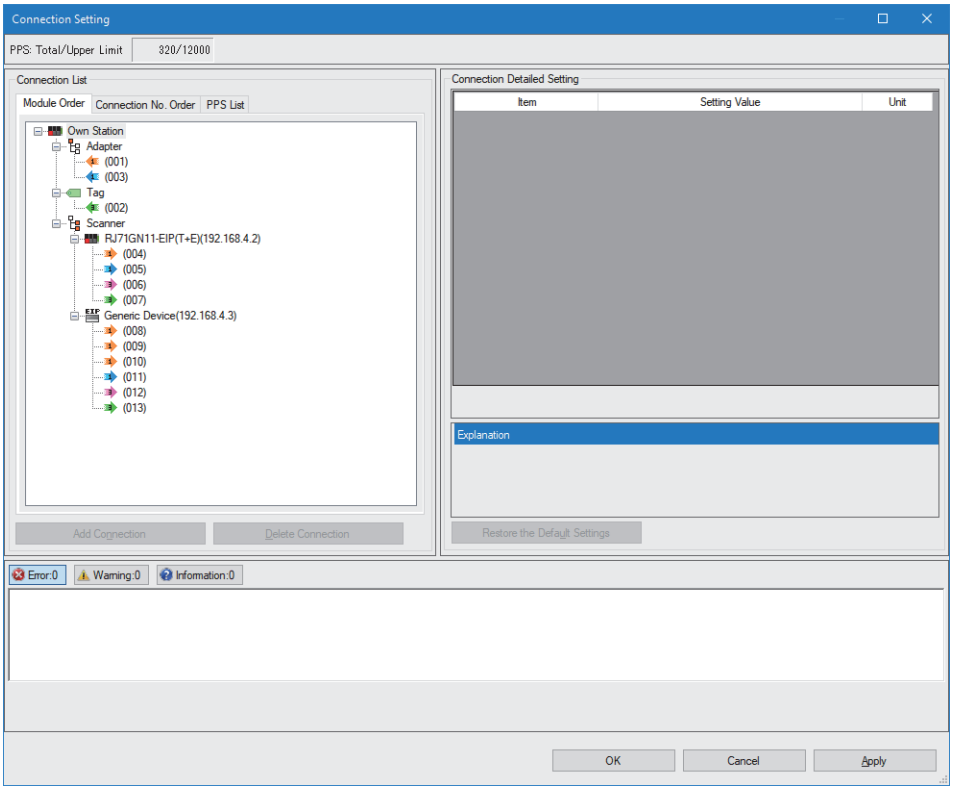
- Before executing this function, register the EDS files of the EtherNet/IP devices to be detected. If an EtherNet/IP device whose EDS file has not been registered is detected, it will be registered as a generic device. For how to register EDS files, refer to the following.

☞ Page 141 Adding/deleting the EDS file

- When executing this function, wait about 10 seconds after completion before executing automatic detection of EtherNet/IP devices again. (If communications have been disconnected, wait about 1 minute before executing automatic detection of EtherNet/IP devices again.)
- While this function is being executed, automatic detection of EtherNet/IP devices from other EtherNet/IP Configuration tools is not possible.
- If the number of EtherNet/IP devices connected to the network exceeds 256, devices past the 256th are not displayed in the detection results. Because detection is done in random order, the detected devices are displayed in random order.
- If 'EtherNet/IP communication start status' (Un\G7340097) is changed from 1 (operating) to 0 (stopped) while this function is being executed, some modules may be excluded from the detection of EtherNet/IP devices. While this function is being executed, do not operate 'EtherNet/IP communication start request' (Un\G7340096) or change the CPU module status (for example from RUN to STOP).

Connection Detailed Setting

Set the connection for the EtherNet/IP communications. (The following is an example of adding an RJ71GN11-EIP connection to the list of EtherNet/IP devices.)



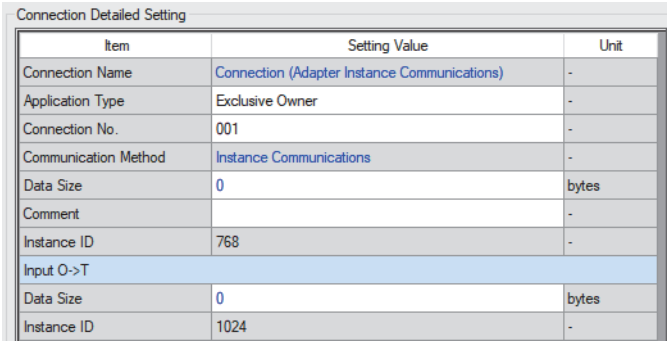
Item		Description
Connection List	Module Order Connection No. Order	Displays the list of connections. The tabs can be used to change to the module order and connection number order and to the communication processing performance (PPS) list. Select an item and click the [Add Connection] button to display the "Add Connection" window. After selecting the connection, click the [OK] button to add the connection. The list of connections contain the following items.*1 ■Adapter Manages the connection settings when the own station is used as an adapter. The following communications connections can be set. • Class1 instance communications (☞ Page 127 Connections: Adapter (Instance communications)) • Class1 tag communications (☞ Page 128 Connections: Adapter (Tag communications)) ■Tag Manages the connection settings when the own station is used as a server (a target). The following communications connections can be set. • UCMM tag communications (☞ Page 129 Connections: Class3/UCMM tag) • Class3 tag communications (☞ Page 129 Connections: Class3/UCMM tag) ■Scanner Manages the connection settings when the own station is used as a scanner (originator/client). The modules registered in the list of EtherNet/IP devices are displayed. Connections are managed for each module. The following communications connections can be set. • Class1 instance communications (☞ Page 130 Connections: Scanner (Input Only (Class1 Instance))) • Class1 tag communications (☞ Page 132 Connections: Scanner (Input Only (Class1 Tag))) • Class1 instance communications (☞ Page 134 Connections: Scanner (Exclusive Owner (Class1 Instance))) • Class3 message communications (☞ Page 137 Connections: Scanner (Class3 message communications)) • Class3 tag communications (☞ Page 138 Connections: Scanner (Class3 tag communications))
	PPS List	Displays a list of the PPS (communication processing performance) for each connection. (☞ Page 139 PPS List)
Connection Detailed Setting		Detailed settings can be made for the selected connection.

*1 For details other than the communications connections described in this section, check the manual of the EtherNet/IP device to be used.

Point

- Connection settings can be copied and pasted. (only within [Module Order] tab)
- Connection settings can be deleted with Delete.

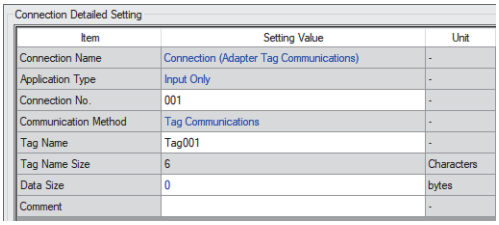
■Connections: Adapter (Instance communications)


Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Adapter Instance Communications)	-
Application Type	Exclusive Owner	-
Connection No.	001	-
Communication Method	Instance Communications	-
Data Size	0	bytes
Comment		-
Instance ID	768	-
Input O->T		
Data Size	0	bytes
Instance ID	1024	-

Item		Description	Setting range
Connection Name		Displays the connection name.	—
Application Type		Set the application type.	• Input Only • Exclusive Owner (Default: Input Only)
Connection No.		Set the connection number. The default value is the minimum value from the unused connection numbers in the connection list.	001 to 256 (Default: Refer to the left.)
Communication Method		Displays the communication method.	—
Data Size		Set the data size. (Unit: Bytes)	0 to 1444 (Default: 0)
Comment		Set comments to the connection if required.	Up to 32 characters (one-byte or two-byte) (Default: empty)
Instance ID		Displays the instance ID.	—
Input O->T	Data Size	Set the data size. (Unit: Bytes) This setting is displayed only when "Application Type" is set to "Exclusive Owner".	0 to 1444 (Default: 0)
	Instance ID	Displays the instance ID. This setting is displayed only when "Application Type" is set to "Exclusive Owner".	—

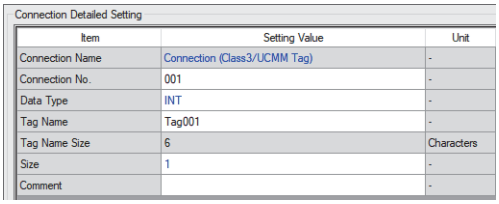
■Connections: Adapter (Tag communications)


Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Adapter Tag Communications)	-
Application Type	Input Only	-
Connection No.	001	-
Communication Method	Tag Communications	-
Tag Name	Tag001	-
Tag Name Size	6	Characters
Data Size	0	bytes
Comment		-

Item	Description	Setting range
Connection Name	Displays the connection name.	—
Application Type	Displays the application type.	—
Connection No.	Set the connection number. The default value is the minimum value from the unused connection numbers in the connection list.	001 to 256 (Default: Refer to the left.)
Communication Method	Displays the communication method.	—
Tag Name	Set the tag name. The connection number with the minimum digit is set as a default value.	Up to 255 characters (Default: Tag001)
Tag Name Size	Displays the number of characters in the string displayed in "Tag Name". (Unit: Characters)	—
Data Size	Set the data size. (Unit: Bytes)	0 to 1444 (Default: 0)
Comment	Set comments to the connection if required.	Up to 32 characters (one-byte or two-byte) (Default: empty)

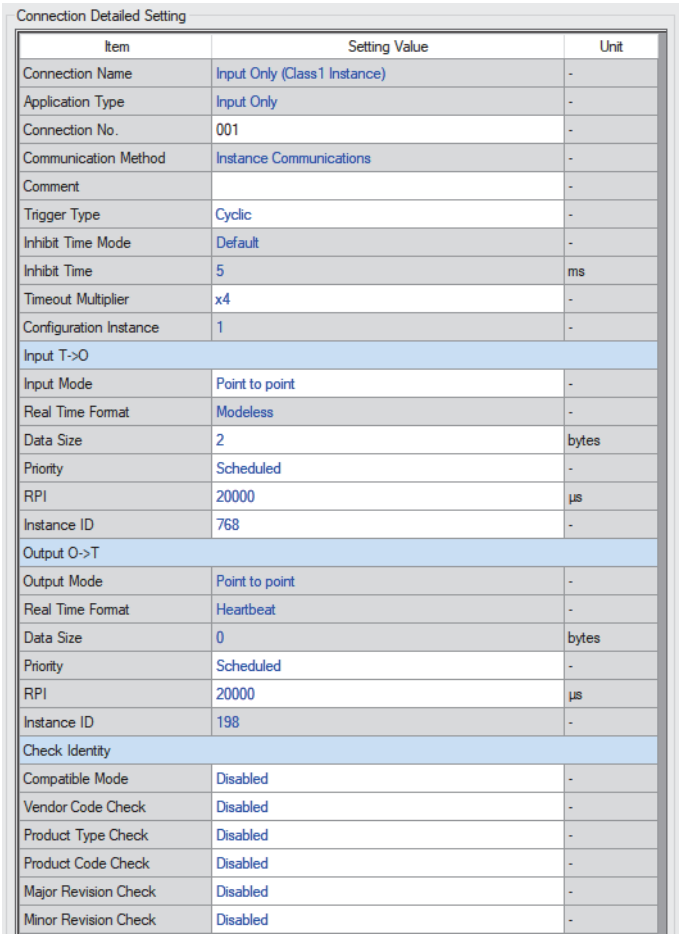
■Connections: Class3/UCMM tag



Item	Description	Setting range
Connection Name	Displays the connection name.	—
Connection No.	Set the connection number. The default value is the minimum value from the unused connection numbers in the connection list.	001 to 256 (Default: Refer to the left.)
Data Type	Set the data type for the tag. • INT: Signed 16-bit data • DINT: Signed 32-bit data	• INT • DINT (Default: INT)
Tag Name	Set the tag name. The connection number with the minimum digit is set as a default value.	Up to 255 characters (Default: Tag001)
Tag Name Size	Displays the number of characters in the string displayed in "Tag Name". (Unit: Characters)	—
Size	Set the size (the number of elements for INT/DINT type data). The size setting range depends on the setting of "Data Type". • For INT: 1 to 249 • For DINT: 1 to 124	1 to 249 (Default: 1)
Comment	Set comments to the connection if required.	Up to 32 characters (one-byte or two-byte) (Default: empty)

■Connections: Scanner (Input Only (Class1 Instance))

The following image shows an example of the window when a CC-Link IE TSN Plus module connection is added.



Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Input Only (Class1 Instance)	-
Application Type	Input Only	-
Connection No.	001	-
Communication Method	Instance Communications	-
Comment		-
Trigger Type	Cyclic	-
Inhibit Time Mode	Default	-
Inhibit Time	5	ms
Timeout Multiplier	x4	-
Configuration Instance	1	-
Input T->O		
Input Mode	Point to point	-
Real Time Format	Modeless	-
Data Size	2	bytes
Priority	Scheduled	-
RPI	20000	µs
Instance ID	768	-
Output O->T		
Output Mode	Point to point	-
Real Time Format	Heartbeat	-
Data Size	0	bytes
Priority	Scheduled	-
RPI	20000	µs
Instance ID	198	-
Check Identity		
Compatible Mode	Disabled	-
Vendor Code Check	Disabled	-
Product Type Check	Disabled	-
Product Code Check	Disabled	-
Major Revision Check	Disabled	-
Minor Revision Check	Disabled	-

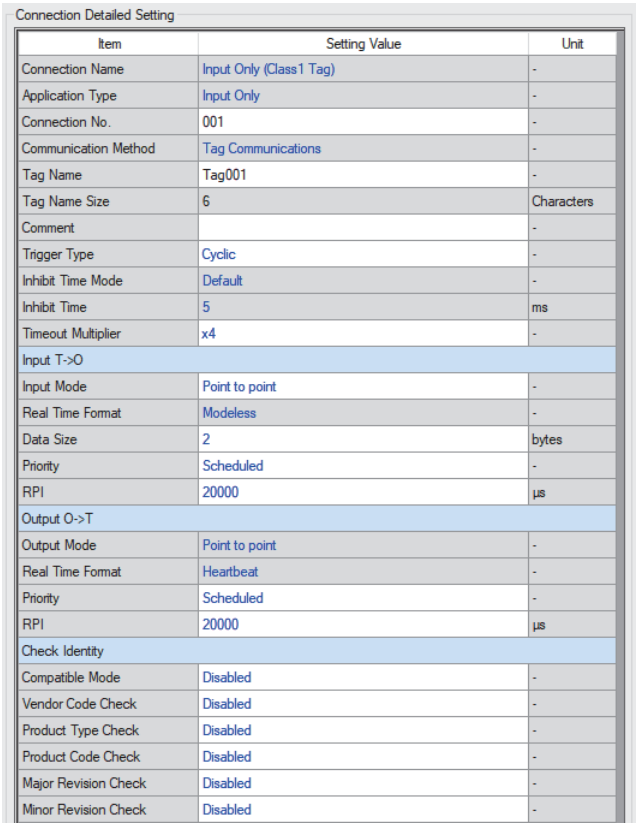
Item	Description	Setting range[*1]
Connection Name	Displays the connection name.	—
Application Type	Displays the application type.	—
Connection No.	Set the connection number. The default value is the minimum value from the unused connection numbers in the connection list.	001 to 256 (Default: Refer to the left.)
Communication Method	Displays the communication method.	—
Comment	Set comments to the connection if required.	Up to 32 characters (one-byte or two-byte) (Default: empty)
Trigger Type	Set the trigger type to be used in combination with "RPI" to control the timing of data sending. The setting items depend on the EtherNet/IP device to be used. • Cyclic: Data is sent periodically according to "RPI". • Change of State: Data is sent when the status changes.	• Cyclic • Change of State (Default: Cyclic)
Inhibit Time Mode	Set the mode of the transmission inhibit time (minimum delay time) until transmission. This item can be set only when "Trigger Type" is set to "Change of State". • Default: 1/4 of "RPI" of Output (O->T) is used as "Inhibit Time". However, if the value exceeds 255ms, 255ms is used. • Un-Activated: 0ms is used as "Inhibit Time". • Custom: Enter a value directly in "Inhibit Time".	• Default • Un-Activated • Custom (Default: Default)
Inhibit Time	Set the transmission inhibit time (minimum delay time) until transmission. (Unit: ms) This item can be set only when "Inhibit Time Mode" is set to "Custom". If "Inhibit Time Mode" is set to "Default", automatic calculation will be performed.	1 to 255 (Default: 1/4 the value of "RPI" of Output (O->T) is used.)

Item		Description	Setting range*1
Timeout Multiplier		Set the timeout multiplier.	• ×4 • ×8 • ×16 • ×32 • ×64 • ×128 • ×256 • ×512 (Default: ×4)
Configuration Instance		Obtains and displays the following values for the EDS file. • Connection Manager section • Connection entry • Path field	—
Input T->O	Input Mode	Set the transmission mode for packets containing input data. The setting items depend on the EtherNet/IP device to be used. • Multicast: Multicast (one to many) communications are performed. • Point to point: Unicast (one to one) communications are performed.	• Multicast • Point to point (Default: Point to point)
	Real Time Format	Displays the realtime format.	—
	Data Size	Set the data size to be sent from the target to the originator. (Unit: Bytes)	1 to 1444 (Default: 2)
	Priority	Set the priority of the connection. The setting items depend on the EtherNet/IP device to be used.	• Low • High • Scheduled • Urgent (Default: Scheduled)
	RPI	Set the request packet interval (RPI). (Unit: 500μs)	500 to 60000000 (Default: 20000)
	Instance ID	Set the instance ID. The setting range is 768 to 1023 if the adapter is a CC-Link IE TSN Plus module.	0 to 65535 (Default: 768)
Output O->T	Output Mode	Displays the transmission mode for packets containing output data.	—
	Real Time Format	Displays the realtime format.	—
	Data Size	Set the data size to be sent from the originator to the target. (Unit: Bytes) When "Real Time Format" is set to "Heartbeat", it is not necessary to set the data size. This is fixed to "0" if the adapter is a CC-Link IE TSN Plus module.	1 to 1444 (Default: 0)
	Priority	Set the priority of the connection. The setting items depend on the EtherNet/IP device to be used.	• Low • High • Scheduled • Urgent (Default: Scheduled)
	RPI	Set the request packet interval (RPI). (Unit: 500μs)	500 to 60000000 (Default: 20000)
	Instance ID	Set the instance ID.	Fixed to 198
Check Identity	Compatible Mode	Enables or disables compatible mode. For details, refer to the following. ☞ Page 282 Consistency check	• Disabled • Enabled (Default: Disabled)
	Vendor Code Check	Set whether or not to check the vendor code. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Product Type Check	Set whether or not to check the product type. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Product Code Check	Set whether or not to check the product code. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Major Revision Check	Set whether or not to check the major revision. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Minor Revision Check	Set whether or not to check the minor revision. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)

*1 Some values cannot be set depending on the EDS file of the communication destination.

■Connections: Scanner (Input Only (Class1 Tag))

The following image shows an example of the window when a CC-Link IE TSN Plus module connection is added.



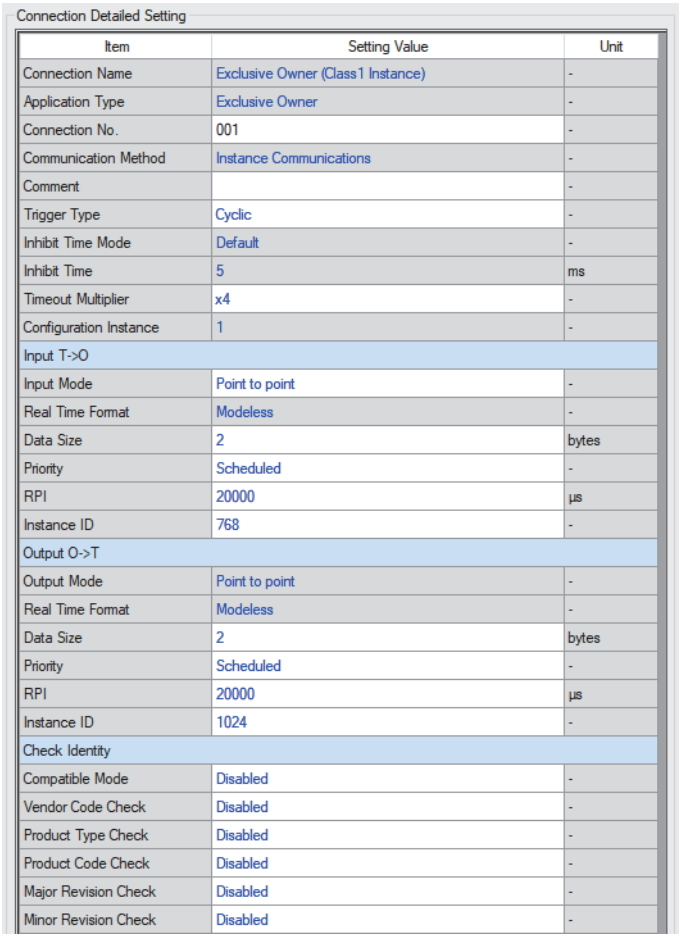
Item	Description	Setting range*1
Connection Name	Displays the connection name.	—
Application Type	Displays the application type.	—
Connection No.	Set the connection number. The default value is the minimum value from the unused connection numbers in the connection list.	001 to 256 (Default: Refer to the left.)
Communication Method	Displays the communication method.	—
Tag Name	Set the tag name. The connection number with the minimum digit is set as a default value.	Up to 255 characters (Default: Tag001)
Tag Name Size	Displays the number of characters in the string displayed in "Tag Name". (Unit: Characters)	—
Comment	Set comments to the connection if required.	Up to 32 characters (one-byte or two-byte) (Default: empty)
Trigger Type	Set the trigger type to be used in combination with "RPI" to control the timing of data sending. The setting items depend on the EtherNet/IP device to be used. • Cyclic: Data is sent periodically according to "RPI". • Change of State: Data is sent when the status changes.	• Cyclic • Change of State (Default: Cyclic)
Inhibit Time Mode	Set the mode of the transmission inhibit time (minimum delay time) until transmission. This item can be set only when "Trigger Type" is set to "Change of State". • Default: 1/4 of "RPI" of Output (O->T) is used as "Inhibit Time". However, if the value exceeds 255ms, 255ms is used. • Un-Activated: 0ms is used as "Inhibit Time". • Custom: Enter a value directly in "Inhibit Time".	• Default • Un-Activated • Custom (Default: Default)
Inhibit Time	Set the transmission inhibit time (minimum delay time) until transmission. (Unit: ms) This item can be set only when "Inhibit Time Mode" is set to "Custom". If "Inhibit Time Mode" is set to "Default", automatic calculation will be performed.	1 to 255 (Default: 1/4 the value of "RPI" of Output (O->T) is used.)

Item		Description	Setting range*1
Timeout Multiplier		Set the timeout multiplier.	• ×4 • ×8 • ×16 • ×32 • ×64 • ×128 • ×256 • ×512 (Default: ×4)
Input T->O	Input Mode	Set the transmission mode for packets containing input data. The setting items depend on the EtherNet/IP device to be used. • Multicast: Multicast (one to many) communications are performed. • Point to point: Unicast (one to one) communications are performed.	• Multicast • Point to point (Default: Point to point)
	Real Time Format	Displays the realtime format.	—
	Data Size	Set the data size to be sent from the target to the originator. (Unit: Bytes)	1 to 1444 (Default: 2)
	Priority	Set the priority of the connection. The setting items depend on the EtherNet/IP device to be used.	• Low • High • Scheduled • Urgent (Default: Scheduled)
	RPI	Set the request packet interval (RPI). (Unit: 500μs)	500 to 60000000 (Default: 20000)
Output O->T	Output Mode	Displays the transmission mode for packets containing output data.	—
	Real Time Format	Displays the realtime format.	—
	Priority	Set the priority of the connection. The setting items depend on the EtherNet/IP device to be used.	• Low • High • Scheduled • Urgent (Default: Scheduled)
	RPI	Set the request packet interval (RPI). (Unit: 500μs)	500 to 60000000 (Default: 20000)
Check Identity	Compatible Mode	Enables or disables compatible mode. For details, refer to the following. ☞ Page 282 Consistency check	• Disabled • Enabled (Default: Disabled)
	Vendor Code Check	Set whether or not to check the vendor code. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Product Type Check	Set whether or not to check the product type. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Product Code Check	Set whether or not to check the product code. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Major Revision Check	Set whether or not to check the major revision. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Minor Revision Check	Set whether or not to check the minor revision. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)

*1 Some values cannot be set depending on the EDS file of the communication destination.

■Connections: Scanner (Exclusive Owner (Class1 Instance))

The following image shows an example of the window when a CC-Link IE TSN Plus module connection is added.



Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Exclusive Owner (Class1 Instance)	-
Application Type	Exclusive Owner	-
Connection No.	001	-
Communication Method	Instance Communications	-
Comment		-
Trigger Type	Cyclic	-
Inhibit Time Mode	Default	-
Inhibit Time	5	ms
Timeout Multiplier	x4	-
Configuration Instance	1	-
Input T->O		
Input Mode	Point to point	-
Real Time Format	Modeless	-
Data Size	2	bytes
Priority	Scheduled	-
RPI	20000	µs
Instance ID	768	-
Output O->T		
Output Mode	Point to point	-
Real Time Format	Modeless	-
Data Size	2	bytes
Priority	Scheduled	-
RPI	20000	µs
Instance ID	1024	-
Check Identity		
Compatible Mode	Disabled	-
Vendor Code Check	Disabled	-
Product Type Check	Disabled	-
Product Code Check	Disabled	-
Major Revision Check	Disabled	-
Minor Revision Check	Disabled	-

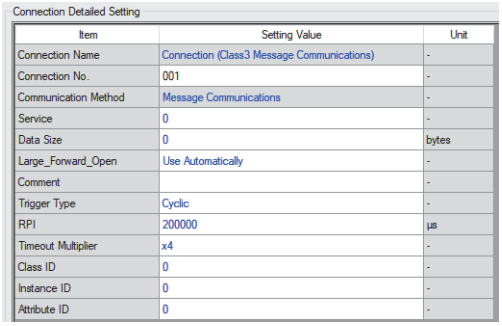
Item	Description	Setting range*1
Connection Name	Displays the connection name.	—
Application Type	Displays the application type.	—
Connection No.	Set the connection number. The default value is the minimum value from the unused connection numbers in the connection list.	001 to 256 (Default: Refer to the left.)
Communication Method	Displays the communication method.	—
Comment	Set comments to the connection if required.	Up to 32 characters (one-byte or two-byte) (Default: empty)
Trigger Type	Set the trigger type to be used in combination with "RPI" to control the timing of data sending. The setting items depend on the EtherNet/IP device to be used. • Cyclic: Data is sent periodically according to "RPI". • Change of State: Data is sent when the status changes.	• Cyclic • Change of State (Default: Cyclic)
Inhibit Time Mode	Set the mode of the transmission inhibit time (minimum delay time) until transmission. This item can be set only when "Trigger Type" is set to "Change of State". • Default: 1/4 of "RPI" of Output (O->T) is used as "Inhibit Time". However, if the value exceeds 255ms, 255ms is used. • Un-Activated: 0ms is used as "Inhibit Time". • Custom: Enter a value directly in "Inhibit Time".	• Default • Un-Activated • Custom (Default: Default)
Inhibit Time	Set the transmission inhibit time (minimum delay time) until transmission. (Unit: ms) This item can be set only when "Inhibit Time Mode" is set to "Custom". If "Inhibit Time Mode" is set to "Default", automatic calculation will be performed.	1 to 255 (Default: 1/4 the value of "RPI" of Output (O->T) is used.)

Item		Description	Setting range[*1]
Timeout Multiplier		Set the timeout multiplier.	• ×4 • ×8 • ×16 • ×32 • ×64 • ×128 • ×256 • ×512 (Default: ×4)
Configuration Instance		Obtains and displays the following values for the EDS file. • Connection Manager section • Connection entry • Path field	—
Input T->O	Input Mode	Set the transmission mode for packets containing input data. The setting items depend on the EtherNet/IP device to be used. • Multicast: Multicast (one to many) communications are performed. • Point to point: Unicast (one to one) communications are performed.	• Multicast • Point to point (Default: Point to point)
	Real Time Format	Displays the realtime format.	—
	Data Size	Set the data size to be sent from the target to the originator. (Unit: Bytes)	1 to 1444 (Default: 2)
	Priority	Set the priority of the connection. The setting items depend on the EtherNet/IP device to be used.	• Low • High • Scheduled • Urgent (Default: Scheduled)
	RPI	Set the request packet interval (RPI). (Unit: 500μs)	500 to 60000000 (Default: 20000)
	Instance ID	Set the instance ID. The setting range is 768 to 1023 if the adapter is a CC-Link IE TSN Plus module.	0 to 65535 (Default: 768)
Output O->T	Output Mode	Displays the transmission mode for packets containing output data.	—
	Real Time Format	Displays the realtime format.	—
	Data Size	Set the data size to be sent from the originator to the target. (Unit: Bytes) When "Real Time Format" is set to "Heartbeat", it is not necessary to set the data size. This is fixed to "0" if the adapter is a CC-Link IE TSN Plus module.	1 to 1444 (Default: 0)
	Priority	Set the priority of the connection. The setting items depend on the EtherNet/IP device to be used.	• Low • High • Scheduled • Urgent (Default: Scheduled)
	RPI	Set the request packet interval (RPI). (Unit: 500μs)	500 to 60000000 (Default: 20000)
	Instance ID	Set the instance ID. The setting range is 1024 to 1279 if the adapter is a CC-Link IE TSN Plus module.	0 to 65535 (Default: 1024)

Item		Description	Setting range*1
Check Identity	Compatible Mode	Enables or disables compatible mode. For details, refer to the following. ☞ Page 282 Consistency check	• Disabled • Enabled (Default: Disabled)
	Vendor Code Check	Set whether or not to check the vendor code. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Product Type Check	Set whether or not to check the product type. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Product Code Check	Set whether or not to check the product code. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Major Revision Check	Set whether or not to check the major revision. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)
	Minor Revision Check	Set whether or not to check the minor revision. This item is fixed to "Enabled" if "Compatible Mode" is set to "Enabled".	• Disabled • Enabled (Default: Disabled)

*1 Some values cannot be set depending on the EDS file of the communication destination.

■Connections: Scanner (Class3 message communications)

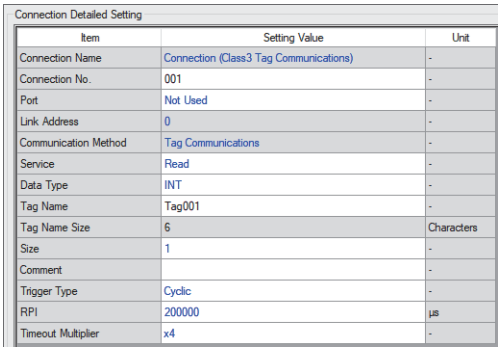


Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Class3 Message Communications)	-
Connection No.	001	-
Communication Method	Message Communications	-
Service	0	-
Data Size	0	bytes
Large_Forward_Open	Use Automatically	-
Comment		-
Trigger Type	Cyclic	-
RPI	200000	µs
Timeout Multiplier	x4	-
Class ID	0	-
Instance ID	0	-
Attribute ID	0	-

Item	Description	Setting range
Connection Name	Displays the connection name.	—
Connection No.	Set the connection number. The default value is the minimum value from the unused connection numbers in the connection list.	001 to 256 (Default: Refer to the left.)
Communication Method	Displays the communication method.	—
Service	Set the service ID.	0 to 255 (Default: 0)
Data Size	Set the data size. (Unit: Bytes)	0 to 1404 (Default: 0)
Large_Forward_Open	Set whether to use Large_Forward_Open. In the following cases, select "Use Always". • Performing Class3 communications using Large_Forward_Open is required in the manual of the server device used. • The size of response data from the server device is expected to be 512 bytes or larger. • Responses from the server device are the following error codes. General Status: 23h CIP Status Name: Buffer Overflow	• Use Automatically • Use Always (Default: Use Automatically)
Comment	Set comments to the connection if required.	Up to 32 characters (one-byte or two-byte) (Default: empty)
Trigger Type	Set the trigger type to be used in combination with "RPI" to control the timing of data sending. • Cyclic: Class3 messages are sent periodically according to "RPI". • Application Trigger: Class3 messages are sent according to the request from the client (own station).	• Cyclic • Application Trigger (Default: Cyclic)
RPI	Set the request packet interval (RPI). (Unit: 500µs)	200000 to 60000000 (Default: 200000)
Timeout Multiplier	Set the timeout multiplier.	• ×4 • ×8 • ×16 • ×32 • ×64 • ×128 • ×256 • ×512 (Default: ×4)
Class ID	Set the class ID.	0 to 65535 (Default: 0)
Instance ID	Set the instance ID.	0 to 65535 (Default: 0)
Attribute ID	Set the attribute ID.	0 to 65535 (Default: 0)

■Connections: Scanner (Class3 tag communications)



Connection Detailed Setting

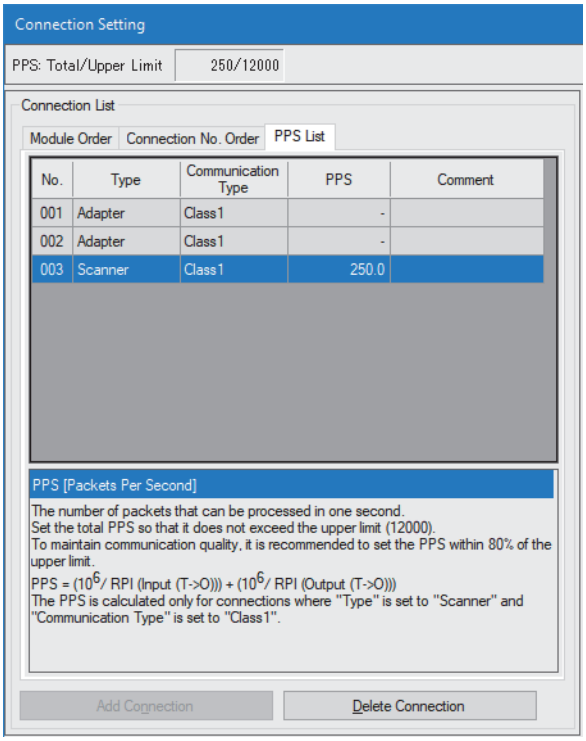
Item	Setting Value	Unit
Connection Name	Connection (Class3 Tag Communications)	-
Connection No.	001	-
Port	Not Used	-
Link Address	0	-
Communication Method	Tag Communications	-
Service	Read	-
Data Type	INT	-
Tag Name	Tag001	-
Tag Name Size	6	Characters
Size	1	-
Comment		-
Trigger Type	Cyclic	-
RPI	200000	µs
Timeout Multiplier	x4	-

Item	Description	Setting range
Connection Name	Displays the connection name.	—
Connection No.	Set the connection number. The default value is the minimum value from the unused connection numbers in the connection list.	001 to 256 (Default: Refer to the left.)
Port	Set the port. • Not Used: No port is used. • Backplane: Communication is performed to the link address.	• Not Used • Backplane (Default: Not Used)
Link Address	Set the link address. This item can be set only when "Port" is set to "Backplane".	0 to 255 (Default: 0)
Communication Method	Displays the communication method.	—
Service	Set the service type.	• Read • Write (Default: Read)
Data Type	Set the data type for the tag. • INT: Signed 16-bit data • DINT: Signed 32-bit data	• INT • DINT (Default: INT)
Tag Name	Set the tag name. The connection number with the minimum digit is set as a default value.	Up to 255 characters (Default: Tag001)
Tag Name Size	Displays the number of characters in the string displayed in "Tag Name". (Unit: Characters)	—
Size	Set the size (the number of elements for INT/DINT type data). The size setting range depends on the setting of "Service", "Data Type", and "Tag Name Size". • For INT: 1 to 248 (Read), 1 to 246 - ("Tag Name Size"÷2)*1 (Write) • For DINT: 1 to 124 (Read), 1 to 123 - ("Tag Name Size"÷4)*1 (Write)	1 to 248 (Default: 1)
Comment	Set comments to the connection if required.	Up to 32 characters (one-byte or two-byte) (Default: empty)
Trigger Type	Set the trigger type to be used in combination with "RPI" to control the timing of data sending. • Cyclic: Class3 messages are sent periodically according to "RPI". • Application Trigger: Class3 messages are sent according to the request from the client (own station).	• Cyclic • Application Trigger (Default: Cyclic)
RPI	Set the request packet interval (RPI). (Unit: 500µs)	200000 to 60000000 (Default: 200000)
Timeout Multiplier	Set the timeout multiplier.	• ×4 • ×8 • ×16 • ×32 • ×64 • ×128 • ×256 • ×512 (Default: ×4)

*1 Round up to one decimal point.

■PPS List

This tab displays the communication processing performance (PPS) of each connection.
Adjust the total value while checking "PPS: Total/Upper Limit".
Communication processing performance (PPS) can be adjusted by changing the requested packet interval (RPI).
To maintain communication quality, setting a value that does not exceed 80% of the total communication processing performance (PPS) is recommended.



Point

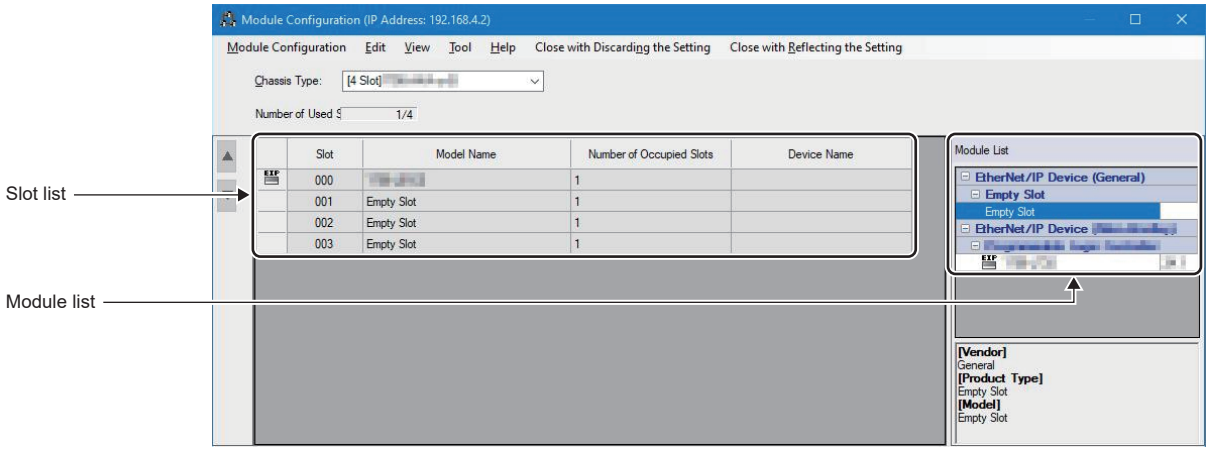
Right-click a connection with PPS displayed, and from the pop-up window, select [Move to RPI (Input (T->O))] or [Move to RPI (Output (O->T))] to move to the applicable location of the detailed connection settings.

Module Configuration setting

Set the module for EtherNet/IP communications.

■Setting procedure

1. Under "Chassis Type", select the chassis to be set. As the number of slots is indicated on the chassis, please select this according to the number of modules to be added.
2. Select the module to be added from "Module List" and drag it to the list of slots.



3. Check the system configuration.

[Module Configuration] ⇨ [Check] ⇨ [System Configuration]

4. Select [Close with Reflecting the Setting] and close the "Module Configuration" window.

■Setting items

Item	Description	Setting range
Chassis Type	Changes the chassis type to be used for the module.	—
Number of Used Slots	Displays the number of slots to be used for the module.	—
Slot	Displays the slot number of the module.	—
Model Name	Displays the model name of the module.	—
Number of Occupied Slots	Displays the number of occupied slots for the selected slot.	—
Device Name	Enter the name of the device for the selected slot if required.	Up to 32 characters (one-byte or two-byte) (Default: empty)

Point

When a module is added to the slot list, the registration of some EDS files may be required for the module.
If the registration of the EDS file is not satisfied, the module cannot be added to the slot list.
Check the source of the EDS files to be downloaded, register the necessary EDS files.

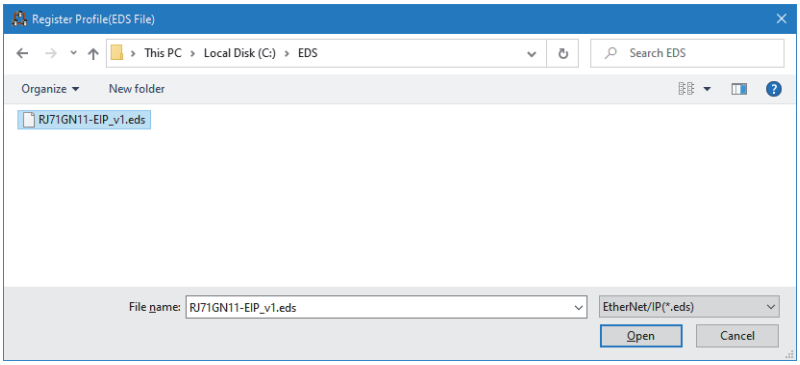
Adding/deleting the EDS file

■Adding the EDS file

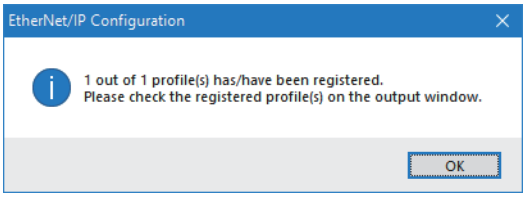
Register the EDS file (profile) of the EtherNet/IP device to be set in the following procedure.

1. Select the EDS file to be registered in the following window and click the [Open] button.

[Tool] ⇨ [Profile Management] ⇨ [Register]



2. The registration is completed when the following window appears.



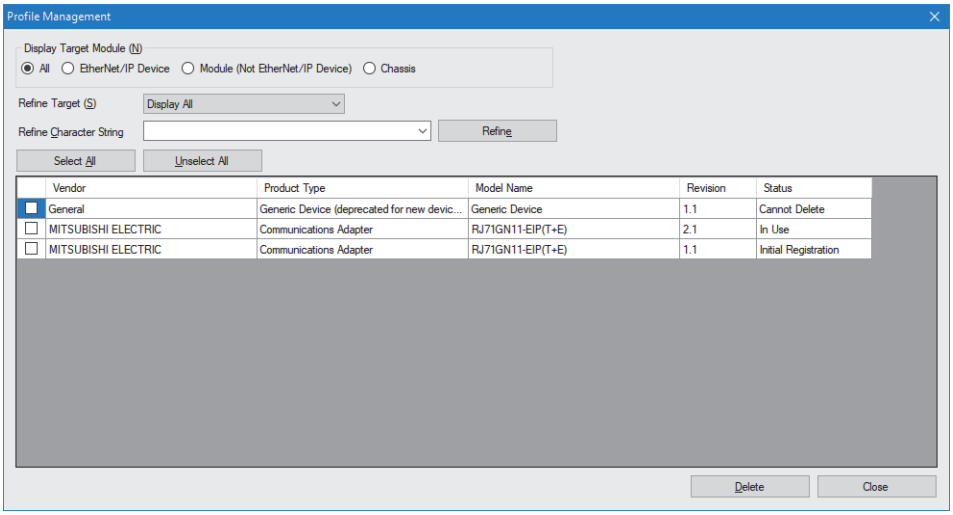
Point

EDS files that are not created according to the EtherNet/IP specifications may not be added to the EtherNet/IP configuration.

■Deleting the EDS file

The registered EDS file (profile) can be deleted from the following location.

[Tool] ⇨ [Profile Management] ⇨ [Management]



An EDS file (profile) can be deleted by selecting the checkbox on the left side of its field and clicking the [Remove] button.

Displayed items

The display items in "Status" are shown below.

Status	Description
Initial Registration	An EDS file to be registered at installation. If the EDS file is deleted, the created EtherNet/IP Configuration tool may not be opened properly.
Cannot Delete	An EDS file which cannot be deleted from EtherNet/IP Configuration tool.
In Use	An EDS file which is currently being used in EtherNet/IP Configuration tool. The file cannot be deleted.
Deleting Completed	A deleted EDS file. This status is displayed when a file deletion is completed.
Deleting Failed	An EDS file which failed to be deleted. This status is displayed when a file deletion fails even though the file deletion is attempted.

Point

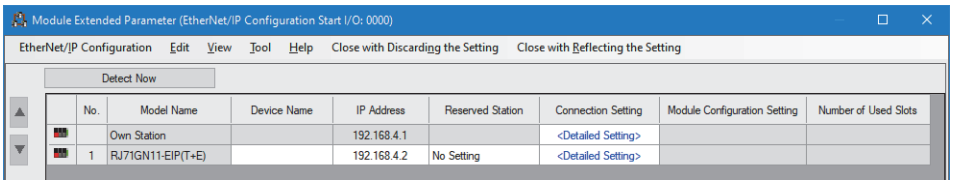
If an EDS file of the CC-Link IE TSN Plus module with "Initial Registration" status is deleted, and the EDS file will be used again, please consult your local Mitsubishi representative.

Setting the Class1 instance communications

To perform Class1 instance communications for the EtherNet/IP device, follow the procedure below.

1. Connect the engineering tool to the originator side and register the EDS file of the target side from the "EtherNet/IP Configuration" window. (☞ Page 141 Adding/deleting the EDS file)

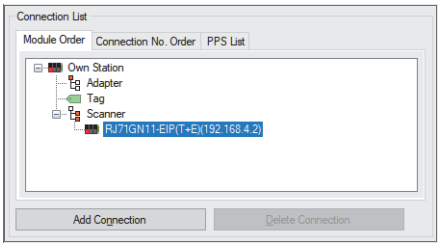
2. Select the EtherNet/IP device of the target side in "Module List" and drag it to the list of EtherNet/IP devices.



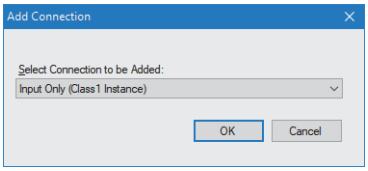
3. Set the items such as the device name and IP address of the EtherNet/IP device of the target side.

4. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection of the EtherNet/IP device. (The setting window that opens from "<Detailed Setting>" of each line is the same.)

5. Configure the settings to send data to the adapter using the own station (originator) as a scanner.
Select the EtherNet/IP device under "Scanner" in "Connection List" and click the [Add Connection] button.



6. Select "Input Only (Class1 Instance)" or "Exclusive Owner (Class1 Instance)" in "Select Connection to be Added:" and click the [OK] button.

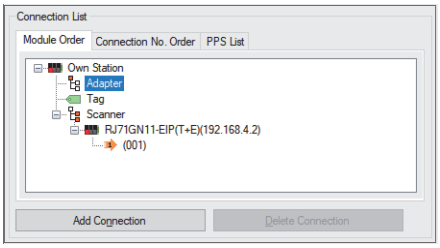


7. Set the parameter for the Class1 instance communications in "Detailed Connection Settings". (☞ Page 130 Connections: Scanner (Input Only (Class1 Instance)), ☞ Page 134 Connections: Scanner (Exclusive Owner (Class1 Instance)))

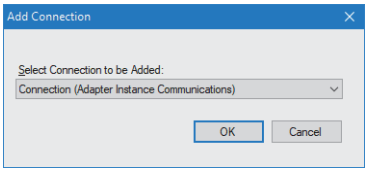
Point

- For "Instance ID" under "Input T->O", set the instance ID of the connection to be communicated with a device as the target.
- For "Data Size" under "Input T->O", set the data size of the connection to be communicated with a device as the target.

8. Configure the settings to receive data from the scanner using the own station (originator) as an adapter.
Select "Adapter" in "Connection List" and click the [Add Connection] button.



9. Select "Connection (Adapter Instance Communications)" in "Select Connection to be Added:" and click the [OK] button.



10. Set the parameter for the Class1 instance communications in "Detailed Connection Settings". (☞ Page 127 Connections: Adapter (Instance communications))

11. Click the [OK] button to reflect the parameter.

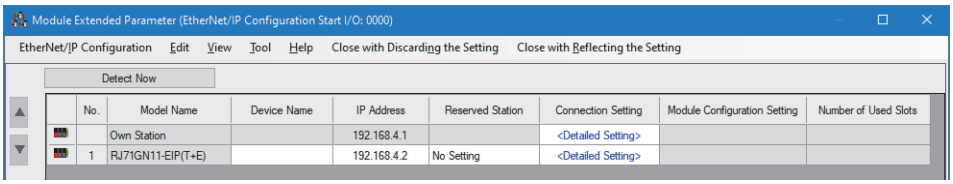
12. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

Setting the Class1 tag communications

To perform Class1 tag communications for the EtherNet/IP device, follow the procedure below.

1. Connect the engineering tool to the originator side and register the EDS file of the target side from the "EtherNet/IP Configuration" window. (☞ Page 141 Adding/deleting the EDS file)

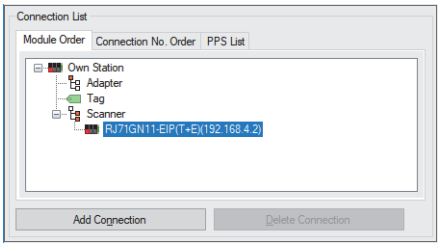
2. Select the EtherNet/IP device of the target side in "Module List" and drag it to the list of EtherNet/IP devices.



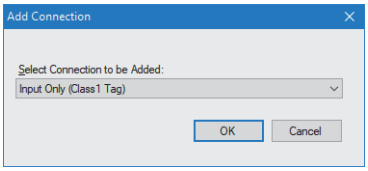
3. Set the items such as the device name and IP address of the EtherNet/IP device of the target side.

4. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection of the EtherNet/IP device. (The setting window that opens from "<Detailed Setting>" of each line is the same.)

5. Configure the settings to send data to "Consumer" (target) using the own station (originator) as "Producer". Select the EtherNet/IP device under "Scanner" in "Connection List" and click the [Add Connection] button.



6. Select "Input Only (Class1 Tag)" in "Select Connection to be Added:" and click the [OK] button.

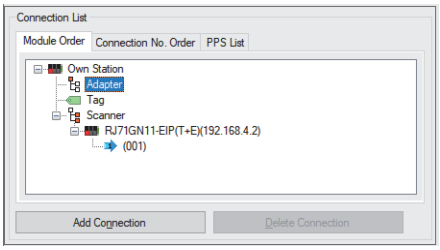


7. Set the parameter for the Class1 tag communications in "Connection Detailed Setting". (☞ Page 132 Connections: Scanner (Input Only (Class1 Tag)))

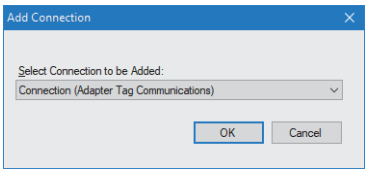
Point

- For "Tag Name", set the tag name of the connection you wish to communicate with as the target.
- For "Data Size" under "Input T->O", set the data size of the connection to be communicated with a device as the target.

8. Configure the settings to receive data from "Producer" (target) using the own station (originator) as "Consumer". Select "Adapter" in "Connection List" and click the [Add Connection] button.



9. Select "Connection (Adapter Tag Communications)" in "Select Connection to be Added:" and click the [OK] button.



10. Set the parameter for the Class1 tag communications in "Connection Detailed Setting". (☞ Page 128 Connections: Adapter (Tag communications))

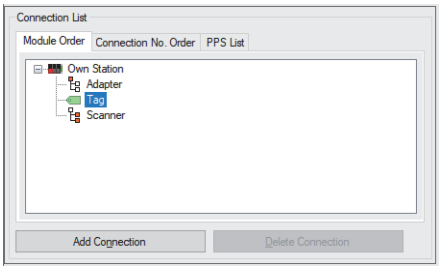
11. Click the [OK] button to reflect the parameter.

12. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

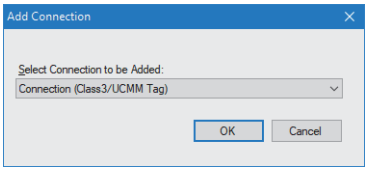
Setting the UCMM tag communications

To perform UCMM tag communications for the EtherNet/IP device, follow the procedure below.
Set UCMM tag communications only when the own station operates as a server (target).

1. Connect the engineering tool to the target side, double-click "<Detailed Setting>" in the "Connection Setting" column in the "EtherNet/IP Configuration" window, and set the connection of the EtherNet/IP device.
2. Select "Tag" in "Connection List" and click the [Add Connection] button.



3. Select "Connection (Class3/UCMM Tag)" in "Select Connection to be Added:" and click the [OK] button.

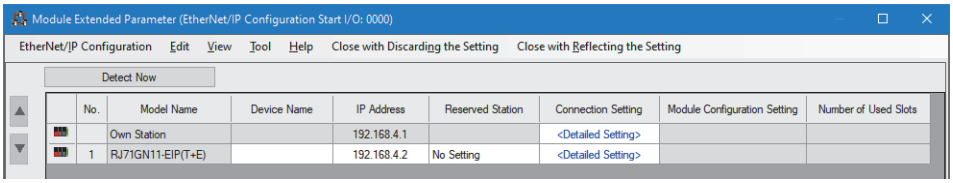


4. Set the parameter for the UCMM tag communications in "Connection Detailed Setting". (☞ Page 129 Connections: Class3/UCMM tag)
5. Click the [OK] button to reflect the parameter.
6. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

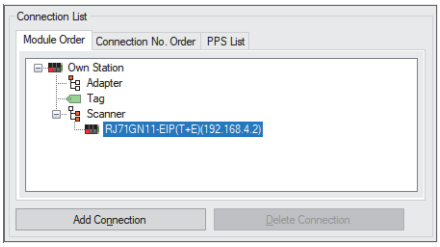
Setting the Class3 message communications

To perform Class3 message communications for the EtherNet/IP device, follow the procedure below.
Set Class3 message communications only when the own station operates as a client.

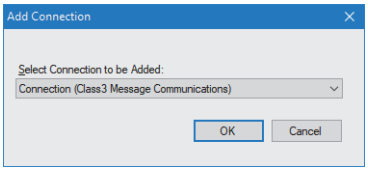
1. Connect the engineering tool to the originator side and register the EDS file of the target side from the "EtherNet/IP Configuration" window. (☞ Page 141 Adding/deleting the EDS file)
2. Select the EtherNet/IP device of the target side in "Module List" and drag it to the list of EtherNet/IP devices.



3. Set the items such as the device name and IP address of the EtherNet/IP device of the target side.
4. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection of the EtherNet/IP device.
(The setting window that opens from "<Detailed Setting>" of each line is the same.)
5. Select the EtherNet/IP device under "Scanner" in "Connection List" and click the [Add Connection] button.



6. Select "Connection (Class3 Message Communications)" in "Select Connection to be Added:" and click the [OK] button.



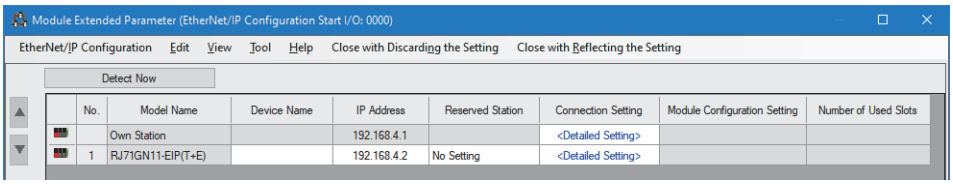
7. Set the parameter for the Class3 message communications in "Connection Detailed Setting". (☞ Page 137 Connections: Scanner (Class3 message communications))
8. Click the [OK] button to reflect the parameter.
9. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

Setting the Class3 tag communications

To perform Class3 tag communications for the EtherNet/IP device, follow the procedure below.

1. Connect the engineering tool to the originator side and register the EDS file of the target side from the "EtherNet/IP Configuration" window. (☞ Page 141 Adding/deleting the EDS file)

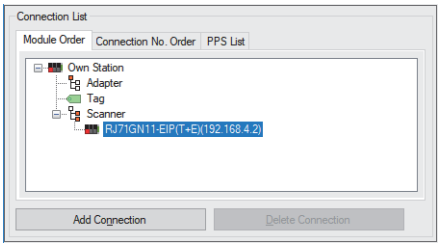
2. Select the EtherNet/IP device of the target side in "Module List" and drag it to the list of EtherNet/IP devices.



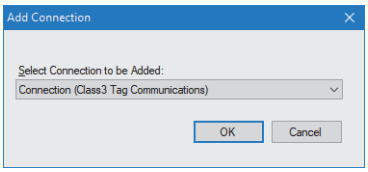
3. Set the items such as the device name and IP address of the EtherNet/IP device of the target side.

4. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection of the EtherNet/IP device.
(The setting window that opens from "<Detailed Setting>" of each line is the same.)

5. Configure the settings to send data to the server (target) using the own station (originator) as a client.
Select the EtherNet/IP device under "Scanner" in "Connection List" and click the [Add Connection] button.



6. Select "Connections (Class3 Tag Communications)" in "Select Connection to be Added:" and click the [OK] button.



7. Set the parameter for the Class3 tag communications in "Connection Detailed Setting". (☞ Page 138 Connections: Scanner (Class3 tag communications))

8. Configure the settings to receive data from the client (target) using the own station (originator) as a server.
The setting procedure is the same as the UCMM tag communications. (☞ Page 147 Setting the UCMM tag communications)

9. Click the [OK] button to reflect the parameter.

10. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

Checking the EtherNet/IP Configuration tool version

The following method can be used to check the version of the EtherNet/IP Configuration tool.

[Help] ⇨ [Version Information]

MEMO

PART 4 CC-Link IE TSN (P1) DETAILS

This part consists of the following chapters.

9 FUNCTIONS

10 DEDICATED INSTRUCTION

11 PROGRAMMING

9 FUNCTIONS

The following table lists the functions of CC-Link IE TSN.

9.1 Function List

The following are the symbols used for the availability column.

○: Available, △: Partially available, ×: Not available

Cyclic transmission

This section describes periodic data communications among stations on the network using link devices.

Function		Description	Availability		Reference
			Master station	Local station	
Communications using RX, RY, RWr, and RWw		This allows data to be exchanged in units of bits and in units of words between the master station and device station.	○	○	Page 157 Communications using RX, RY, RWr, and RWw
Communications using LB and LW		This allows data to be communicated in units of bits and words between the master station and local stations.	○	○	Page 162 Communications using LB and LW
Link refresh		Automatically transfers data between a link device in a module on CC-Link IE TSN Plus and a device in a CPU module.	○	○	Page 167 Link refresh
Direct access to link devices		Directly reads or writes the corresponding data from/to link devices of the CC-Link IE TSN Plus module using the program.	○	○	Page 169 Direct access to link devices
Cyclic data assurance		This function assures the cyclic data assurance in units of 32 bits or station-based units.	○	○	Page 172 Cyclic data assurance
Communication cycle coexistence		When device stations with different communication cycles are included in the network, multiple communication cycles according to each device station are used for communications.	○	×	Page 180 Communication cycles coexistence
Interlink transmission		This function transfers data in the link devices of the master station to another network module on a relay station.	○	×	Page 181 Interlink transmission
I/O maintenance settings	Output mode upon CPU error	Select whether to hold or clear output when a stop error occurs in the CPU module. Set it on the sending side.	○	○	Page 182 I/O maintenance settings
	Output hold/clear setting during CPU STOP	Select whether to hold or clear output when the status of the CPU module changes from RUN to STOP. Set it on the sending side.	○	○	
	Data link faulty station setting	Select whether to clear or hold input from a disconnected station. Set it on the receiving side.	○	○	
Remote device test		Turns on or off the output of the remote station when the CPU module is in STOP state.	○	×	Page 187 Remote device test
CANopen communications		Controls a servo amplifier that supports the CANopen profile.	○	×	Page 189 CANopen communications

Transient transmission

Transient transmission is used for communications at any timing and has the following three types.

Function	Description	Availability		Reference
		Master station	Local station	
Communications using a dedicated instruction	Data is read/written from the master station or local station to devices in a CPU module of the local station or the buffer memory areas of a remote station using the dedicated instructions. 📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions)	○	△	Page 190 Communications using a dedicated instruction
Communications using SLMP	Data is read/written from the CC-Link IE TSN Plus module and the external device, such as a personal computer, to devices in the CPU module of the master station and local station and the buffer memory areas of the remote station via an SLMP. (📖 SLMP Reference Manual)	○	○	Page 190 Communications using the SLMP
Communications using the engineering tool	This type of communications are used to configure the settings of or monitor each station using the engineering tool. It allows seamless communications with stations on different types networks.	○	○	Page 191 Communications using the engineering tool

Ethernet connection

This type of connection allows one module to be connected to an Ethernet device without interfering with CC-Link IE TSN.

Function	Description	Availability		Reference
		Master station	Local station	
Connection with MELSOFT product	Programming and monitoring of the programmable controller are performed via Ethernet.	○	○	Page 193 Connection with MELSOFT product
Connection with SLMP-compatible devices	This type of connection allows SLMP-compatible devices (such as a personal computer or a vision sensor) to be connected to the CC-Link IE TSN Plus module.	○	○	Page 196 Connection with SLMP-compatible devices
Socket communications	Using dedicated instructions, arbitrary data can be exchanged with an external device connected by Ethernet over TCP/IP or UDP/IP.	○	○	Page 197 Socket communications

Security

Security depending on the network environment can be structured by restricting access by each communication path to the CPU module.

Function	Description	Availability		Reference
		Master station	Local station	
IP filter	Identifies the IP address of the access source, and prevents unauthorized access.	○	○	Page 203 IP filter
Remote password	Permits or prohibits access from the external device to the CPU module via the CC-Link IE TSN Plus module.	○	○	Page 206 Remote password

RAS

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

Function	Description	Availability		Reference
		Master station	Local station	
Device station disconnection	Stops data link of the station where an error occurred, and continues data link only for stations that are operating normally.	○	×	Page 211 Device station disconnection
Automatic return	Restarts the data link automatically when the device station that was disconnected due to an error becomes normal again.	○	○	Page 211 Automatic return
Master station duplication detection	If one network has multiple master stations, an overlap is detected.	○	×	Page 211 Master station duplication detection
IP address duplication detection	If one network has stations with the same IP address, an overlap is detected.	○	○	Page 212 IP address duplication detection
Time synchronization	Synchronizes the time of device stations with the time synchronization source (CPU module of the master station).	○	×	Page 213 Time synchronization

Synchronization function

This function adjusts the timing with the timing of different device stations connected on the same network.

Function	Description	Availability		Reference
		Master station	Local station	
CC-Link IE TSN Network synchronous communication function	Synchronizes control cycles between device stations over CC-Link IE TSN according to the inter-module synchronization cycle specified in the master station. This adjusts the timing with the timing of different device stations connected on the same network.	○	○	Page 214 CC-Link IE TSN Network Synchronous Communication Function

Troubleshooting

This function checks the status of modules and networks by executing diagnostics and operation tests using the engineering tool.

Function	Description	Availability		Reference
		Master station	Local station	
Module communication test	Checks the module hardware when the communication using the CC-Link IE TSN Plus module is unstable.	○	○	Page 397 Module Communication Test
CC-Link IE TSN/CC-Link IE Field diagnostics	Monitors the status of CC-Link IE TSN. The network maps, stations where data link is not operating, selected station communications status monitor and so on are displayed on the engineering tool.	○	○	Page 398 CC-Link IE TSN/CC-Link IE Field Diagnostics
Communication test	This test checks if transient transmission data can be properly routed from the own station to the communication target.	○	○	Page 408 Communication Test

Others

Function		Description	Availability		Reference
			Master station	Local station	
"CC-Link IE TSN Configuration" window	Parameter setting of device stations	Set parameters of device stations (items such as the number of points and assignment of link devices) in the master station.	○	×	Page 96 Parameter setting of device stations
	Detection of connected/ disconnected devices	Connected device stations are detected and displayed on the "CC-Link IE TSN Configuration" window.	○	×	Page 100 Connected/ Disconnected Module Detection
	Parameter processing of device stations	The processing is to read and save the parameters from the device station, and to write the saved parameters to the device station.	○	×	Page 103 Parameter Processing of Device Station
	Command execution to device stations	Commands to a device station (Error clear request, Error history clear request) are executed.	○	○	Page 105 Command execution to device stations
	IP address setting of a device station	Set IP addresses of device stations connected to the master station.	○	×	Page 106 IP address setting of the device station
Reserved station setting		A device station that is set in the parameters and included as a station in the network when its number is counted. This station is reserved for network extension in the future, and thus the station is not actually connected, and is not detected as a faulty station despite being not connected.	○	×	Page 223 Reserved station setting
Error invalid station setting		A device station that is set to be not detected as a faulty station by the master station.	○	×	Page 223 Error invalid station setting
Device station parameter automatic setting		Saves parameters of the device station to the master station, and sets the parameters automatically when the device station is connected or returned to the network.	○	×	Page 224 Device station parameter automatic setting
Data collection using CC-Link IE TSN Communication Software		Receives cyclic data on CC-Link IE TSN using CC-Link IE TSN Communication Software. For details on the CC-Link IE TSN Communication Software, refer to the following. 📖 CC-Link IE TSN Communication Software for Windows User's Manual	○	○	Page 225 Data collection using the CC-Link IE TSN Communication Software

9.2 Cyclic Transmission

This section describes periodic data communications among stations on the network using link devices.

- The link devices can be assigned in "Network Configuration Settings" under "Basic Settings". (☞ Page 96 "CC-Link IE TSN Configuration" window)
- The link refresh is assigned in "Refresh Settings" under "Basic Settings". (☞ Page 77 Refresh Setting)

Cyclic transmission operates as follows with the communication mode set by the module parameter of the master station.

Communication mode	Description
Unicast mode	• Cyclic data is sent to one station. • When this communication mode is used, the local station cannot receive cyclic data from another station. Use this mode when there is no local station or when it is not required for the local station to receive cyclic data from another station. • The cyclic transmission time of this mode is shorter than the cyclic transmission time of multicast mode. (☞ Page 568 Communication cycle intervals)
Multicast mode	• Cyclic data is sent to multiple stations. • When this mode is used, the local station can receive cyclic data from another station. Use this mode when it is required for the local station to receive cyclic data from another station. • The cyclic transmission time of this mode is longer than the cyclic transmission time of unicast mode. (☞ Page 568 Communication cycle intervals)

Point

- When communicating in multicast mode, the local station cannot receive RX and RWr sent by the CC-Link IE TSN Class A remote station. (☞ Page 161 Multicast mode)
- To allow the local station to obtain RX and RWr sent by the CC-Link IE TSN Class A remote station, use the program to send RX and RWr from the master station to the local station. (☞ Page 246 Examples of Communication with CC-Link IE TSN Class A Remote Stations)
- In multicast mode, set "Communication Period Setting" for the local station under "Network Configuration Settings" to "Basic Period".
- If a data link error occurs in multicast mode, ERR LED at the local station flashes. However, even if a data link error occurs at the CC-Link IE TSN Class A remote station during data link, ERR LED at the local station does not flash. (The LED remains off.)
- In multicast mode, 'Data link error status of each station' (SB00B0) and 'Total number of device stations present value' (SW0059) at the local station can be checked by SB and SW. However, the information of the CC-Link IE TSN Class A remote station may not be checked by some SB and SW.

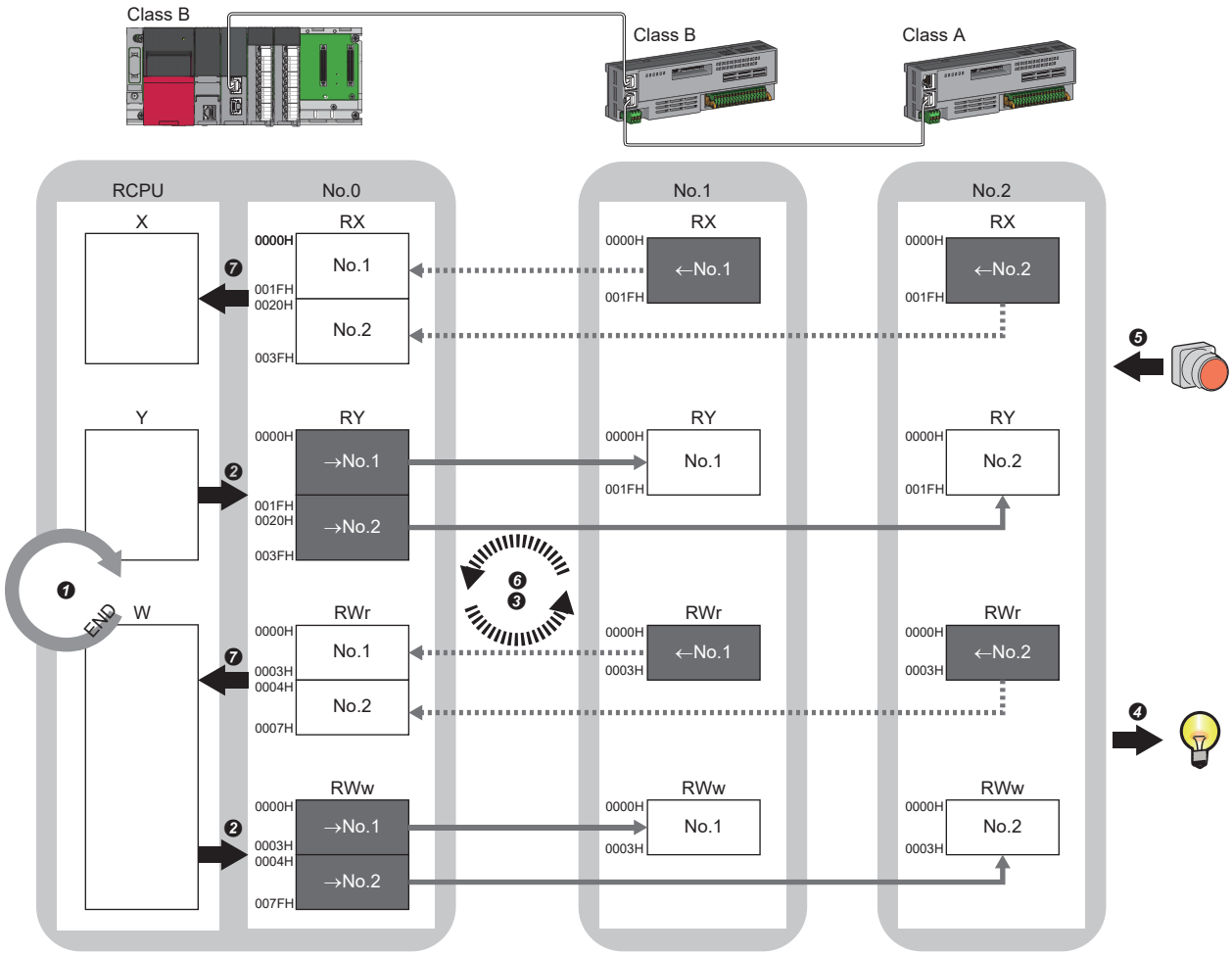
Communications using RX, RY, RWr, and RWw

This allows data to be exchanged in units of bits and in units of words between the master station and device station.

Master station and remote stations

■Unicast mode

1:1 communications between the master station and each remote station. Remote stations do not communicate with each other.



No.0, No.1, No.2: Station No.0 (master station), station No.1, station No.2
→No.1, →No.2: Send range: to station No.1, send range: to station No.2
←No.1, ←No.2: Send range: from station No.1, send range: from station No.2
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

- Output from the master station

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

- Input from the remote station

❺ The status of the external device is stored in the link devices (RX, RWr) of the remote station.
❻ The status of the link devices (RX, RWr) of the remote station is stored in the link devices (RX, RWr) of the master station by cyclic data transfer processing.
❼ The status of the link devices (RX, RWr) of the master station is stored in the devices of the CPU module by link refresh.

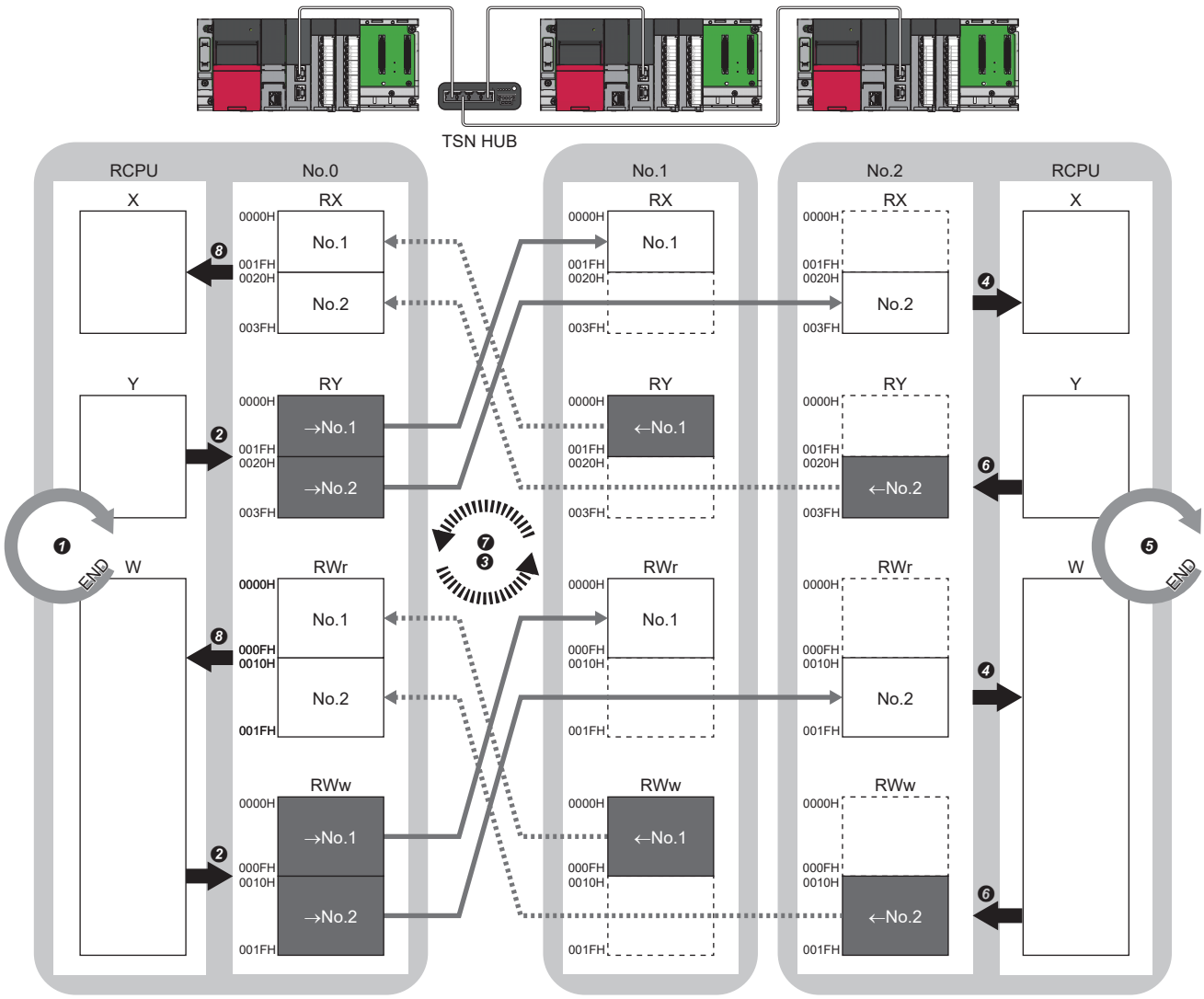
■Multicast mode

- The master station and remote station send data on the line in multicast mode in each send range.
- The master station receives all data, but the remote station discards the data of another remote station. Therefore, communication at each station is performed in the same manner as unicast mode. (☞ Page 157 Unicast mode)

Master station and local stations

■Unicast mode

1:1 communications between the master station and each local station. Local stations do not communicate with each other.



No.0, No.1, No.2: Station No.0 (master station), station No.1, station No.2
→No.1, →No.2: Send range: to station No.1, send range: to station No.2
←No.1, ←No.2: Send range: from station No.1, send range: from station No.2

- Output from the master station

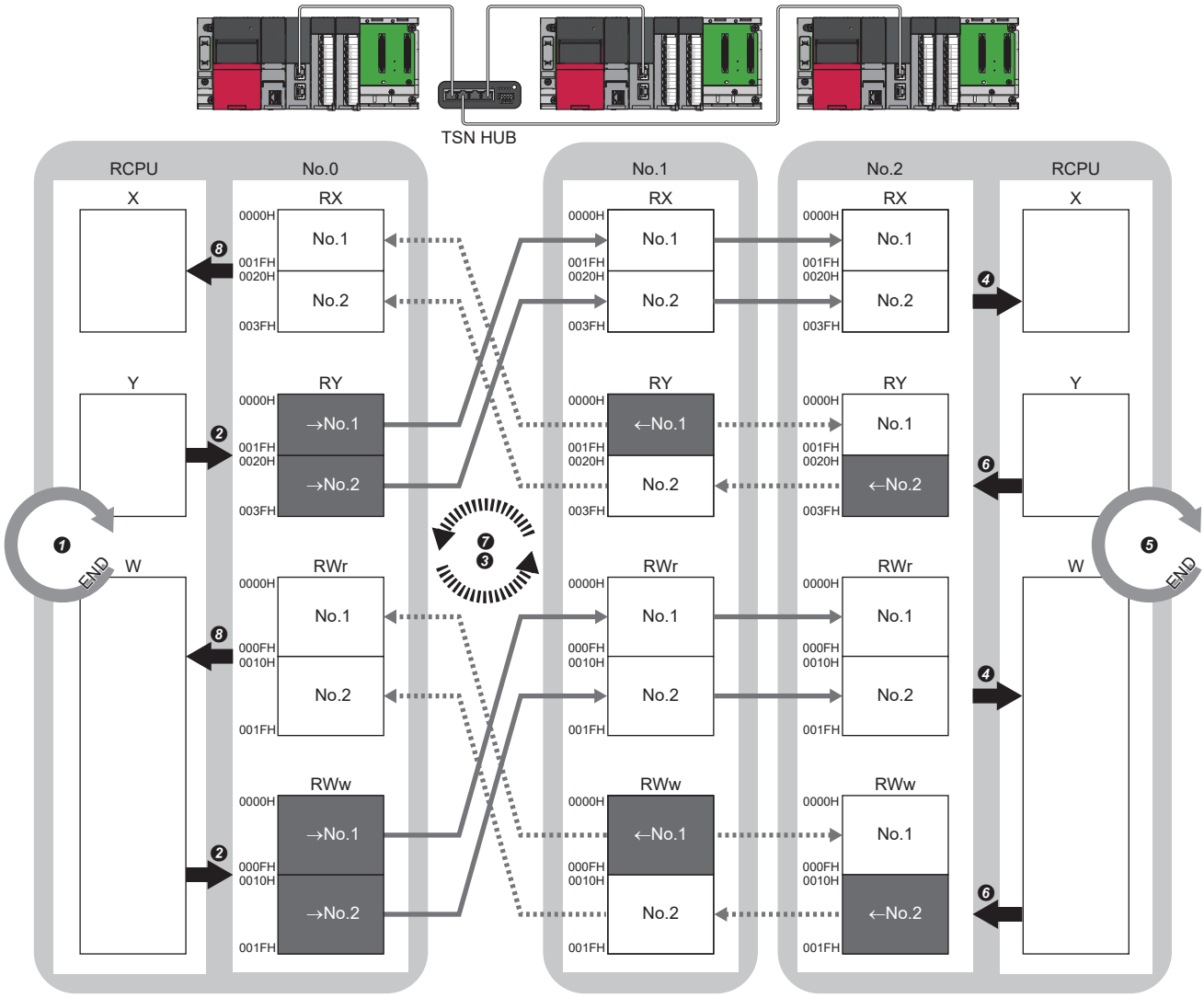
❶ The device is turned on by the sequence scan of the CPU module in the master station, and END processing is performed.
❷ The device status of the CPU module is stored in the link devices (RY, RWw) of the master station by link refresh.
❸ The status of the link devices (RY, RWw) of the master station is stored in the link devices (RX, RWr) of the local station by cyclic data transfer processing.
❹ The status of the link devices (RX, RWr) of the local station is stored in the devices of the CPU module by link refresh.

- Input from the local station

❺ The device is turned on by the sequence scan of the CPU module in the local station, and END processing is performed.
❻ The device status of the CPU module is stored in the link devices (RY, RWw) of the local station by link refresh.
❼ The status of the link devices (RY, RWw) of the local station is stored in the link devices (RX, RWr) of the master station by cyclic data transfer processing.
❽ The status of the link devices (RX, RWr) of the master station is stored in the devices of the CPU module by link refresh.

■Multicast mode

- The master station and local station send data on the line in multicast mode in each send range.
- The CC-Link IE TSN Class A local station communicates data in the same communication range as the CC-Link IE TSN Class B local station.



No.0, No.1, No.2: Station No.0 (master station), station No.1, station No.2
→No.1, →No.2: Send range: to station No.1, send range: to station No.2
←No.1, ←No.2: Send range: from station No.1, send range: from station No.2

- Output from the master station

❶ The device is turned on by the sequence scan of the CPU module in the master station, and END processing is performed.
❷ The device status of the CPU module is stored in the link devices (RY, RWw) of the master station by link refresh.
❸ The status of the link devices (RY, RWw) of the master station is stored in the link devices (RX, RWr) of the local station on the same network by cyclic data transfer processing.
❹ The status of the link devices (RX, RWr) of the local station is stored in the devices of the CPU module by link refresh.

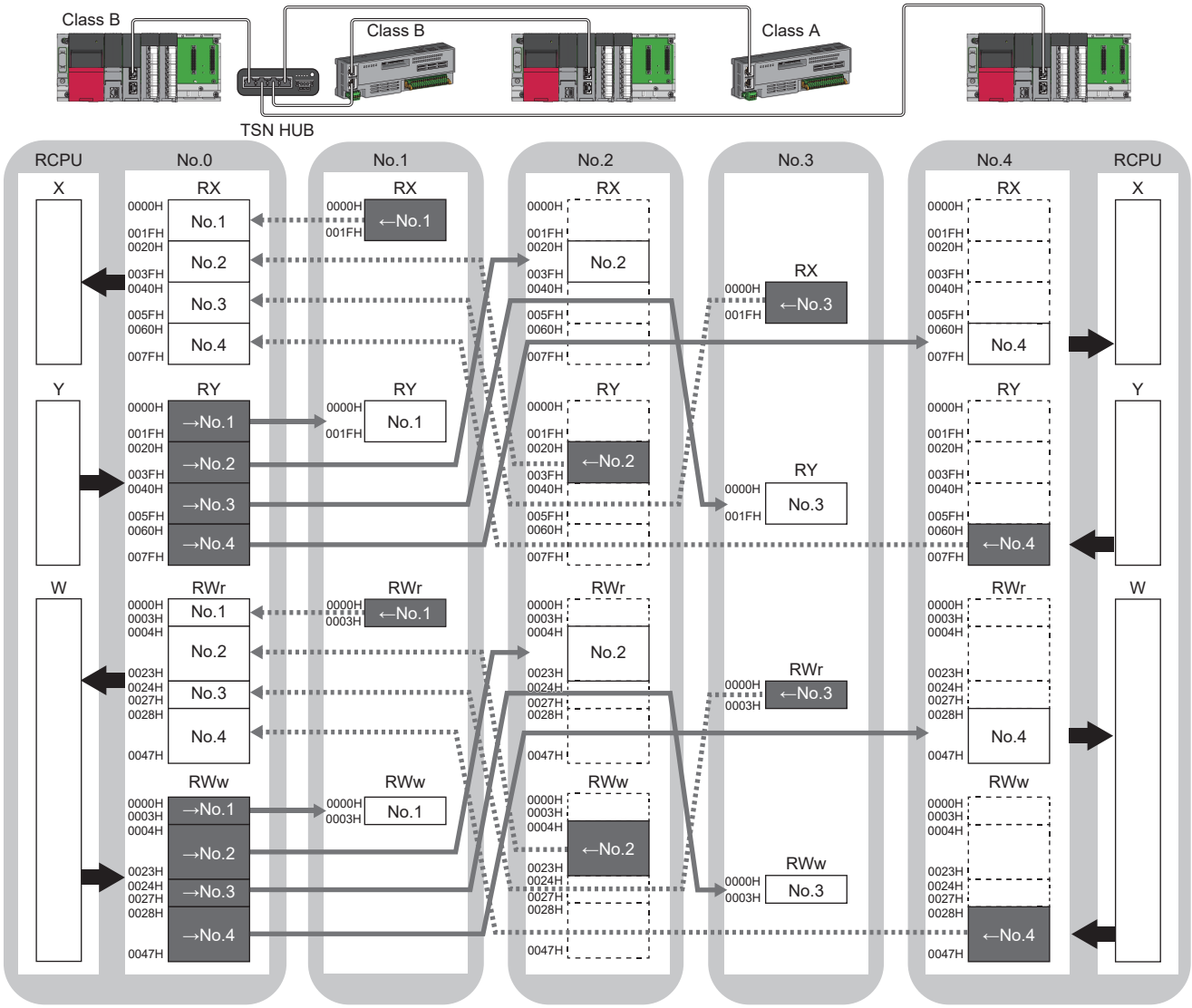
- Input from the local station

❺ The device is turned on by the sequence scan of the CPU module in the local station, and END processing is performed.
❻ The device status of the CPU module is stored in the link devices (RY, RWw) of the local station by link refresh.
❼ The status of the link devices (RY, RWw) of the local station (station No.2) is stored in the link devices (RX, RWr) of the master station on the same network and the link devices (RY, RWw) of the local station (station No.1) by cyclic data transfer processing.
❽ The status of the link devices (RX, RWr) of the master station is stored in the devices of the CPU module by link refresh.

Coexistence of remote stations and local stations

■Unicast mode

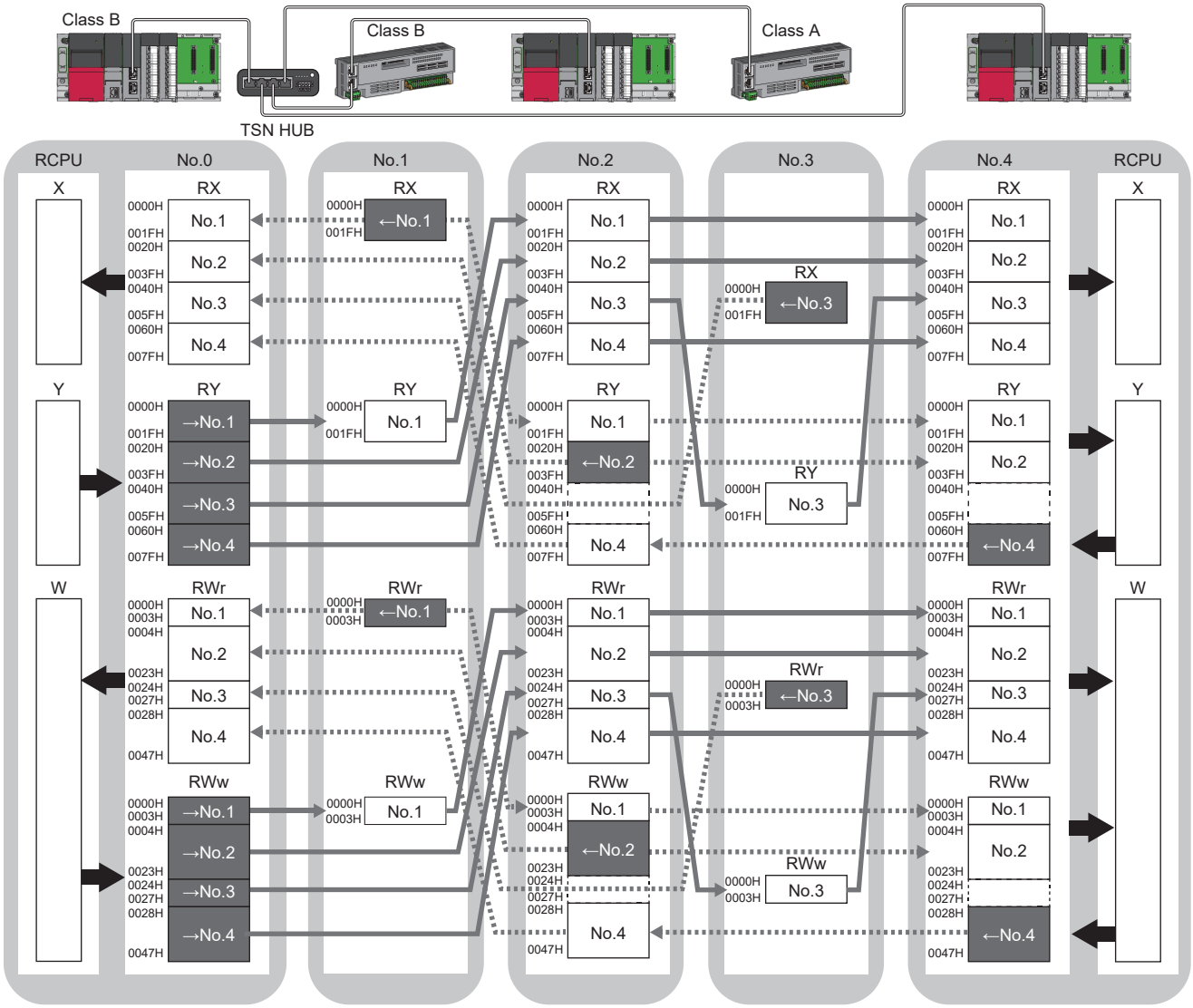
- 1:1 communications between the master station and each remote station, and between the master station and each local station.
- Communications are not performed between remote stations, between local stations, and between a remote station and a local station.



No.0, No.1, No.2, No.3, No.4: station No.0 (master station), station No.1, station No.2, station No.3, station No.4
→No.1, →No.2, →No.3, →No.4: Send range: to station No.1, send range: to station No.2, send range: to station No.3, send range: to station No.4
←No.1, ←No.2, ←No.3, ←No.4: Send range: from station No.1, send range: from station No.2, send range: from station No.3, send range: from station No.4
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Multicast mode

- The master station and each local station can obtain data of all device stations.
- The CC-Link IE TSN Class A local station communicates data in the same communication range as the CC-Link IE TSN Class B local station.



No.0, No.1, No.2, No.3, No.4: station No.0 (master station), station No.1, station No.2, station No.3, station No.4
→No.1, →No.2, →No.3, →No.4: Send range: to station No.1, send range: to station No.2, send range: to station No.3, send range: to station No.4
←No.1, ←No.2, ←No.3, ←No.4: Send range: from station No.1, send range: from station No.2, send range: from station No.3, send range: from station No.4
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

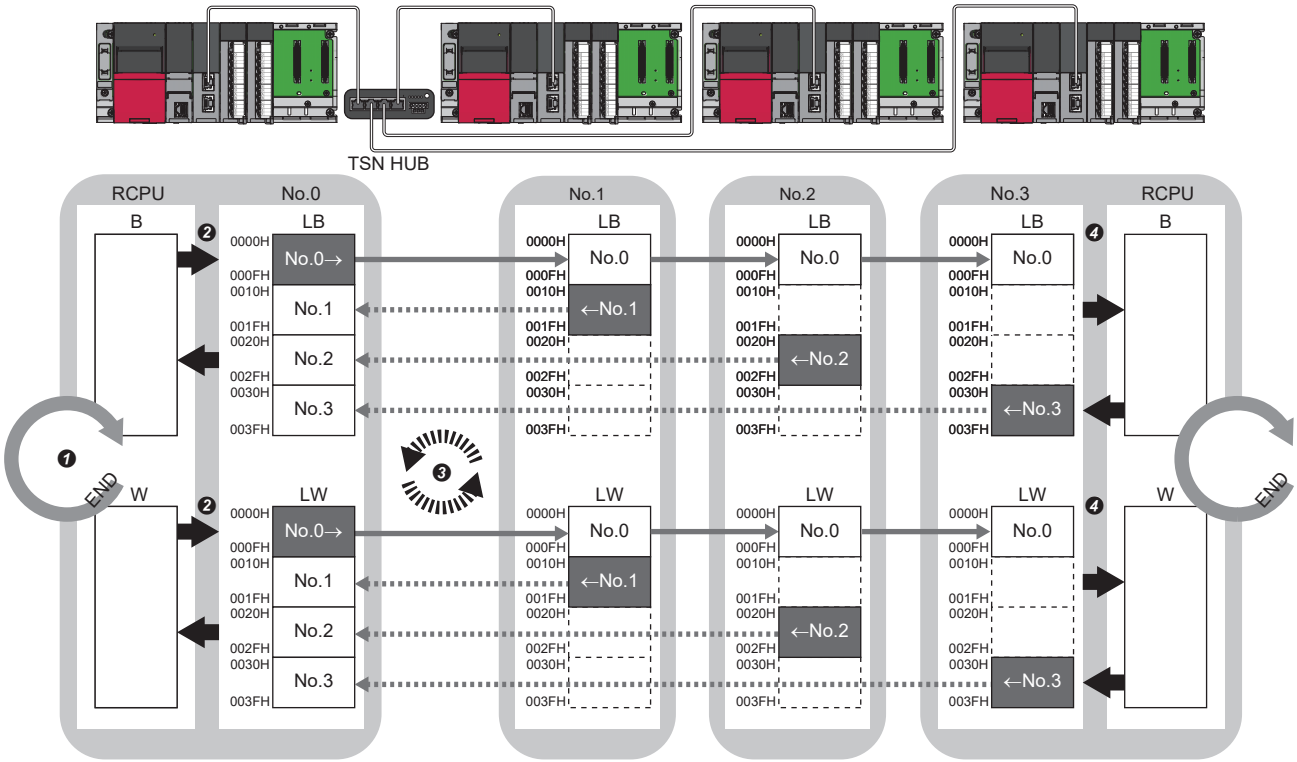
Communications using LB and LW

This allows data to be communicated in units of bits and words between the master station and local stations.

Master station and local stations, or between local stations

■Unicast mode

1:1 communications between the master station and each local station. Local stations do not communicate with each other.



No.0, No.1, No.2, No.3: Station No.0 (master station), station No.1, station No.2, station No.3

No.0→: Send range: to station No.1, station No.2, and station No.3

←No.1, ←No.2, ←No.3: Send range: from station No.1, send range: from station No.2, send range: from station No.3

❶ The device of the CPU module on the sending side turns on.

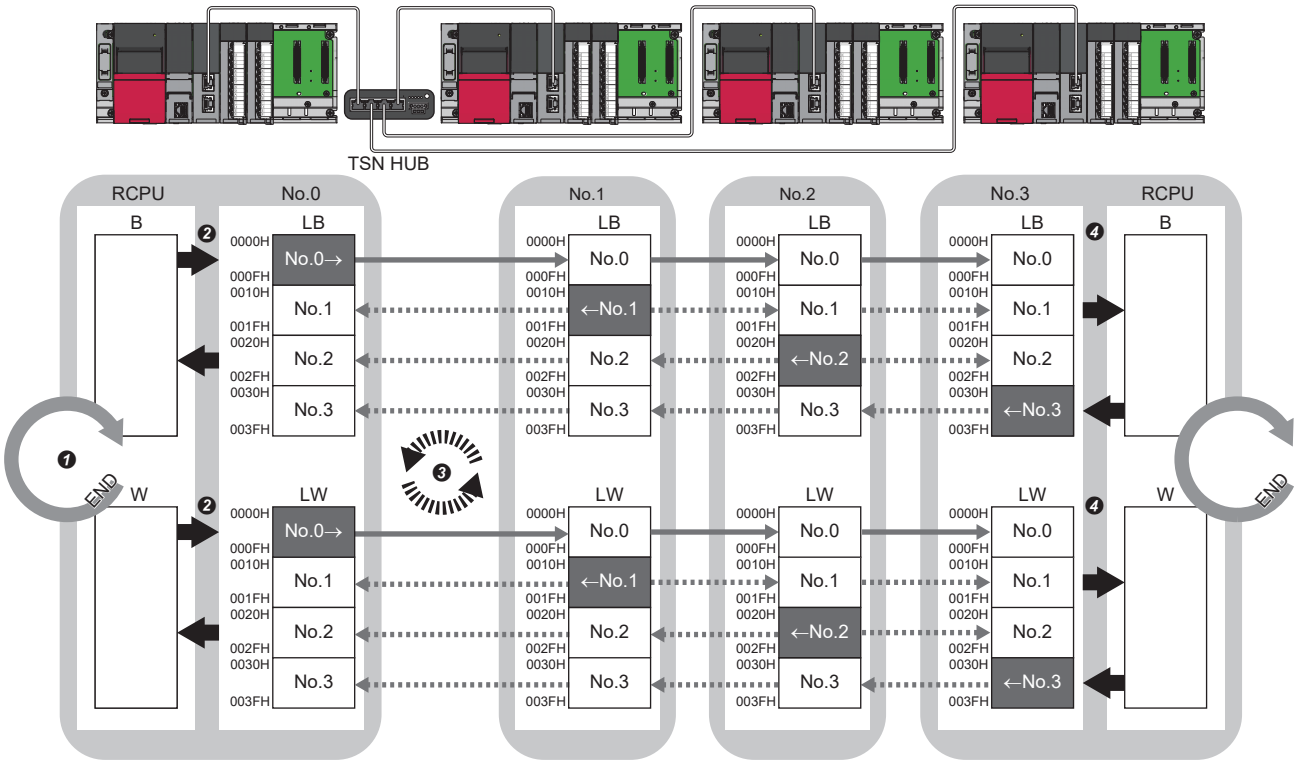
❷ The device status of the CPU module on the sending side is stored in the link devices (LB, LW) of the master station by link refresh.

❸ The status of the link devices (LB, LW) is stored in the link devices (LB, LW) of the CC-Link IE TSN Plus module on the receiving side by cyclic data transfer processing.

❹ The status of the link devices (LB, LW) is stored in the devices of the CPU module on the receiving side.

■Multicast mode

- This allows link device data to be exchanged between local stations as well as between the master station and local stations.
- The CC-Link IE TSN Class A local station communicates data in the same communication range as the CC-Link IE TSN Class B local station.



No.0, No.1, No.2, No.3: Station No.0 (master station), station No.1, station No.2, station No.3
No.0→: Send range: to station No.1, station No.2, and station No.3
←No.1, ←No.2, ←No.3: Send range: from station No.1, send range: from station No.2, send range: from station No.3

❶ The device of the CPU module on the sending side turns on.
❷ The device status of the CPU module on the sending side is stored in the link devices (LB, LW) of the master station by link refresh.
❸ The status of the link devices (LB, LW) is stored in the link devices (LB, LW) of each local station on the receiving side by cyclic data transfer processing.
❹ The status of the link devices (LB, LW) is stored in the devices of the CPU module on the receiving side.

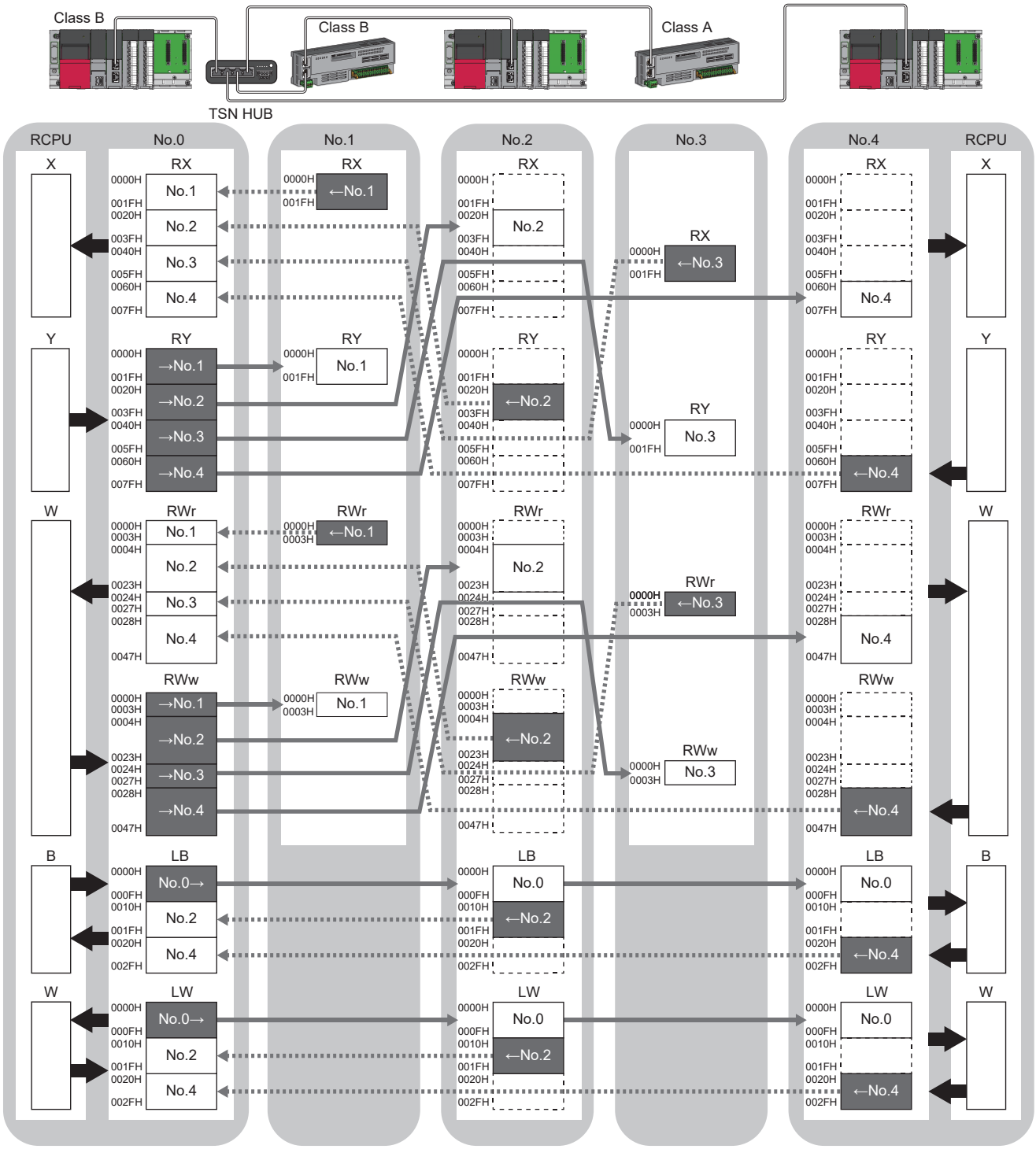
Communications using RX, RY, RWr, RWw, LB, and LW

This allows data to be exchanged in units of bits and in units of words between the master station and device station.

Coexistence of the master station and device stations

The module on CC-Link IE TSN performs communications using RX, RY, RWr, and RWw and communications using LB and LW simultaneously.

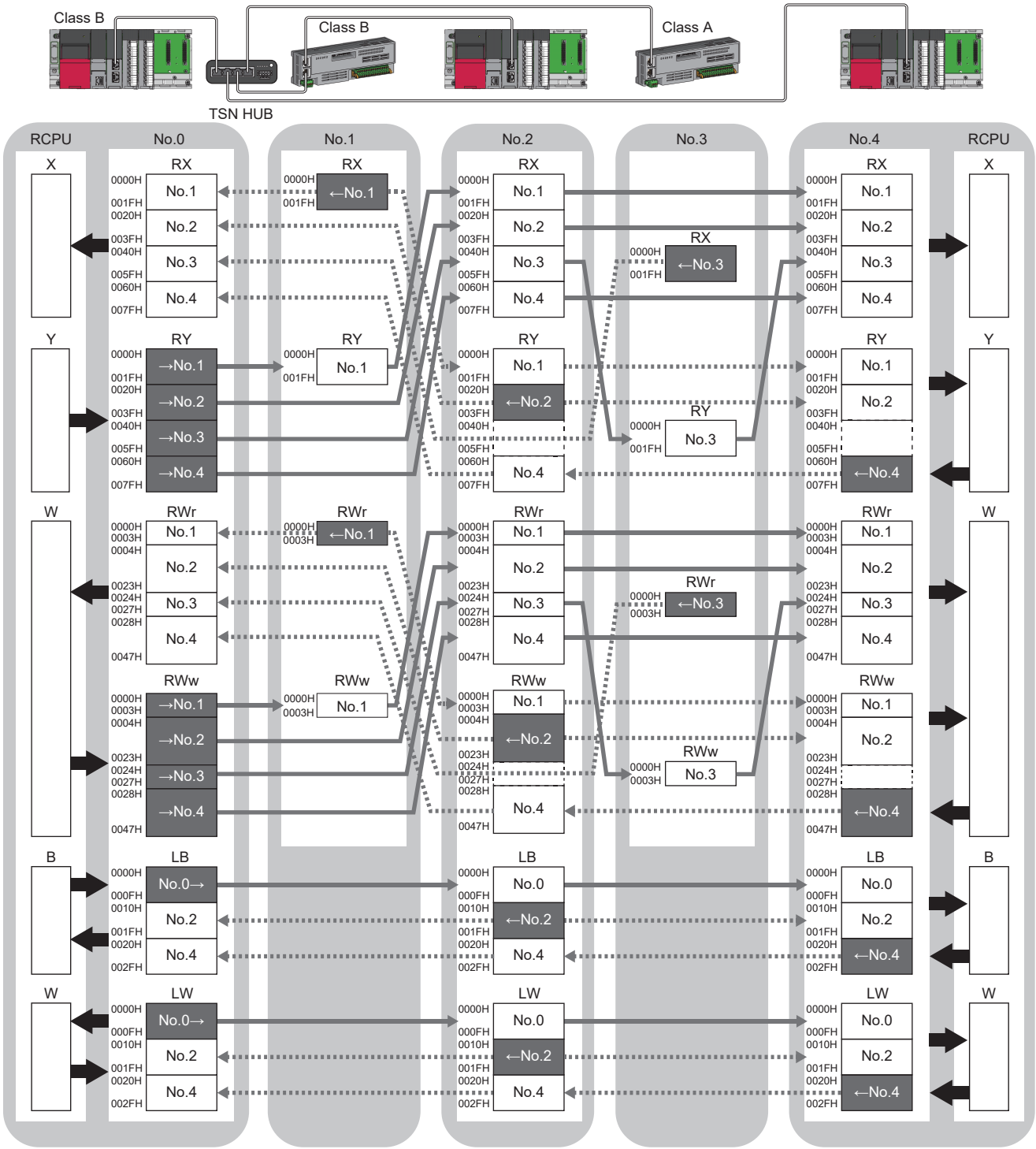
■Unicast mode



No.0, No.1, No.2, No.3, No.4: station No.0 (master station), station No.1, station No.2, station No.3, station No.4
→No.1, →No.2, →No.3, →No.4: Send range: to station No.1, send range: to station No.2, send range: to station No.3, send range: to station No.4
←No.1, ←No.2, ←No.3, ←No.4: Send range: from station No.1, send range: from station No.2, send range: from station No.3, send range: from station No.4
No.0→: Send range: to station No.2 and station No.4
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Multicast mode

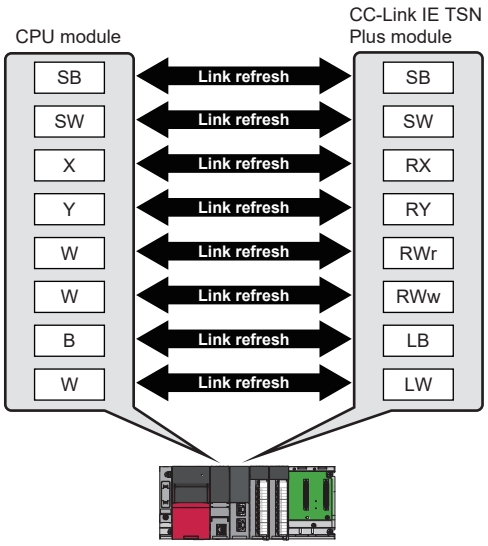
The CC-Link IE TSN Class A local station communicates data in the same communication range as the CC-Link IE TSN Class B local station.



No.0, No.1, No.2, No.3, No.4: station No.0 (master station), station No.1, station No.2, station No.3, station No.4
→No.1, →No.2, →No.3, →No.4: Send range: to station No.1, send range: to station No.2, send range: to station No.3, send range: to station No.4
←No.1, ←No.2, ←No.3, ←No.4: Send range: from station No.1, send range: from station No.2, send range: from station No.3, send range: from station No.4
No.0→: Send range: to station No.2 and station No.4
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

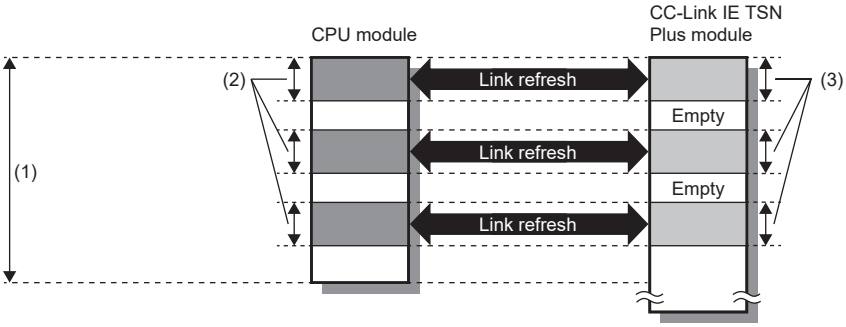
Link refresh

Automatically transfers data between a device in the CC-Link IE TSN Plus module and a device in a CPU module.



Concept of the link refresh range (number of points)

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



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

Shortening the transmission delay time

The transmission delay time can be shortened by reducing the number of link refresh points and shortening a communication cycle interval. (☞ Page 568 Communication cycle intervals)
The following methods can be used to reduce the number of link refresh points.

- In "Refresh Settings" under "Basic Settings", set only the link devices frequently used in the CPU module as the link refresh range. (☞ Page 77 Refresh Setting)
- Remove infrequently used link devices in the CPU module from the link refresh range, and directly read or write the corresponding data from the program by direct access. (☞ Page 169 Direct access to link devices)

Point

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

Setting method

The link refresh is assigned in "Refresh Settings" under "Basic Settings". (☞ Page 77 Refresh Setting)

Precautions

■Latched devices of the CPU module

If data in latched devices of the CPU module are cleared to 0 on a program when the CPU module is powered off and on or reset, the data may be output without being cleared to 0, depending on the timing of the cyclic data transfer processing and link refresh.

CPU module device	How to disable the device data
Latch relay (L), file register (R, ZR)	The device value is cleared to 0 by using the initial device value of the CPU module.*1
CPU module device within the latch range	Delete all the latch range settings specified in "Latch Interval Operation Setting" under "Device Latch Interval Setting" in "Memory/Device Setting" of "CPU Parameter".

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

Direct access to link devices

Directly reads or writes the corresponding data from/to link devices of the CC-Link IE TSN Plus module using the program.

Specify a link device as the link direct device (J□\□) for direct access.

The link special relay (SB) and link special register (SW) can be set using module label. (☞ Page 491 Module Label)

Specification method

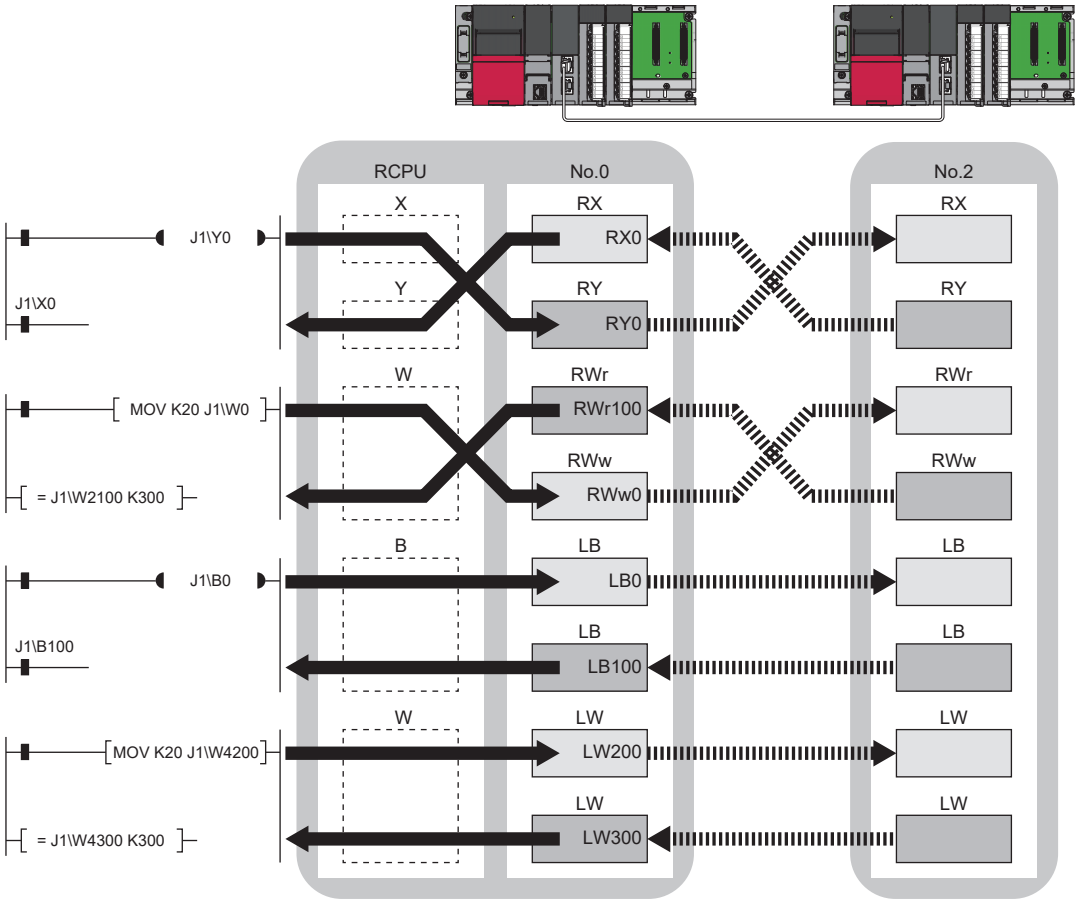
Specify the network number and the link devices of the CC-Link IE TSN Plus module for reading or writing data.

J□\□
(1) (2)

(1) Network number: 1 to 239

(2) Remote input (RX): X0 to X3FFF
Remote output (RY): Y0 to Y3FFF
Remote register (RWw): W0 to W1FFF
Remote register (RWr): W2000 to W3FFF
Link relay (LB): B0 to B7FFF
Link register (LW): W4000 to W7FFF
Link special relay (SB): SB0 to SBFFF
Link special register (SW): SW0 to SWFFF

Ex.



Readable and writable range

Data can be read or written from/to the CC-Link IE TSN Plus module on the base unit where the CPU module is mounted.

■Read

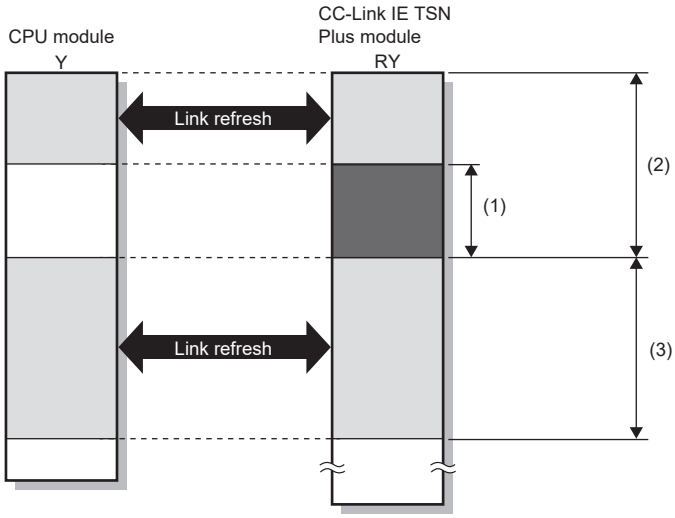
All link devices of the CC-Link IE TSN Plus module can be specified. (☞ Page 169 Specification method)

■Write

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

- Area where data is sent to other stations and outside the link refresh range (☞ Page 157 Communications using RX, RY, RWr, and RWw)
- Within the range of the link device of the CC-Link IE TSN Plus module (☞ Page 169 Specification method)

Ex.



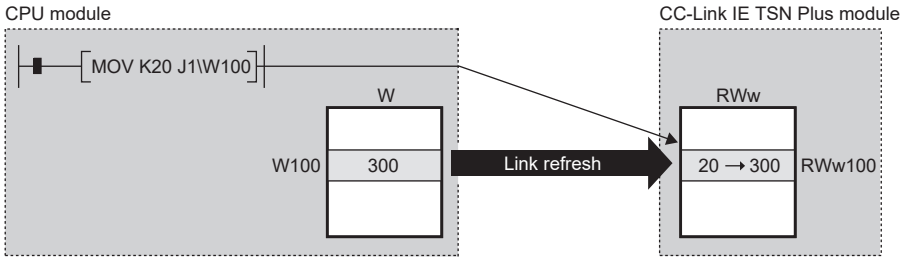
(1) Out of the link refresh range (Data can be written here.)
(2) Area where data is sent to other stations
(3) Area for receiving data from other stations

Point

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

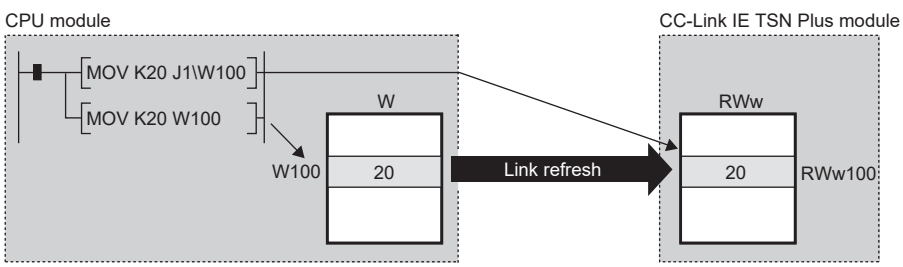
- Bad example (Directly accessing the link refresh target only)

Link refresh overwrites the value.



- Good example (Directly accessing the link device as well as writing the same data to the device of the CPU module)

The value written by the direct access is reflected.



Differences from link refresh

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

*1 For the instruction processing time when the link direct device (J□\□) is used, refer to the following.
MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)

Shortening the transmission delay time

The transmission delay time can be shortened by reducing the number of link refresh points and shortening a communication cycle interval. (☞ Page 568 Communication cycle intervals)

The following methods can be used to reduce the number of link refresh points.

- In "Refresh Settings" under "Basic Settings", set only the link devices frequently used in the CPU module as the link refresh range. (☞ Page 77 Refresh Setting)
- Remove infrequently used link devices in the CPU module from the link refresh range, and directly read or write the corresponding data from the program by direct access.

Point

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

Precautions

■Cyclic data assurance

The direct access to link devices does not provide station-based block data assurance. Use 32-bit data assurance, or if cyclic data of more than 32 bits needs to be assured, use interlock programs. (☞ Page 172 Cyclic data assurance)

■Mounting multiple modules of the same network number

When multiple CC-Link IE TSN Plus modules of the same network number are mounted, the target of the direct access to link devices is the module that has the smallest slot number in the base unit.

■Link direct device in a multiple CPU system

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

Cyclic data assurance

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

○: Assured, ×: Not assured

Method	Description	Link refresh	Direct access to link devices	Access to buffer memory
32-bit data assurance	Assures data in 32-bit units. Data is automatically assured by satisfying assignment conditions of link devices.	○	○	○
Station-based block data assurance	Assures data in station-based units. Data is assured by enabling the station-based block data assurance in the parameter setting.	○	×	×
Interlock program	Assures data of more than 32 bits. Data is assured by configuring interlocks on programs.	○	○	○

Point

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

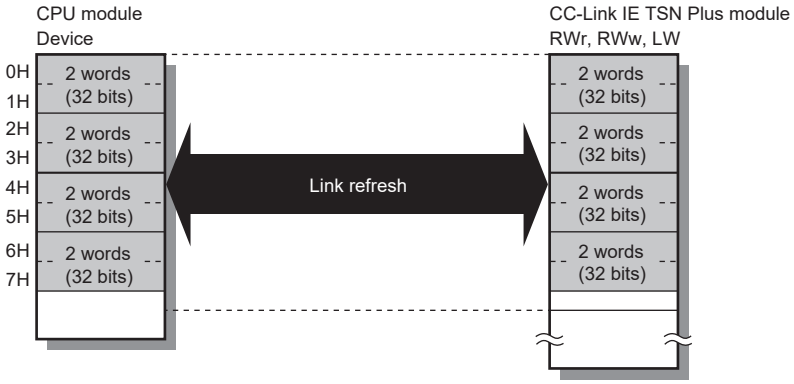
32-bit data assurance

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

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

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

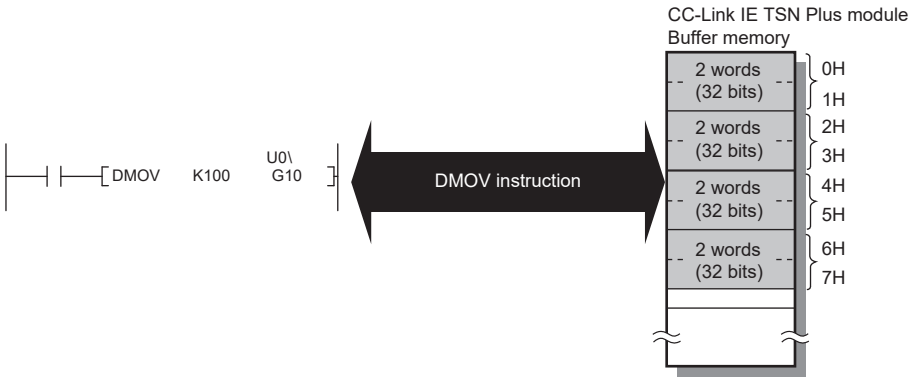
- The start device number of RWr, RWw, and LW is a multiple of 2
- The number of points assigned to RWr, RWw, and LW is a multiple of 2.



■Data assurance at the time of access to buffer memory

The 32-bit data can be assured by satisfying the following conditions:

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



Station-based block data assurance

Cyclic data is assured for each station by handshake between the CPU module and the CC-Link IE TSN Plus module for a link refresh. The link device is assured as follows.

- RX, RY, RWw, and RWr data are assured for each station
- LB and LW data are assured for each station

■Setting

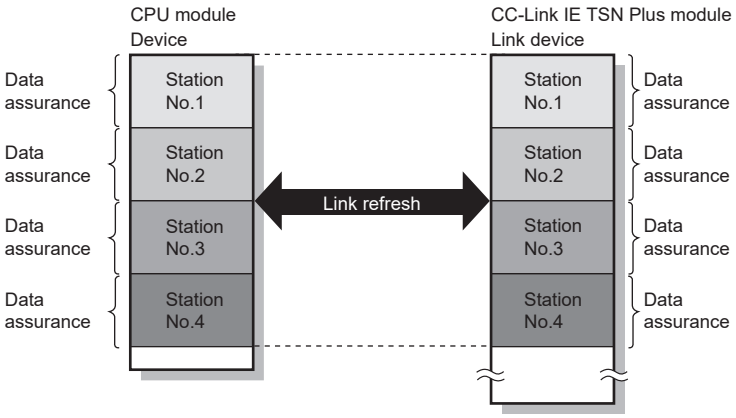
Set station-based block data assurance under "Supplementary Cyclic Settings" in "Application Settings" of the master station.

(☞ Page 85 Supplementary Cyclic Settings)

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

■Access to link devices

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



■Precautions

RX, RY, RWw, and RWr data cannot be assured for each station with LB and LW data.

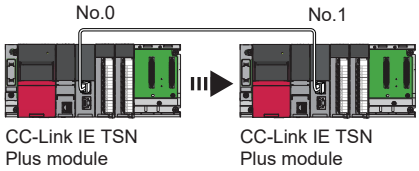
Interlock program

Data of more than 32 bits can be assured without using the station-based block data assurance setting. Use either of the following methods:

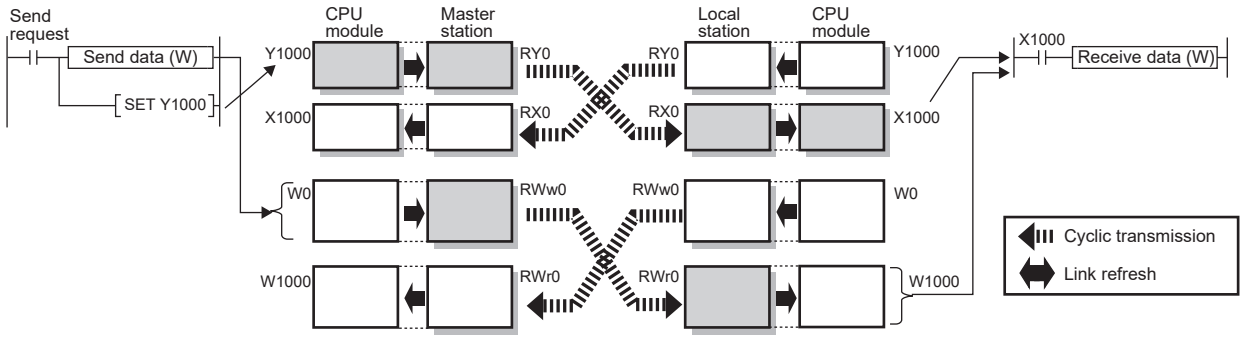
- Data assurance by handshake of the remote I/O
- Data assurance by handshake of the remote register
- Data assurance by handshake of the link relay

■Data assurance by handshake of the remote I/O

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



- Data flow

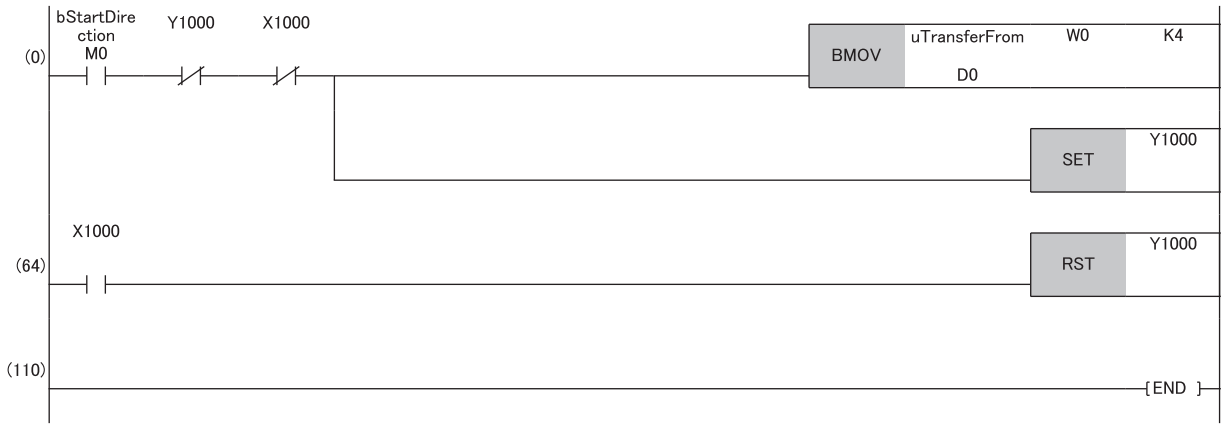


- Program

Sending station: Master station (station No.0)

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

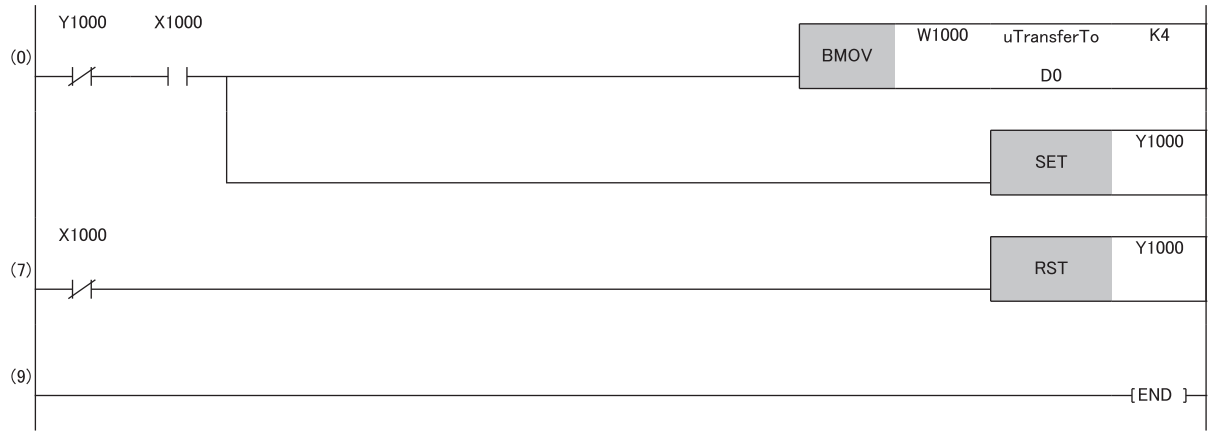
	Label Name	Data Type		Class	Assign (Device/Label)
1	bStartDirection	Bit	...	VAR_GLOBAL	M0
2	uTransferFrom	Word [Signed]	...	VAR_GLOBAL	D0



Receiving station: Local station (station No.1)

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

	Label Name	Data Type		Class	Assign (Device/Label)
1	uTransferTo	Word [Signed]	...	VAR_GLOBAL	D0

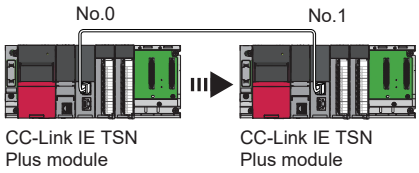


- Program flow

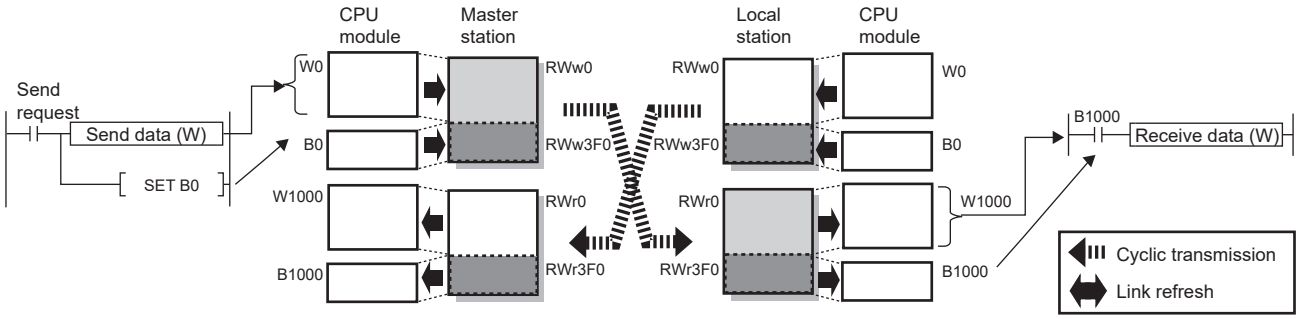
❶ The master station checks that the send request bStartDirection (M0) is turned on, and transfers contents of uTransferFrom [0] to [3] (D0 to D3) to the send data W0 to W3.
❷ When the transfer is completed, the master station turns on Y1000.
❸ The local station checks that X1000 is turned on, and transfers contents of the receive data W1000 to W1003 to uTransferTo [0] to [3] (D0 to D3).
❹ When the transfer is completed, the local station turns on Y1000.
❺ The master station checks that X1000 is turned on, and turns off Y1000.
❻ The local station checks that X1000 is turned off, and turns off the reception complete signal Y1000.

■Data assurance by handshake of the remote register

An example of sending data in W0 to W3 of the master station (station No.0) to W1000 to W1003 of the local station (station No.1) is shown below. (B0 and B1000 are used for a handshake to the CPU module.)



• Data flow

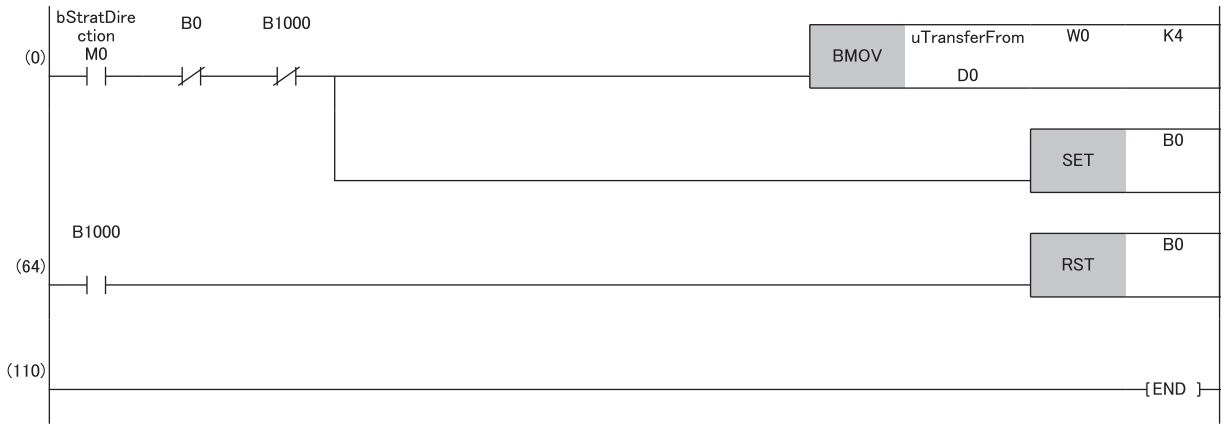


• Program

Sending station: Master station (station No.0)

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

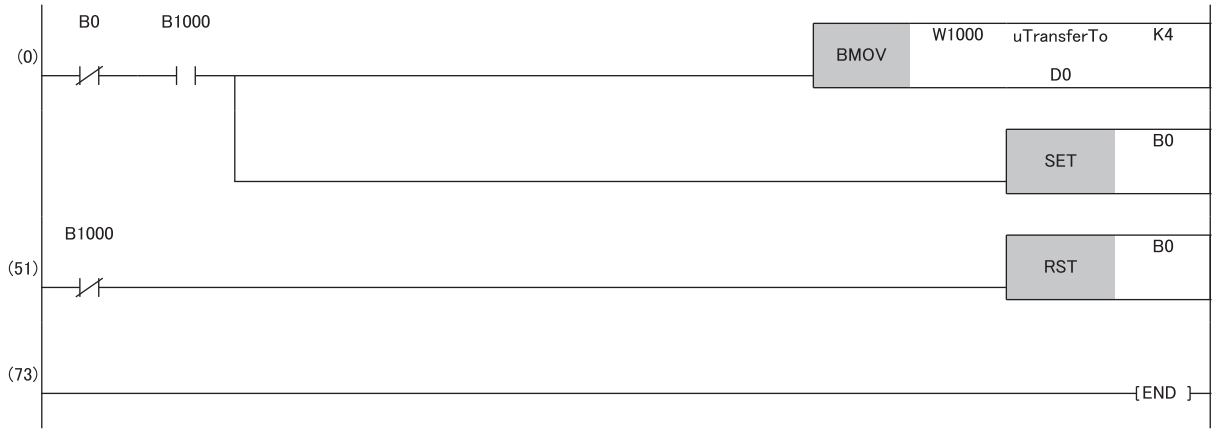
	Label Name	Data Type		Class	Assign (Device/Label)
1	bStratDirection	Bit	...	VAR_GLOBAL	M0
2	uTransferFrom	Word [Signed]	...	VAR_GLOBAL	D0



Receiving station: Local station (station No.1)

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

	Label Name	Data Type		Class	Assign (Device/Label)
1	uTransferTo	Word [Signed]	...	VAR_GLOBAL	D0



- Program flow

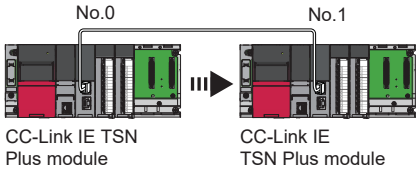
❶ The master station checks that the send request bStartDirection (M0) is turned on, and transfers contents of uTransferFrom [0] to [3] to the send data W0 to W3.
❷ When the transfer is completed, the master station turns on B0.
❸ The local station checks that B1000 is turned on, and transfers contents of the receive data W1000 to W1003 to uTransferTo [0] to [3] (D0 to D3).
❹ When the transfer is completed, the local station turns on B0.
❺ The master station checks that B1000 is turned on, and turns off B0.
❻ The local station checks that B1000 is turned off, and turns off B0.

■Data assurance by handshake of the link relay

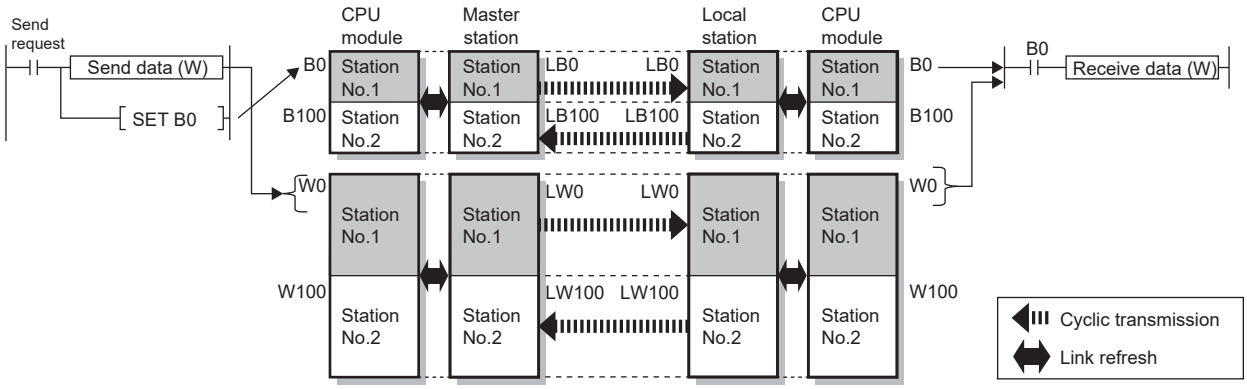
In communications using LB and LW, the link relay (LB) is sent after the link register (LW). Therefore, data inconsistency of the link register (LW) can be prevented by handshake in the data of the link relay (LB).

The following shows the program example when 'Cyclic data (station No.0)' (W0 to W3) of the master station is sent to 'Cyclic data (station No.1)' (W0 to W3) of the local station.

A handshake is established by turning on 'Handshake (station No.0)' (B0) of the master station and turning on 'Handshake (station No.1)' (B100) of the local station after the send data has been stored.



• Data flow

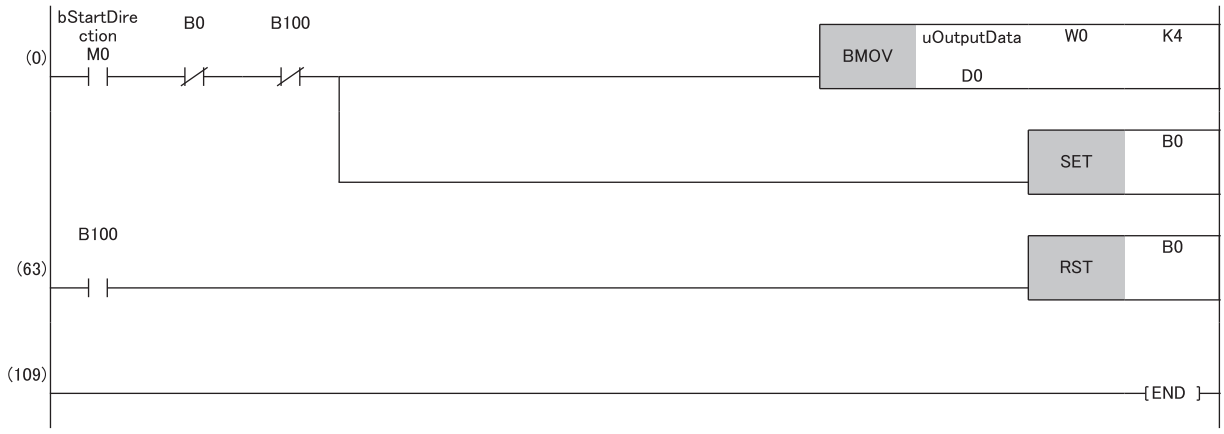


• Program

Sending station: Master station (station No.0)

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

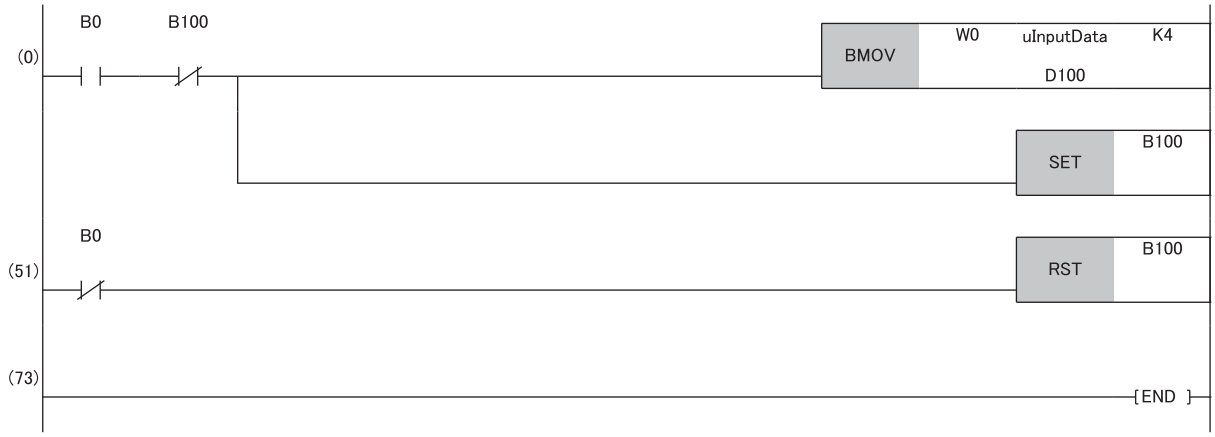
	Label Name	Data Type		Class	Assign (Device/Label)
1	bStartDirection	Bit	...	VAR_GLOBAL	M0
2	uOutputData	Word [Signed]	...	VAR_GLOBAL	D0



Receiving station: Local station (station No.1)

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

	Label Name	Data Type		Class	Assign (Device/Label)
1	uInputData	Word [Signed]	...	VAR_GLOBAL	D100



- Program flow

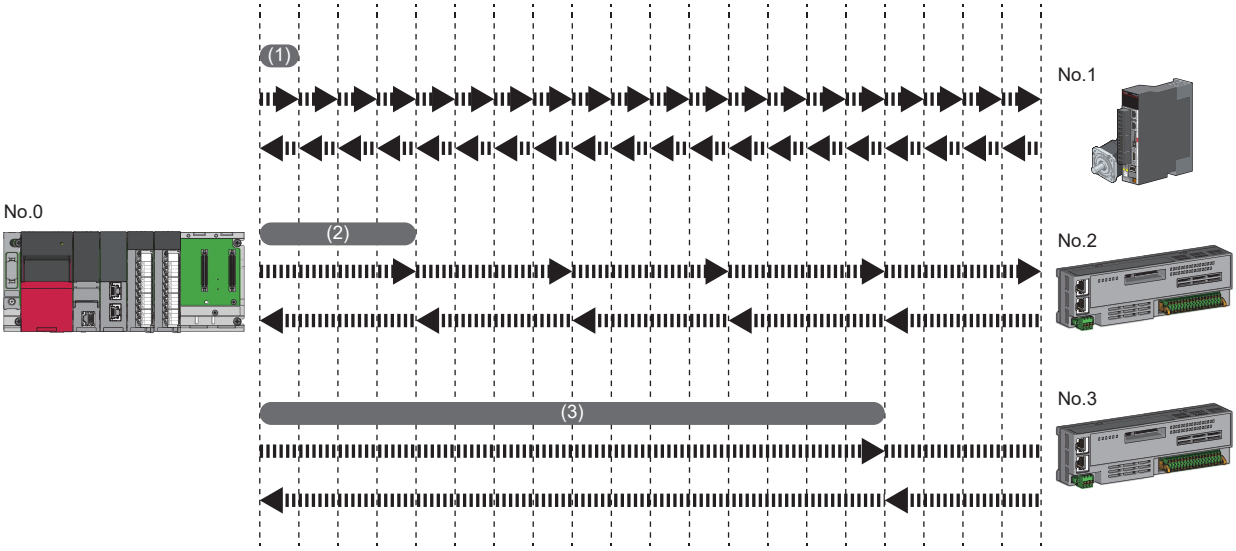
❶ The master station checks that the send request bStartDirection (M0) is turned on, and transfers contents of uOutputData [0] to [3] to the send data W0 to W3.
❷ When the transfer is completed, the master station turns on B0.
❸ The local station checks that B0 is turned on, and transfers contents of the receive data W0 to W3 to uInputData [0] to [3] (D100 to D103).
❹ When the transfer is completed, the local station turns on B100.
❺ The master station checks that B100 is turned on, and turns off B0.
❻ The local station checks that B0 is turned off, and turns off B100.

Communication cycles coexistence

When device stations with different communication cycles are included in the network, multiple communication cycles according to each device station are used for communications.

The time for each communication cycle is the total time of cyclic transmission, transient transmission, and system reservation time.

Even if device stations with different communication cycles are connected to a network, a device station with a high-speed communication cycle is not affected by a device station with a low speed.



(1) Basic cycle
(2) Normal speed
(3) Low speed (for "×16")

Setting method

The master station communicates with device stations by using three communication cycles that are the basic cycle under "Basic Period Setting", and "Normal-Speed" and "Low-Speed" under "Multiple Period Setting". (☞ Page 80 Communication Period Setting)

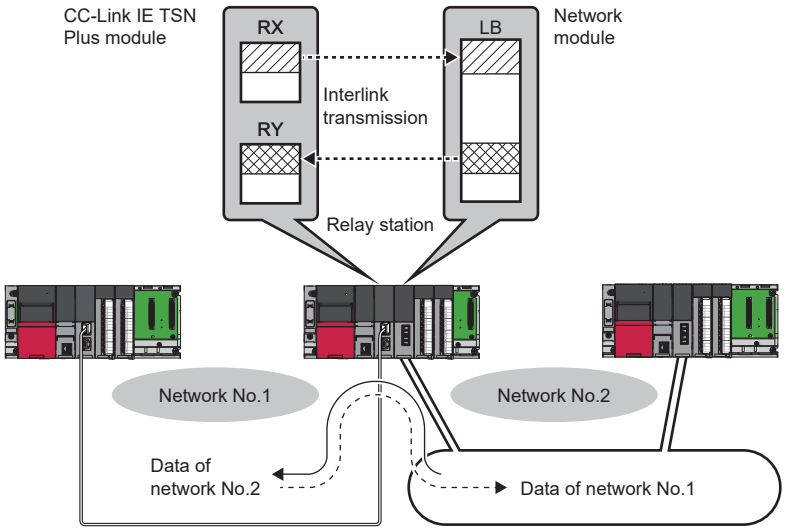
The communication cycle of each device station can be selected from "Basic Period", "Normal-Speed", or "Low-Speed" in "Network Configuration Settings" under "Basic Settings".

Precautions

When "Communication Mode" under "Application Settings" is set to "Multicast", set "Communication Period Setting" for the local station in "Network Configuration Settings" to "Basic Period".

Interlink transmission

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



Setting method

Set interlink transmission in "Interlink Transmission Settings" in "Application Settings". (☞ Page 87 Interlink Transmission Settings)

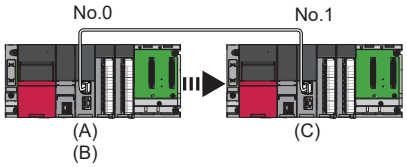
I/O maintenance settings

When using cyclic transmission, set whether to hold or clear output on the sending side or input on the receiving side by using the following setting of (A), (B), or (C). (☞ Page 85 Supplementary Cyclic Settings)

- Setting on sending side (A): "Output Mode upon CPU Error" for if a stop error occurred in the CPU module on the sending side
- Setting on sending side (B): "Output Hold/Clear Setting during CPU STOP" for if the status of the CPU module on the sending side is changed from RUN to STOP
- Setting on receiving side (C): "Data Link Faulty Station Setting" for if the sending side is disconnected

[Application Settings] ⇨ [Supplementary Cyclic Settings] ⇨ [I/O Maintenance Settings]

Input data hold/clear operation on the receiving side



■If a CPU module stop error occurred on the sending side

- If both settings (A) and (B) on the sending side are "Hold", input data on the receiving side is held.
- If setting (A) or (B) on the sending side is "Clear", input data on the receiving side is cleared. (The sending side sends the data cleared to 0.)

■If the CPU module on the sending side is changed from RUN to STOP

- If setting (B) on the sending side is "Hold", input data on the receiving side is held.
- If setting (B) on the sending side is "Clear", input data on the receiving side is cleared. (The sending side sends the data cleared to 0.)

■If the sending side is disconnected

- If setting (C) on the receiving side is "Hold", input data from before disconnection is held on the receiving side.
- If setting (C) on the receiving side is "Clear", input data on the receiving side is cleared.

Devices where hold/clear settings are enabled

The following table and figure show devices for which the settings on the sending side (A)(B) and the setting on the receiving side (C) are enabled.

Setting to	Setting items	Hold/clear settings are enabled	Hold regardless of setting	Clear regardless of setting
Setting on sending side (A)	Output mode upon CPU error	• Master station RY • Local station RY (only the output data from the own station)	—	—
Setting on sending side (B)	Output hold/clear setting during CPU STOP	• Master station RY (if the link refresh source device is other than Y) • Local station RY (only the output data from the own station, and if the link refresh source device is other than Y)	• Master station RWw • Local station RWw (only the output data from the own station) • LB (only the output data from the own station) • LW (only the output data from the own station)	• Master station RY (if the link refresh source device is Y) • Local station RY (only the output data from the own station, and if the link refresh source device is Y)
Setting on receiving side (C)	Data link faulty station setting	• Master station RX • Local station RX • Local station RY (only the input data from other stations)	• Master station RWr • Local station RWr • Local station RWw (only the input data from other stations) • LB (only the input data from other stations) • LW (only the input data from other stations)	—

Precautions

■When "Output Hold/Clear Setting during CPU STOP" is set to "Clear"

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

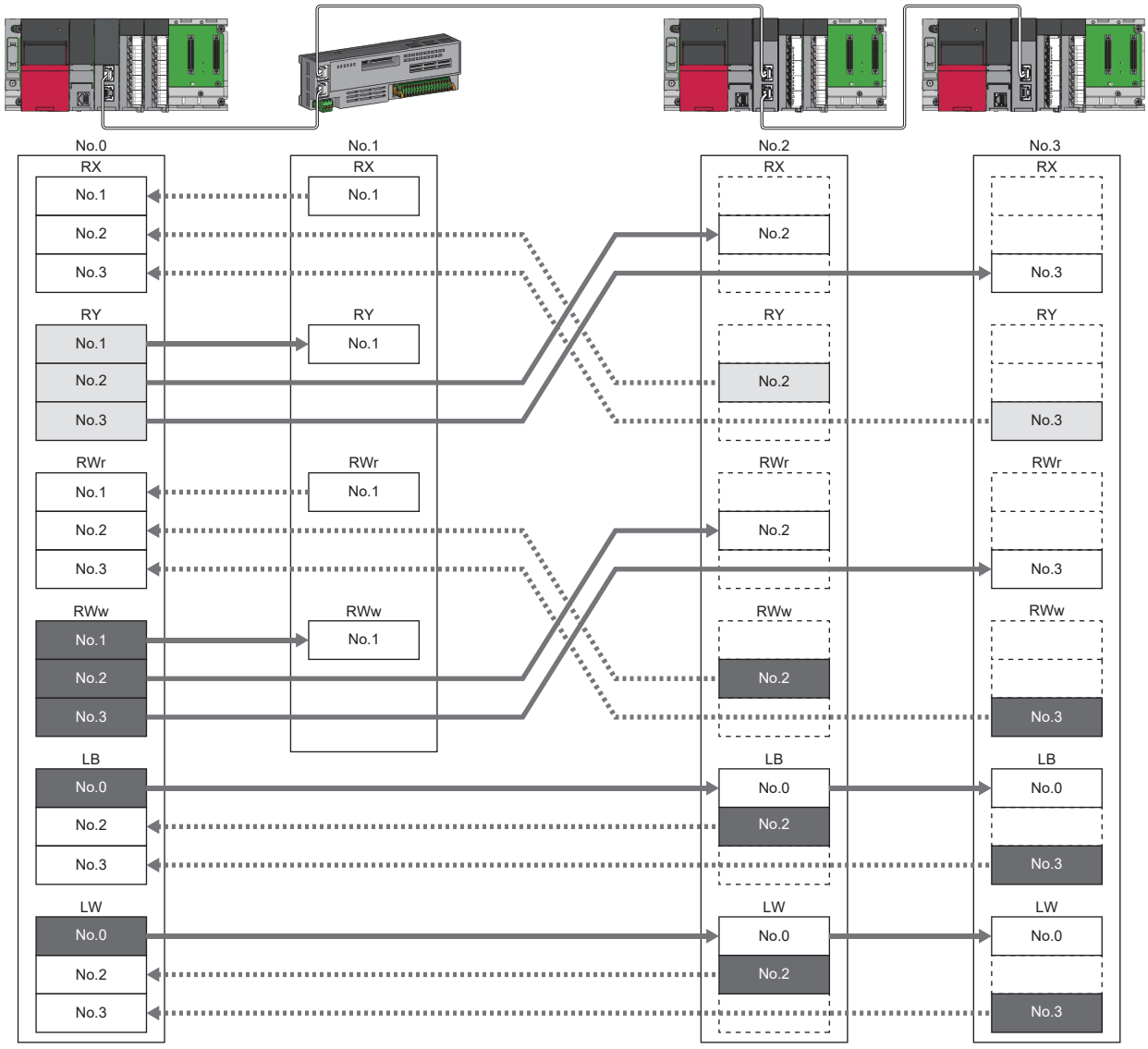
■When the direct access to link devices

The output varies according to the setting of "Output Hold/Clear Setting during CPU STOP".

Output data hold/clear operation during CPU STOP

The following shows the devices where the setting of "Output Hold/Clear Setting during CPU STOP" is enabled when the CPU module on the sending side changes from RUN to STOP.

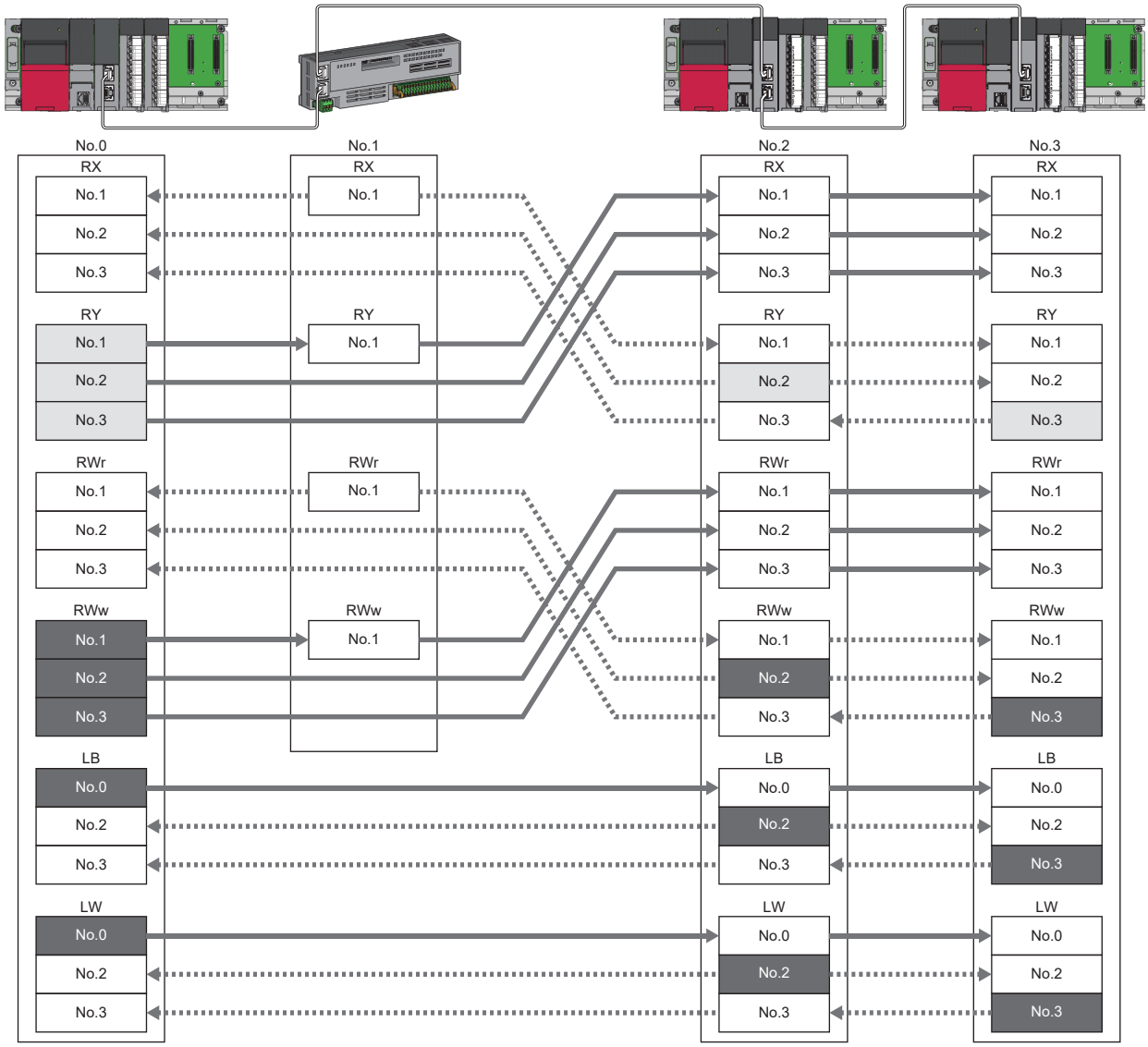
■Unicast mode



When the link refresh source is set to other than Y, data is held or cleared according to the parameter setting. When the link refresh source is set to Y, data is cleared regardless of the parameter setting.

Data is held regardless of the parameter setting.

■Multicast mode



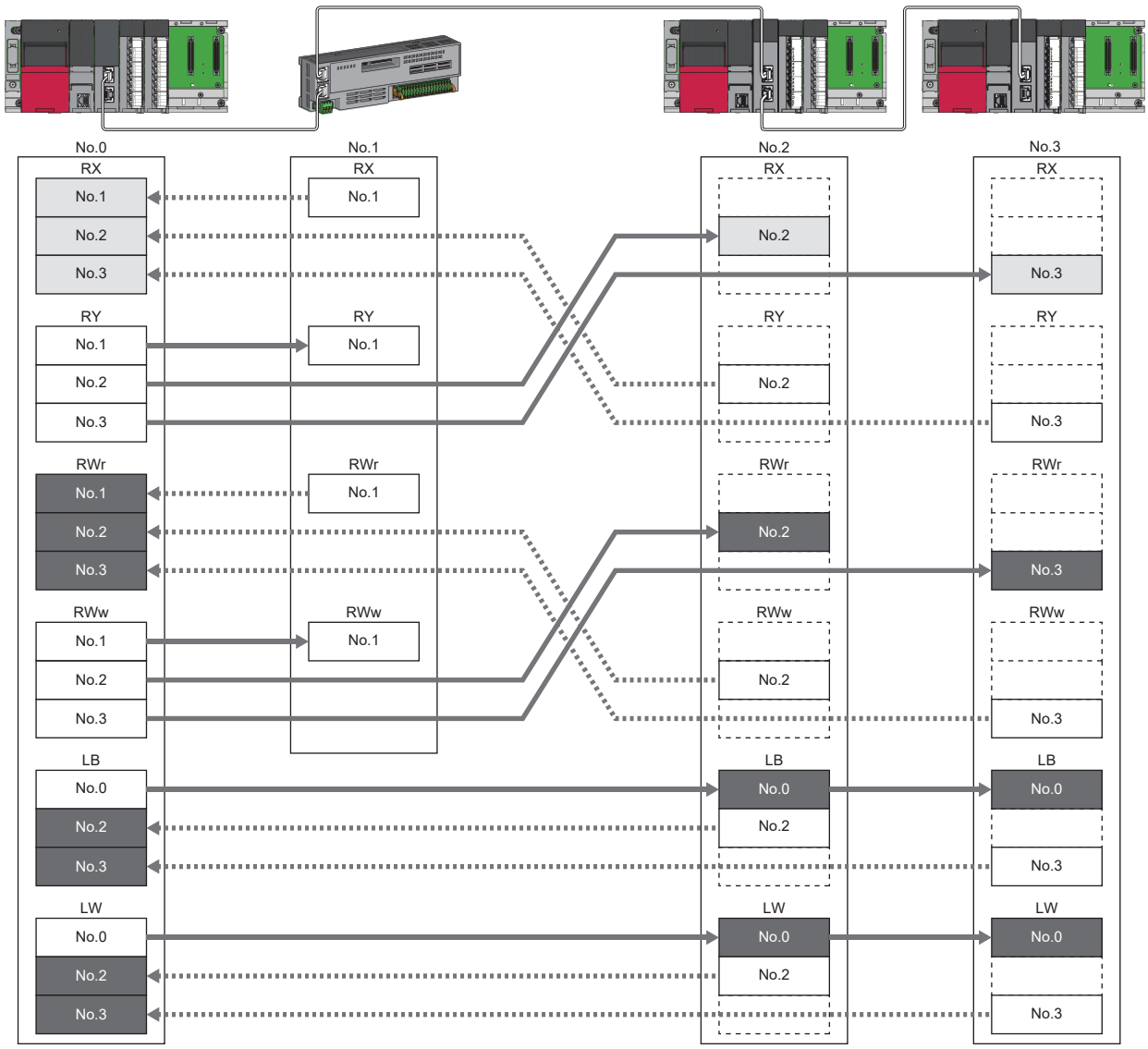
When the link refresh source is set to other than Y, data is held or cleared according to the parameter setting. When the link refresh source is set to Y, data is cleared regardless of the parameter setting.

Data is held regardless of the parameter setting.

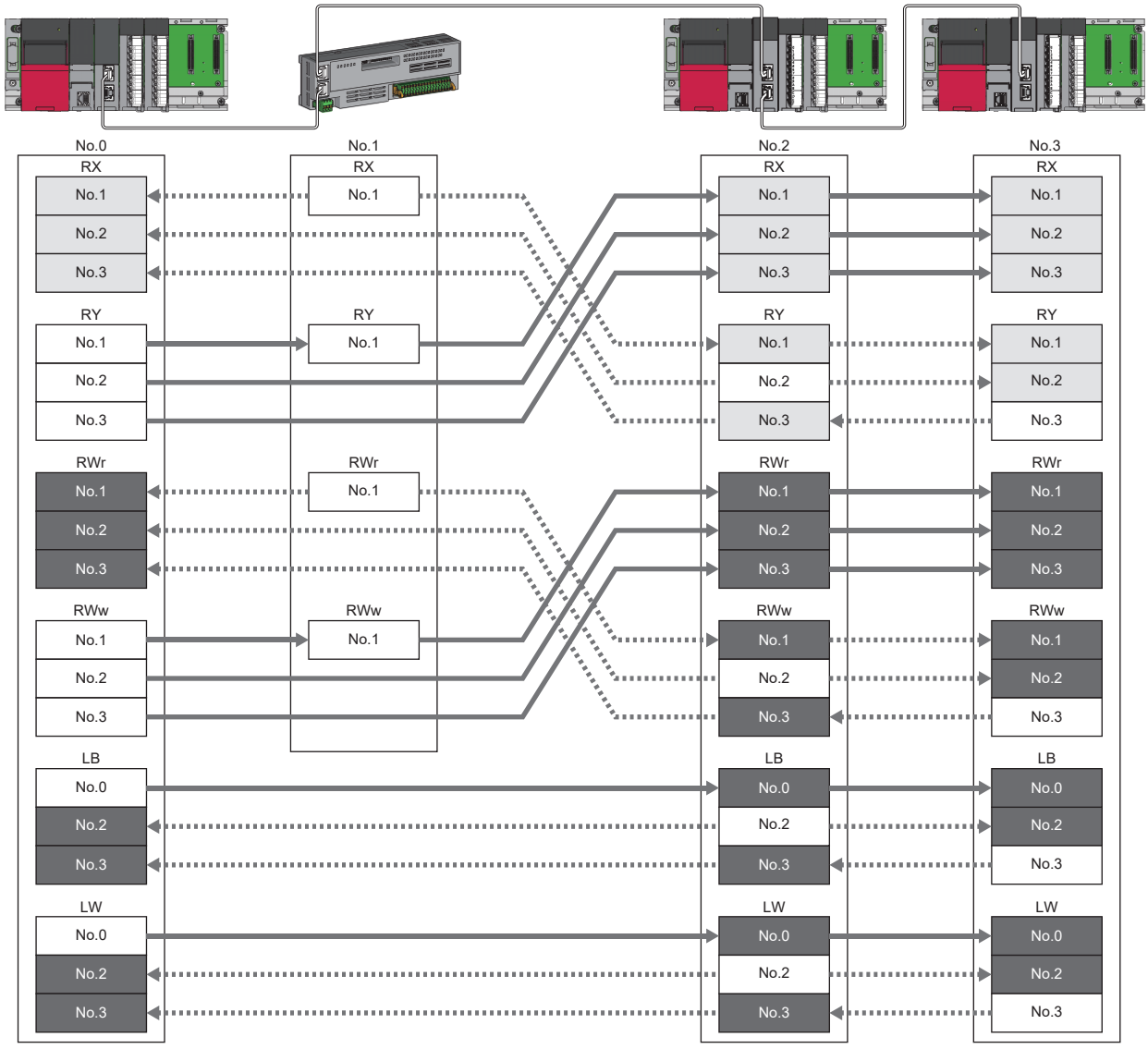
Input data hold/clear operation from the data link faulty station

The following shows the devices where "Data Link Error Station Setting" is enabled when each station becomes faulty.

■Unicast mode



■Multicast mode



Devices that are held or cleared according to the parameter setting
Devices that are held regardless of the parameter setting

Remote device test

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

Output hold/clear setting during CPU STOP

The following shows the current value of RY when "Output Hold/Clear Setting during CPU STOP" is set to "Clear".

- When the remote device test is disabled ('Remote device forced output request' (SB0016) is off): The current value of RY is cleared.
- When the remote device test is enabled ('Remote device forced output request' (SB0016) is on): The current value of RY is output and can be checked.

■Output value in the remote station when the remote device test is enabled

The following table lists outputs in the remote station according to the operating status of the CPU module.

Operating status of the CPU module on the master station	Output Hold/Clear Setting during CPU STOP of the CPU module on the master station	Setting of the output HOLD/CLEAR setting function on the remote station	Remote station output*1
RUN or PAUSE	Hold	Hold	Current value of RY
		Clear	
	Clear	Hold	
		Clear	
RUN → STOP	Hold	Hold	
		Clear	
	Clear	Hold	
		Clear	
When a stop error occurs	Hold	Hold	Fixed to the value prior to STOP
		Clear	Fixed to 0
	Clear	Hold	Fixed to the value prior to STOP
		Clear	Fixed to 0

*1 The output of the remote station is RWw for the CC-Link IE TSN digital-analog converter module. RWw is also not fixed to 0, but output with an offset value.

Setting method

Execute the remote device test according to the following procedure.

1. Set the RUN/STOP/RESET switch to the STOP position of the CPU module.
2. Turn on the 'Remote device forced output request' (SB0016) to start the remote device test.
3. Check that the 'Remote device forced output request accept' (SB0086) and 'Remote device forced output status' (SB0087) are on. (In addition, check that the 'Remote device forced output result' (SW025A) is 0 (no error).)
4. Check by turning on or off the output of the remote station.
5. Turn off the 'Remote device forced output request' (SB0016) to end the remote device test.

Point

After starting the remote device test, errors can be checked by the 'Remote device forced output result' (SW025A).
If an error has occurred, the error code is stored. Take actions according to the error code. (☞ Page 433 Error Codes When a Module Error Occurs)

Precautions

■Conditions

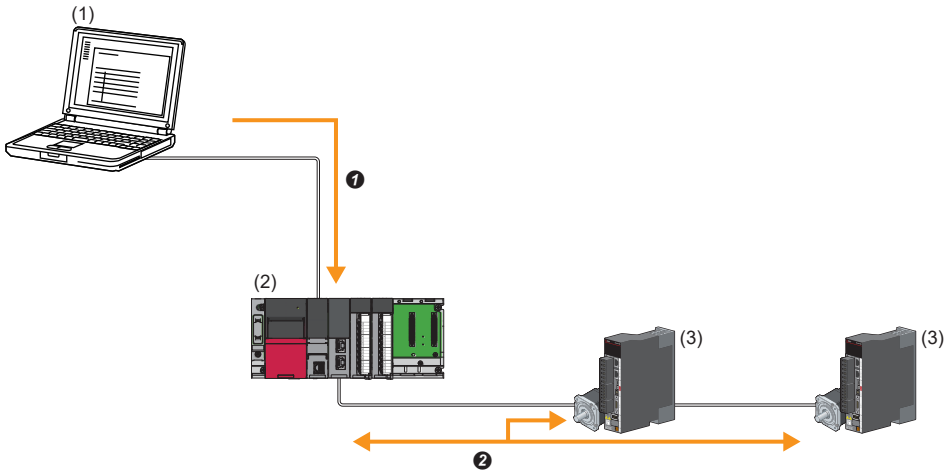
- The remote device test does not start even if the 'Remote device forced output request' (SB0016) is turned on while the CPU module is in RUN or PAUSE state.
- Even if the CPU module is changed to STOP state after the 'Remote device forced output request' (SB0016) is turned on, the remote device test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

■Output HOLD/CLEAR setting function

- During the remote device test, the output HOLD/CLEAR setting function of the remote station is disabled, and the output of the remote station is turned on or off by the master station. The output HOLD/CLEAR setting function is also disabled for all remote stations including the remote station whose output is to be turned on or off.
- If a stop error occurs in the CPU module during the remote device test, the test ends and the data is output from the remote station according to the output HOLD/CLEAR setting function.

CANopen communications

CANopen communications are used for controlling a device that supports the CANopen profile.
CANopen communications have SDO communication using transient transmission and PDO communication using cyclic transmission for devices that support the CANopen profile. SDO communication is performed using the SLMPSND instruction. For details on the SLMPSND instruction, refer to the following.
📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions)
Parameters for PDO communications are defined by the PDO mapping and the settings are specified in "Batch Setting of PDO Mapping" or "PDO Mapping Setting".



(1) Engineering tool
(2) CC-Link IE TSN Plus module
(3) Servo amplifier
❶ Writing PDO mapping settings
❷ PDO communications

Setting method

Set "Batch Setting of PDO Mapping" or "PDO Mapping Setting" in "Network Configuration Setting" of "Basic Settings". (☞ Page 109 PDO mapping setting)

Precautions

■Motion control station

Do not set a device station as the motion control station. Doing so results in a Parameter error (motion control station setting) (error code: D64EH).

■PDO mapping setting

When a servo amplifier is added to the device station in "Network Configuration Setting" of "Basic Settings", set the parameters of "PDO Mapping Setting".

■Multi-axis servo amplifier

For a multi-axis servo amplifier, single module can use up to eight axes.

9.3 Transient Transmission

Transient transmission is used for communications at any timing and has the following three types.

☞ Page 190 Communications using a dedicated instruction
☞ Page 190 Communications using the SLMP
☞ Page 191 Communications using the engineering tool

Communications using a dedicated instruction

Data is read/written from the master station or local station to devices in a CPU module of the local station or the buffer memory areas of a remote station using the dedicated instructions.

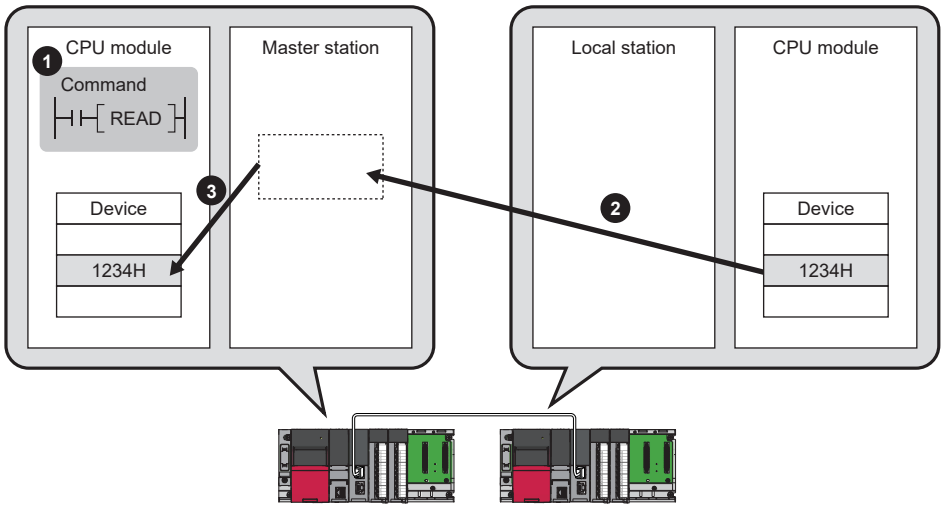
For dedicated instructions that can be used and details on dedicated instructions, refer to the following.

☞ Page 226 DEDICATED INSTRUCTION

📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

Ex.

Accessing a local station using the dedicated instruction (READ instruction)



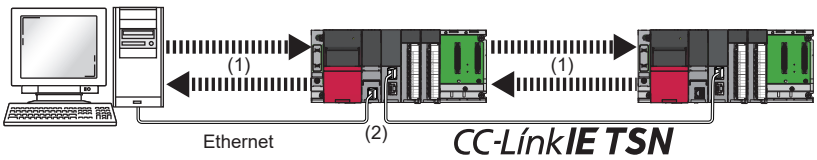
Communications using the SLMP

Data is read/written from the CC-Link IE TSN Plus module and the external device, such as a personal computer, to devices in the CPU module of the master station and local station and the buffer memory areas of the remote station via an SLMP.

It allows seamless communications with stations on different types networks.

The CC-Link IE TSN Plus module can send/receive (1) and relay (2) SLMP messages. For details on an SLMP, refer to the following.

📖 SLMP Reference Manual

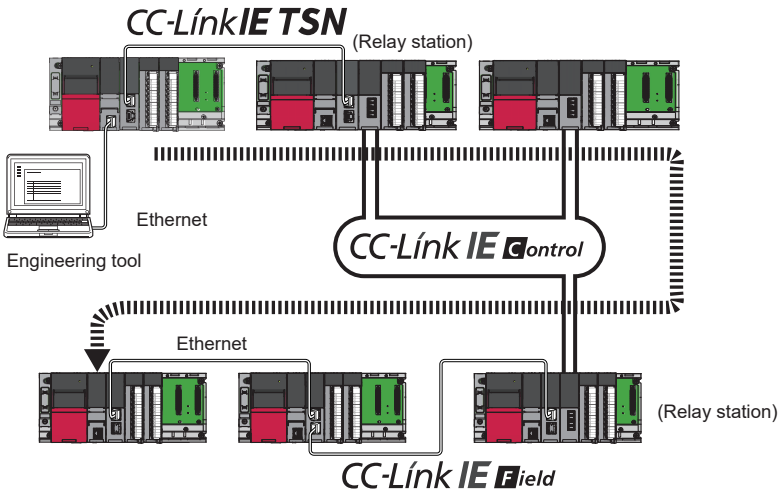


Precautions

For SLMP communications, set the same communication speed for the connected station and access destination. When different communication speeds are set for the connected station and access destination, SLMP communication may not be possible.

Communications using the engineering tool

This type of communications are used to configure the settings of or monitor each station using the engineering tool.
It allows seamless communications with stations on different types networks.



Point

Communications can be made with stations up to eight networks apart (number of relay stations: 7).

When the networks consist of only MELSEC iQ-R series

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

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

■Setting method

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

Point

- Communication paths are automatically set, but they can also be manually set. (☞ Page 192 When the networks consist of MELSEC iQ-R series and other series)
- The communication path cannot be set automatically for Ethernet-equipped modules connected via a router. Set the communication path manually. (☞ Page 192 When the networks consist of MELSEC iQ-R series and other series)

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

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

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

■Setting method

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

Communication test

This test checks if transient transmission data can be properly routed from the own station to the communication target. (☞ Page 408 Communication Test)

9.4 Ethernet Connection

This type of connection allows one module to be connected to an Ethernet device without interfering with CC-Link IE TSN.

Connection with MELSOFT product

Programming and monitoring of the programmable controller are performed via Ethernet.
This function enables remote control using long-distance connectivity and high-speed communications via Ethernet.
This section describes the methods of connecting the CC-Link IE TSN Plus module to MELSOFT products (such as engineering tool and MX Component).
○: Connection available, ×: Connection not available

Connection method	Purpose	Availability	Reference
		MELSOFT products	
Connection via a hub (Connection by specifying the IP address)	To connect multiple MELSOFT products	○	Page 193 Connection via a hub
Connection via a hub (Connection by specifying the network number and station number)		○	

Restriction

- The station with a communication speed different from the station connected to the engineering tool cannot be connected by specifying other station. The online and debug function of the engineering tool may not be used.
- When a MELSOFT product is connected via the CC-Link IE TSN Plus module, a connection cannot be established if another CC-Link IE TSN Plus module to which the same network number is set is mounted on the same base unit (main base unit and extension base unit) as the CC-Link IE TSN Plus module used for the connection.
- This function cannot be used when an Ethernet device is connected to the P2 side of the CC-Link IE TSN Plus module.

Applicable connections

The system dedicated connection that is used is the MELSOFT transmission port (UDP/IP) or the MELSOFT transmission port (TCP/IP).
For details on the port number to be used and the number of simultaneous open connections (maximum number of connections), refer to the following.

- Port number: ☞ Page 593 Port Number
- Number of simultaneous open connections (maximum number of connections): ☞ Page 61 Performance Specifications of Ethernet

Connection via a hub

■Setting at the CC-Link IE TSN Plus module side

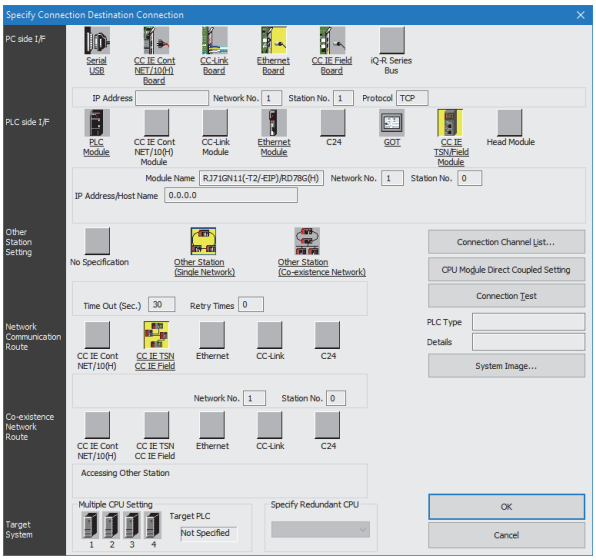
- For connection by specifying the IP address, set the IP address using "Required Settings". (☞ Page 75 Station No./IP Address Setting)
- For connection by specifying the network number and station number, set the network number and station number in "Required Settings".

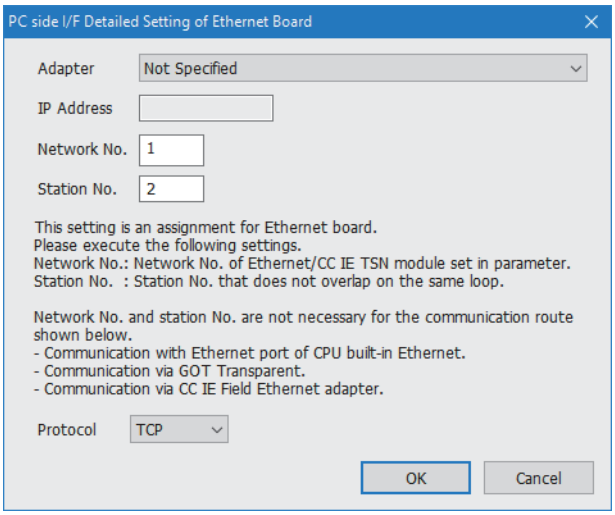
Neither of connections require "Network Configuration Settings" under "Basic Settings".

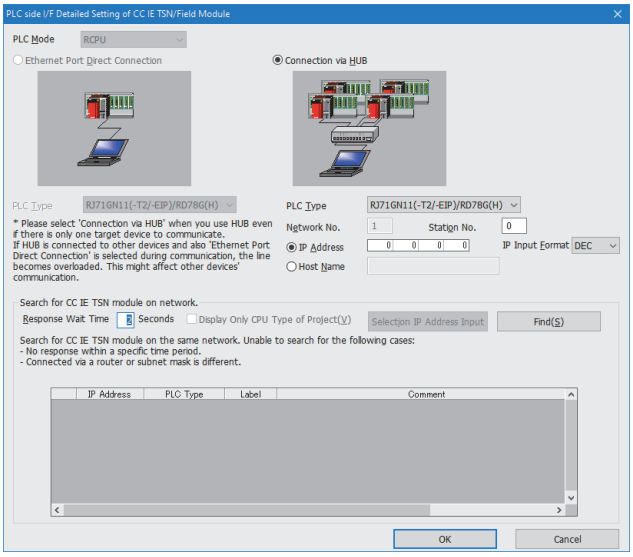
■Settings on the engineering tool side

Set in the "Specify Connection Destination Connection" window.

[Online] ⇨ [Current Connection Destination]







1. Set "PC side I/F" to "Ethernet Board".

2. Double-click "Ethernet Board", and open the "PC side I/F Detailed Setting of Ethernet Board" window.

3. Set the network number, station number, and protocol of the personal computer.

TCP: A connection is established during communication. Since data is exchanged while checking that the data has correctly reached the communication destination, the data reliability can be ensured. Note that the line load is larger than UDP/IP communications.

UDP: Since a connection is not established during communication and whether the communication destination has correctly received the data is not checked, the line load is lower. Note that the data reliability is lower than TCP/IP communications.

4. Set the "PLC side I/F" to the module to be connected.

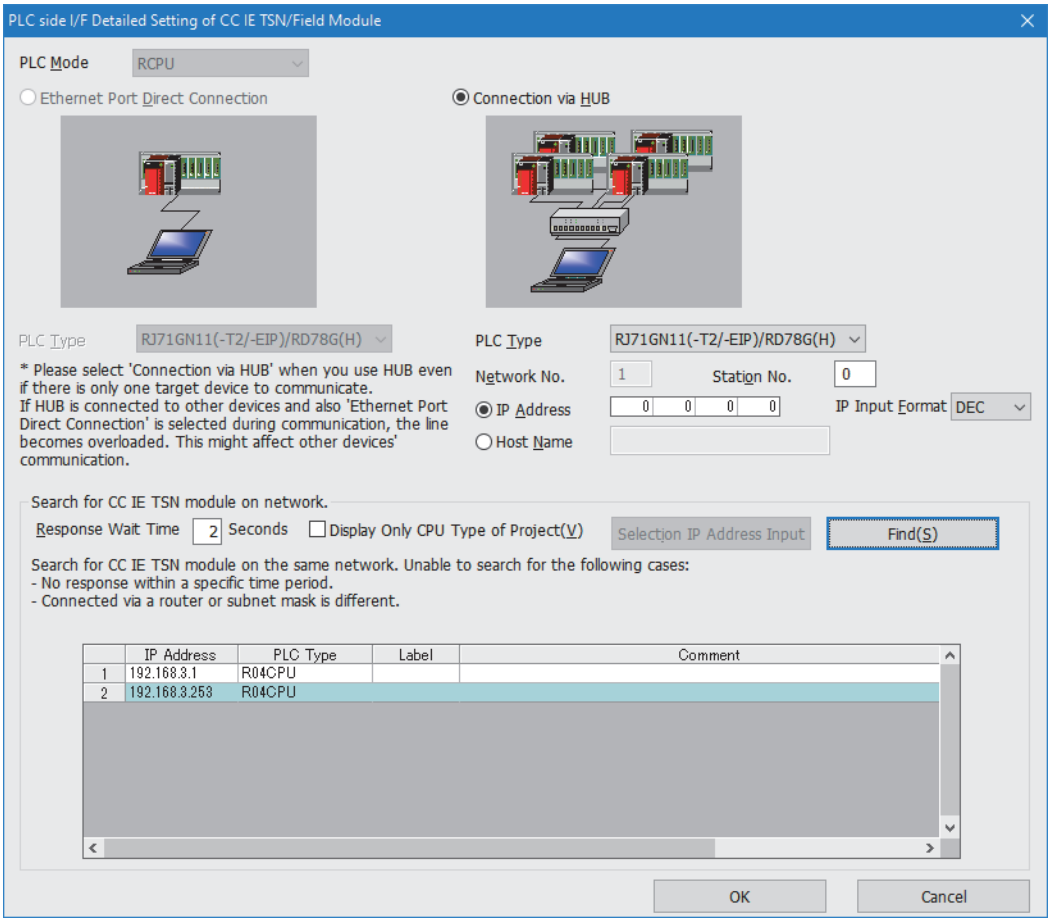
5. Double-click the icon set in step 4, and open the detailed setting window.

6. Select "Connection via HUB" for the connection method, and enter the station number and IP address or host name for the CC-Link IE TSN Plus module.

7. Set "Other Station Setting" or "Network Communication Route" if necessary.

■Searching modules on the network

For a connection using a switching hub, a list of modules that can be searched for will appear by clicking the [Find] button on the detailed setting window.



Search target modules are as follows.

- The control CPU of the CC-Link IE TSN Plus module connected to the same switching hub as the engineering tool
- The control CPU of the CC-Link IE TSN Plus module connected to cascade-connected switching hub

If a connected CC-Link IE TSN Plus module does not appear in the list after searching the modules on the network, check the following items.

- Search is not performed if it is disabled with the IP filter.
- Modules connected via a router cannot be searched.
- If modules with the same IP address are listed, correct the setting of the IP address in "Network Configuration Settings" under "Basic Settings" of the master station.
- If the service processing load of the search-target CPU module is high, it may not be possible to search for the corresponding module. If the search cannot be performed, increase the response wait time in the search dialog, and perform the search again.

Connection with SLMP-compatible devices

This type of connection allows SLMP-compatible devices (such as a personal computer or a vision sensor) to be connected to the CC-Link IE TSN Plus module.

For details on an SLMP, refer to the following.

SLMP Reference Manual

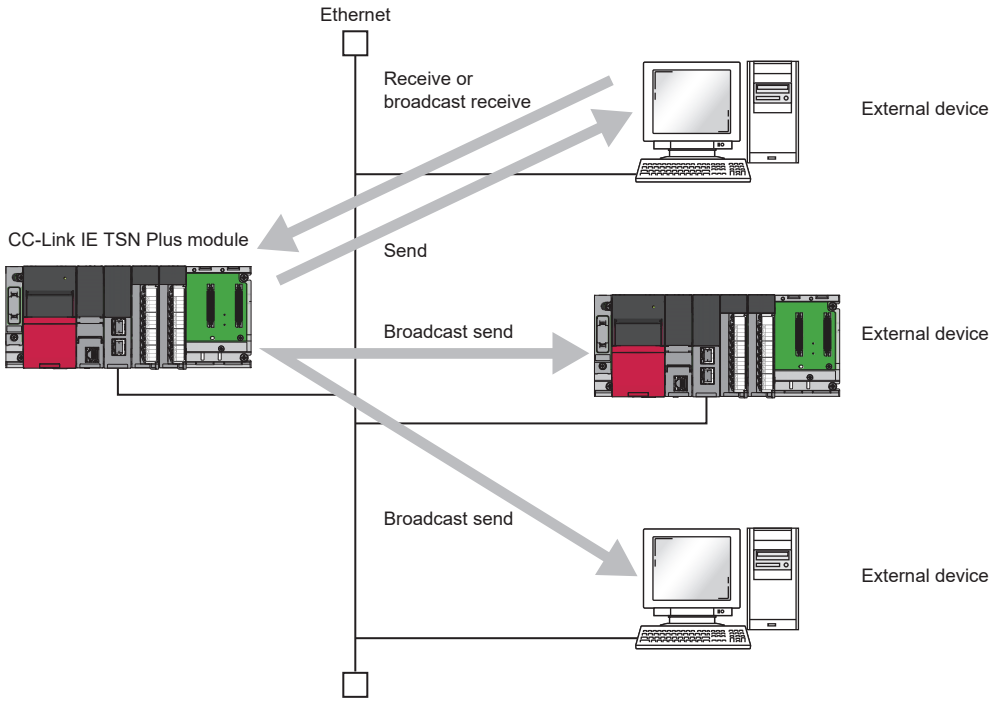
Restriction

- For SLMP communication in the structure where communication speeds of 1Gbps and 100Mbps exist, set the same communication speed for the connected station and access destination. When different communication speeds are set for the connected station and access destination, SLMP communication may not be possible.
- When the system structure is mixed with an Ethernet device, there are restrictions for the network topology and connection destination of the Ethernet device. (Page 26 CC-Link IE TSN SYSTEM CONFIGURATION)
- The port (P2) used for EtherNet/IP supports SLMP communications to the own station, but it cannot access other stations via other network modules.

Socket communications

Using dedicated instructions, arbitrary data can be exchanged with an external device connected by Ethernet over TCP/IP or UDP/IP.

Use this for bidirectional communication one-on-one with an external device.



Point

For examples of socket communications, refer to the following.

☞ Page 259 Example of Socket Communications

Setting method

Set "External Device Configuration" in "Ethernet Communication Setting" under "Basic Settings". (☞ Page 81 Ethernet Communication Setting)

1. Select the external device to be connected in "Module List" and drag it to "List of devices" or "Device map area".

External device name	Description
UDP Connection Module	Select to communicate with the external device using UDP/IP.
Active Connection Module	Select to perform the open processing to the external device from the CC-Link IE TSN Plus module (Active open) and communicate using TCP/IP.
Unpassive Connection Module	Select to receive the open processing from an unspecified external device (Unpassive open) and communicate using TCP/IP.
Fullpassive Connection Module	Select to receive the open processing from the specified external device (Fullpassive open) and communicate using TCP/IP.

2. Set "Communication Method" for the external device to "Socket Communication".
3. Set the other parameters required for communication in the connection.

Applicable dedicated instructions

For the dedicated instructions used for socket communications, refer to the following.

☞ Page 228 Socket Communications Instructions

Applicable connections

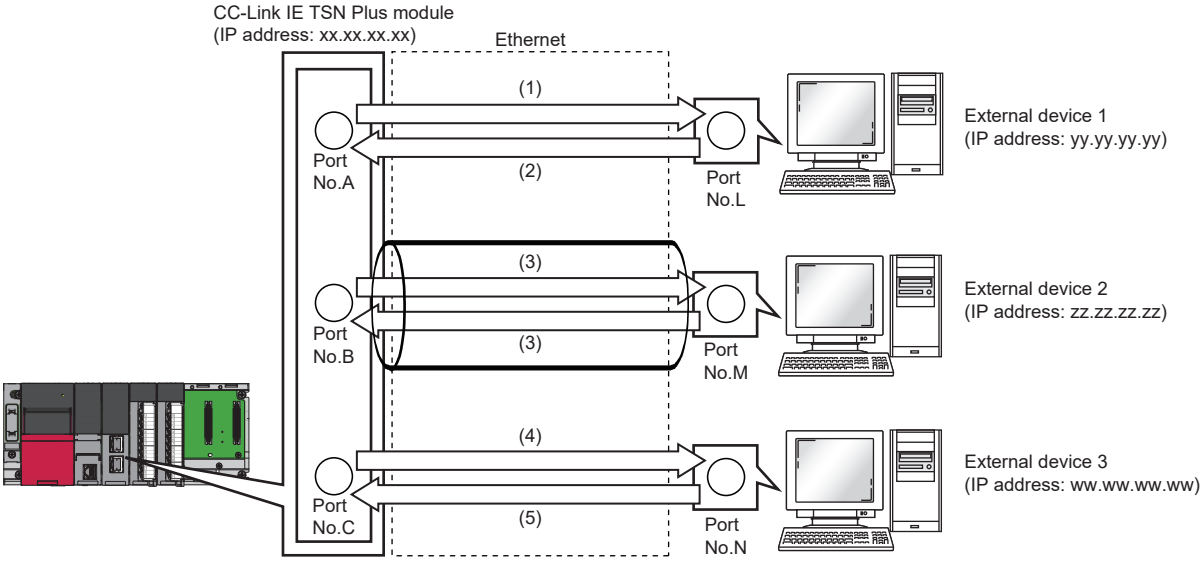
Communication by socket communications can use connection numbers 1 to 8 that were set in "External Device Configuration" in "Ethernet Communication Setting" under "Basic Settings". (☞ Page 81 Ethernet Communication Setting)

Communication structure

With socket communications, port numbers that identify the communication are used to enable multiple communication sessions with the external device. These are used for both TCP/IP and UDP/IP.

For send: Specify send source the CC-Link IE TSN Plus module's port number and the send destination external device's port number.

For receive: Specify the CC-Link IE TSN Plus module's port number, and read the data sent to that port.



(1) Sending UDP data from CC-Link IE TSN Plus module's port number A to external device 1's port number L
(2) Sending UDP data from external device 1's port number L to the CC-Link IE TSN Plus module's port number A
(3) Sending data with TCP/IP connection
(4) Sending UDP data from CC-Link IE TSN Plus module's port number C to external device 3's port number N
(5) Sending UDP data from external device 3's port number N to CC-Link IE TSN Plus module's port number C

Communications using TCP/IP

TCP/IP protocol establishes a connection between the external device's port number for reliable data exchange.

Check the following items before performing socket communications using TCP/IP.

- IP addresses and port numbers on external device side
- IP addresses and port numbers of CC-Link IE TSN Plus modules
- Which side, the external device side or the CC-Link IE TSN Plus module side, will open a connection (Active open or Passive open)

■TCP/IP connection operation

TCP/IP connection includes Active open and Passive open.

First, the side with the TCP/IP connection executes Passive open with the specified port number

The side with TCP/IP connection specifies the port number waiting in the Passive open side, and executes Active open.

This enables the TCP/IP connection, the connection is established, and data can be exchanged.

For details on Active open and Passive open, refer to the following.

☞ Page 586 TCP/IP Communications, UDP/IP Communications

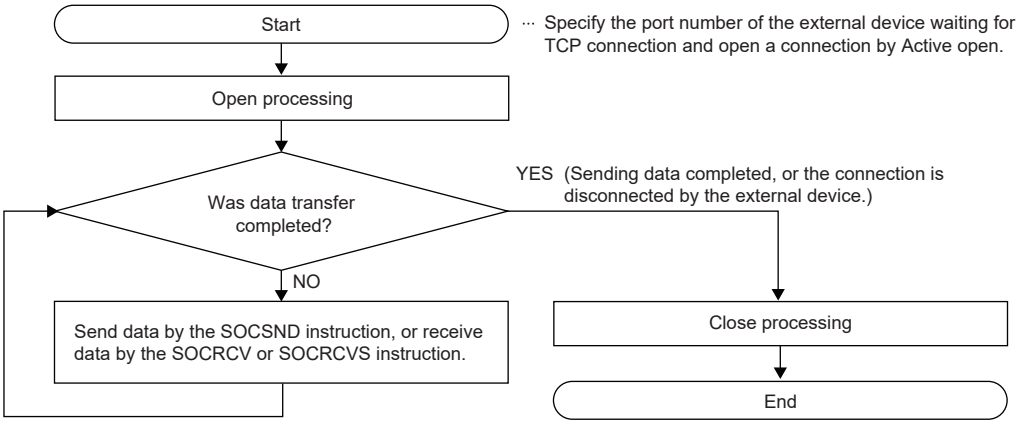
Point

The Active open and Passive open expression may differ according to the external device.

- Active open: TCP/IP connection side, client side, connect side, and others
- Passive open: TCP/IP connection wait side, server side, listen side, and others

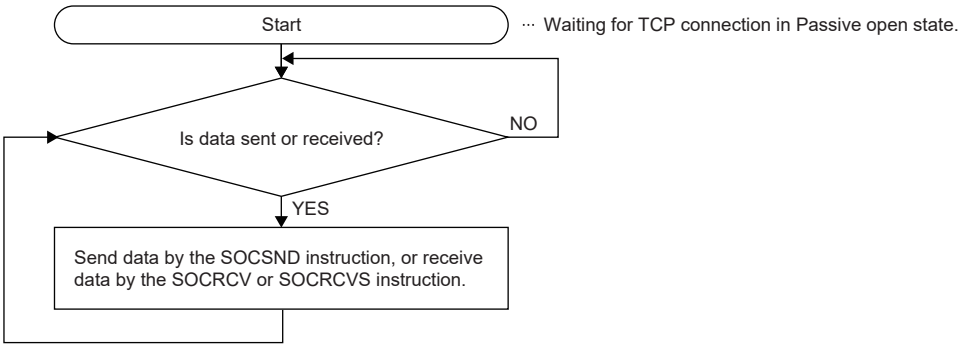
• Active open

The following figure shows the flow of data exchange using Active open.



• Passive open

The following figure shows the flow of data exchange using Passive open.



Precautions for TCP/IP communications

■Conditions for closing

In addition to when close is requested from the external device, the TCP/IP communications processing will be closed in the following cases if 'Open completion signal' (Un\G6291456) turns off.

- When alive check function times out
- When forced close is received from external device

■TCP/IP connection elements

The TCP/IP connection is managed with the following four elements. Only one connection containing the same four elements can be created at one time. To use multiple TCP/IP connections simultaneously, ensure that one of the four elements is different.

- IP addresses of CC-Link IE TSN Plus modules
- Port numbers of CC-Link IE TSN Plus modules
- IP address of the external device side
- Port number of the external device side

Note that when "Unpassive Connection Module" or "Fullpassive Connection Module" is selected, the port number of the CC-Link IE TSN Plus module side has to be different. In addition, one of the other three element also has to be different.

■Reconnecting with same connection

After closing the connection during TCP/IP communications, wait at least 500ms before reconnecting to a connection with the same external device (IP address), own station port number, and external device port number.

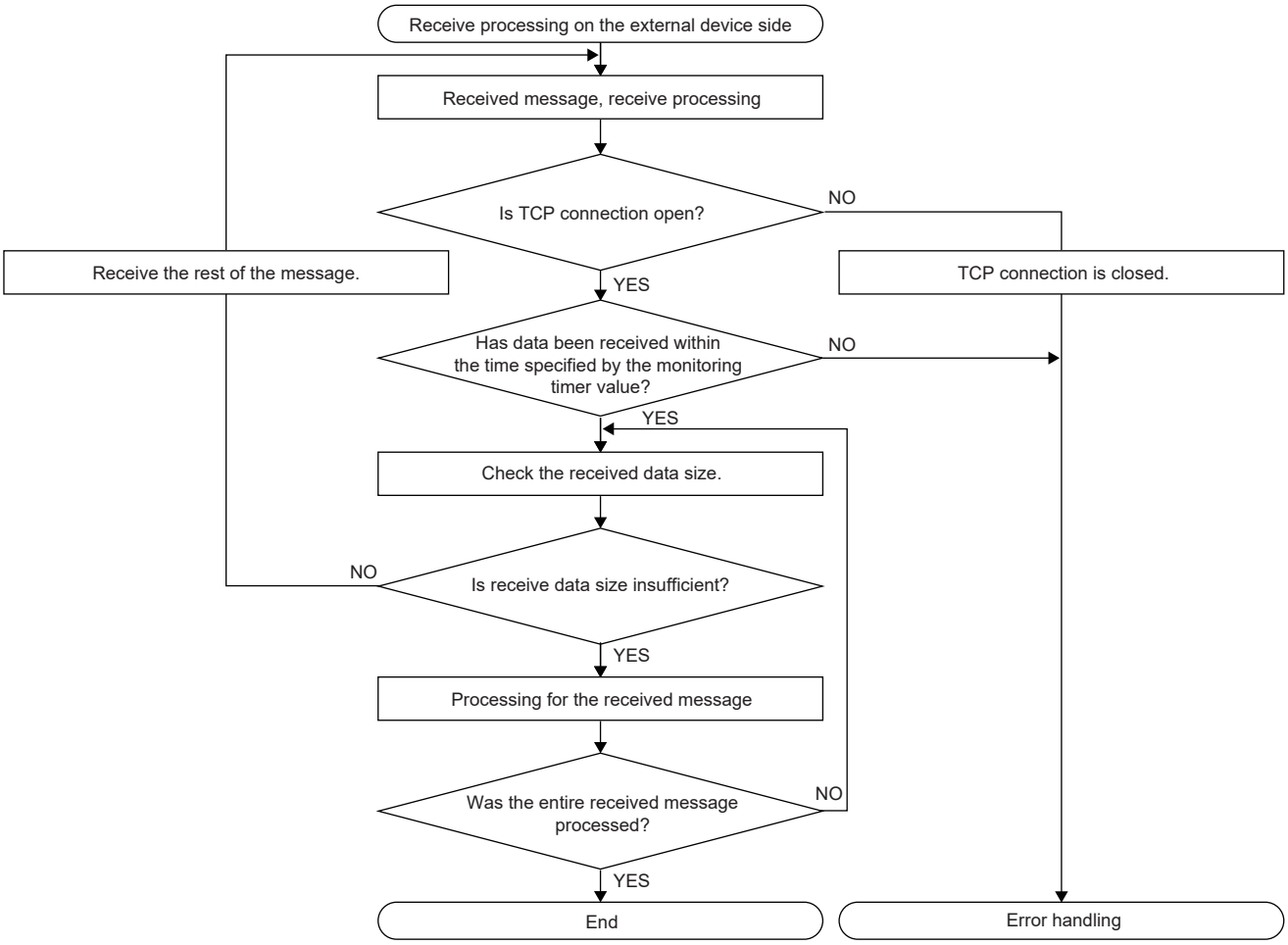
If a wait interval cannot be provided before reconnecting, changing the own station port number on the Active open side and connecting is recommended.

■Checking the receive data length

There is no concept of delimiting the communication data during communication with TCP/IP. Thus, the continuously sent data may be merged on the received side, or the data sent in a group may be split on the receive side. If necessary, the receiving side must check the receive data length and perform the processing.

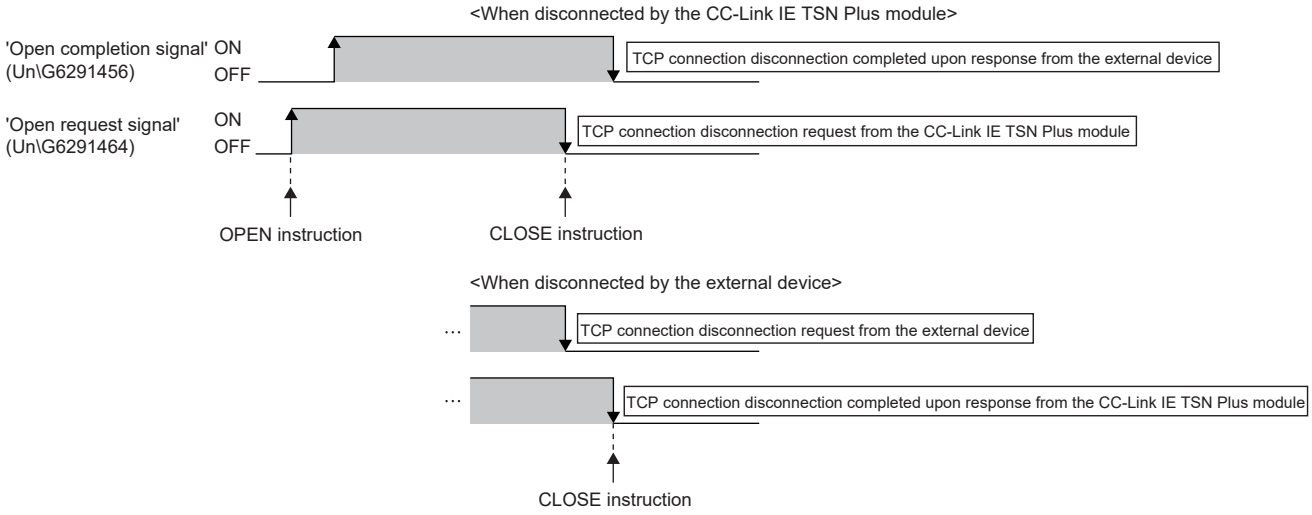
If the data length is determined when receiving with the CC-Link IE TSN Plus module side, using the fixed-length mode is recommended.

When receiving on the external device side, check the receive data length and perform the processing as shown below.



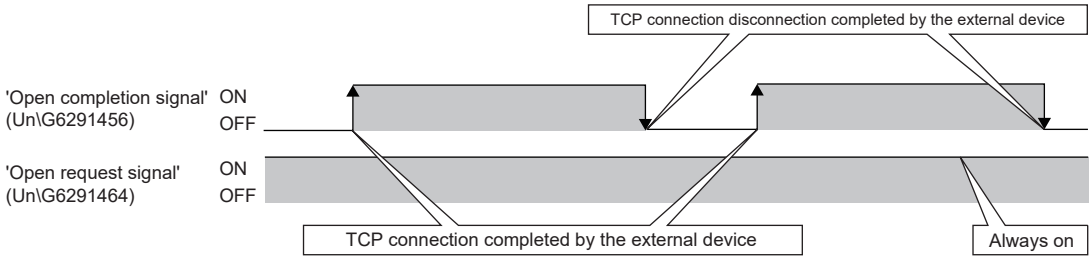
■Precautions for Active open

Use 'Open completion signal' (Un\G6291456) and 'Open request signal' (Un\G6291464) in the program to create an interlock circuit. The on/off timing for the open completion signal and open request signal is shown below.



■Precautions for Passive open

- Use 'Open completion signal' (Un\G6291456) and 'Open request signal' (Un\G6291464) in the program to create an interlock circuit. The on/off timing for the open completion signal and open request signal is shown below.



- With TCP/IP, one external device is connected to with one connection. To connect with multiple external devices with the same own station port number, provide a connection for each external device. If more external devices than the prepared number of connections are connected, the connection will be disconnected immediately.
- Connect from the external device after the CC-Link IE TSN Plus module enters the open standby state. The TCP/IP connection request received from the external device between the time from CPU startup completion to open wait state causes an error, and force close connection is returned to the external device. In this case, wait for the CC-Link IE TSN Plus module to enter the open wait state and then retry from the external device.
- Do not execute the CONCLOSE instruction in the program. If the CONCLOSE instruction is executed, the open completion signal and open request signal for the corresponding connection will turn off. The close processing will be executed and send/receive will be disabled. To re-open a closed connection, execute the CONOPEN instruction.

Communications using UDP/IP

Communication with UDP/IP uses a simple protocol without order control or re-send control.
Check the following items before performing socket communications using UDP/IP.

- IP addresses and port numbers on external device side
- IP addresses and port numbers of CC-Link IE TSN Plus modules

Precautions for UDP/IP communications

- Loss of data, data arrival order interchange, and others could be occur. Consider using TCP/IP if there are problems.
- Even if the communication line between the CPU module and external device is not connected because of a connected cable disconnection and others, the data send processing may end normally. Thus, providing a communication procedure and sending/receiving data is recommended.
- 'Open completion signal' (Un\G6291456) and 'Open request signal' (Un\G6291464) for the connection set to UDP/IP is always on.
- Do not execute the CONCLOSE instruction in the program. If the CONCLOSE instruction is executed, the open completion signal and open request signal for the corresponding connection will turn off. The close processing will be executed and send/receive will be disabled. To re-open a closed connection, execute the CONOPEN instruction.
- Even if 'Open completion signal' (Un\G6291456) is turned on, data sending may fail. If data sending fails, send the data again.

Precautions

This section describes the precautions for exchanging data with socket communications.

■Port number

For the port number of the own station used in the system, refer to the following to use a free port number.
☞ Page 593 Port Number

■Relaying between ports

The Ethernet device connected to the port 1 side of the CC-Link IE TSN Plus module and the Ethernet device connected to the port 2 side cannot relay between the ports, and socket communications cannot be performed.

■Reading received data

If 'Socket reception status signal' (Un\G6291472) is on, read the received data. The communication could be affected if large amounts of data are not read out for a while.

■Accessing a file during communication

The CPU module prioritizes the file access processing over the Ethernet communication processing. Thus, if the file is accessed with FTP, the engineering tool, and so on, during socket communications, the socket communications processing could be delayed.
To access a file while monitoring the response time with the external device with socket communications, add the time required for accessing the file to the monitoring time.

■Module FB and dedicated instruction

- When performing the open processing using the module FB or dedicated instruction, start sending and receiving data after the module FB or dedicated instruction is completed.
- Multiple module FBs or dedicated instructions to one connection cannot be simultaneously executed. When multiple module FBs or dedicated instructions are simultaneously executed, no operation is performed for the module FB or dedicated instruction executed later. Execute again after the module FB or dedicated instruction in execution is completed.

9.5 Security

Security depending on the network environment can be structured by restricting access by each communication path to the CPU module. The following two access restriction methods can be used.

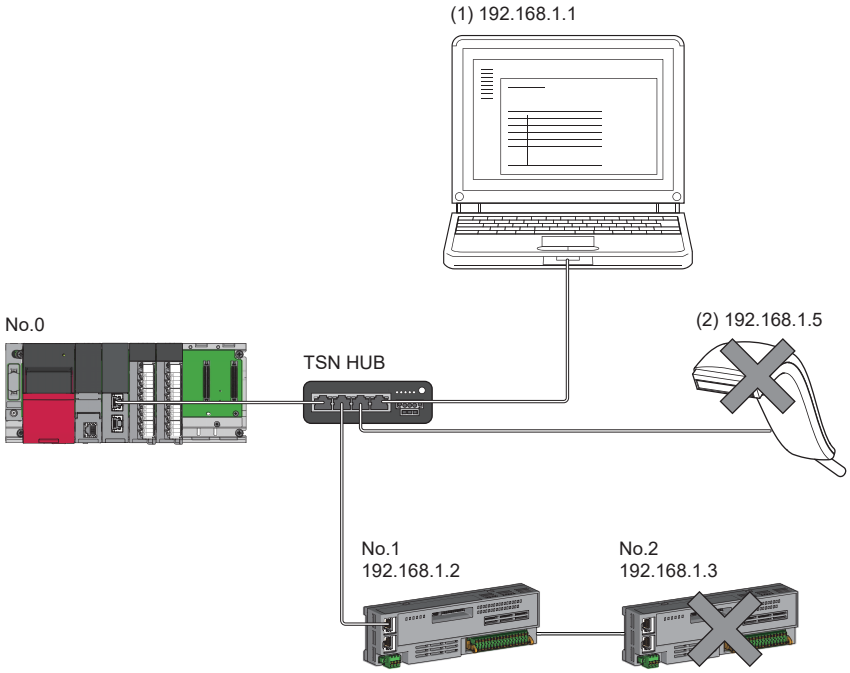
☞ Page 203 IP filter
☞ Page 206 Remote password

IP filter

This function identifies the IP address of the access source, and prevents unauthorized access.

By setting the IP address of the access source using the engineering tool, IP packets are allowed or blocked. (The IP packets received from the access source are allowed or blocked. IP packets sent from the own station are ignored.)

Use of this function is recommended when using in an environment connected to a LAN line.



When the "Allow" IP addresses are set to 192.168.1.1 and 192.168.1.2 using the IP filter of the master station No.0:
Only the Ethernet device (1) and device station No.1 can access the master station, and the Ethernet device (2) and device station No.2 cannot access the master station.

Restriction

This function cannot be used when accessing via a network other than Ethernet or CC-Link IE TSN.

Point

The IP filter is one method of preventing illegal access (such as program or data destruction) from an external device. It does not completely prevent illegal access. 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, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

Our company is not responsible for any problems that occur in the programmable controller and system due to a DoS attack, unauthorized access, computer virus, or other cyber attacks.

Examples of measures for unauthorized access are given below.

- Install a firewall or VPN.
- Install a personal computer as a relay station, and control the relay of send/receive data with an application program
- Install an external device for which the access rights can be controlled as a relay station (Contact the network provider or equipment dealer for details on the external devices for which access rights can be controlled.)

Setting method

1. Set the IP address to be allowed or blocked in the "IP Filter Settings" window of "Security" under "Application Settings". (☞ Page 87 IP Filter Settings)

A warning is displayed in the following cases.

- When blocking the IP address of the device station set in "Network Configuration Settings" under "Basic Settings" was attempted
- When a device station is not set in "Network Configuration Settings" under "Basic Settings", and an IP address allowed to access is not set in the "IP Filter Settings" window (because the IP filter blocks every IP address)

2. Write the module parameters to the CPU module.
3. The IP filter is enabled when the power is turned off and on or the CPU module is reset.

Point

Even if the connection was specified in "Network Configuration Settings" under "Basic Settings" or by a program, access from the external device is either allowed or blocked according to the setting in the "IP Filter Settings" window.

Setting target

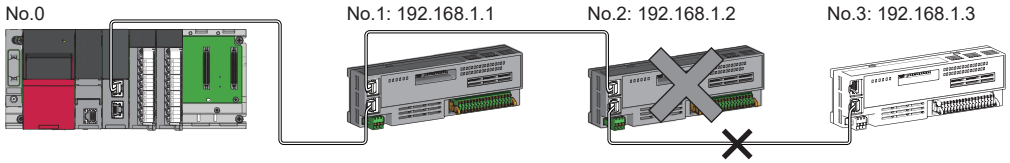
Allow or block should be set to all IP addresses that connect to the same network. Also, set allow or block to the IP address of the device station that is registered in "Network Configuration Settings" under "Basic Settings".
Register the setting details to the master station, and allow or block the IP packets received from the device station of the registered IP address.

Operation

Even for the device station registered in "Network Configuration Settings" under "Basic Settings", a station with an IP address set as blocked can become a disconnected station. As a result, cyclic transmission and transient transmission are not performed. Such a station is also displayed as a disconnected station on the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window. However, Ethernet devices are not displayed on the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window. (☞ Page 398 CC-Link IE TSN/CC-Link IE Field Diagnostics)
When an IP packet is received from an IP address that is set as blocked, the denial is registered in the event history of the master station.
(☞ Page 488 EVENT LIST)

Precautions

- Do not set the IP addresses of the master station or device stations as blocked. When a device station using line topology is set as blocked, cyclic and transient transmissions cannot be performed on the device stations that are connected after the device station set as blocked.



When the "Deny" IP address is set to 192.168.1.2 using the IP filter of the master station No.0:
Only device station No.1 can access the master station, and device station No.2 and device station No.3 cannot access the master station.

- If there is a proxy server in the LAN line, deny the IP address for the proxy server. If the IP address is allowed, it will not be possible to prevent access from personal computers that access the proxy server.
- To block access from an external device to another station, block access to the connected station (station connected directly to an external device) by using the IP filter.

Remote password

Permits or prohibits access from the external device to the CPU module via the CC-Link IE TSN Plus module. This function can prevent illegal access of the CPU module from a remote location.

Point

The remote password is one method of preventing illegal access (such as program or data destruction) from an external device. It does not completely prevent illegal access. 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, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.
Our company is not responsible for any problems that occur in the programmable controller and system due to a DoS attack, unauthorized access, computer virus, or other cyber attacks.
Examples of measures for unauthorized access are given below.

- Install a firewall or VPN.
- Install a personal computer as a relay station, and control the relay of send/receive data with an application program
- Install an external device for which the access rights can be controlled as a relay station (Contact the network provider or equipment dealer for details on the external devices for which access rights can be controlled.)

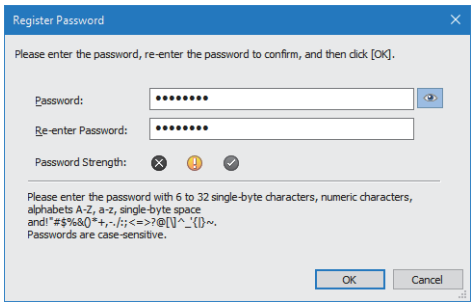
Number of settable modules

Up to eight modules can be set for remote passwords.
When using the multiple CPU system configuration, up to eight modules can be set for each CPU module.

Setting method

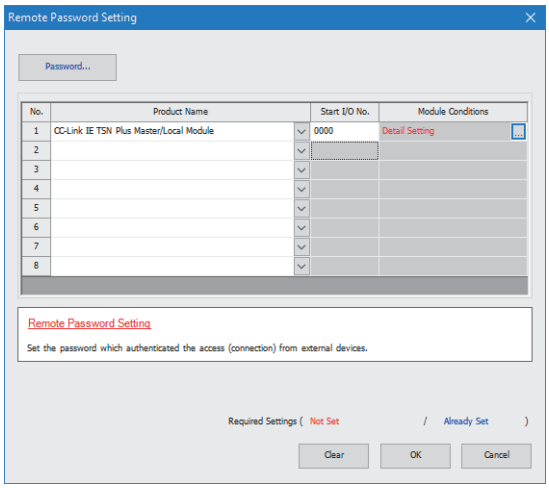
Set on the "Remote Password Setting" window.

[Navigation window] ⇨ [Parameter] ⇨ [Remote Password]

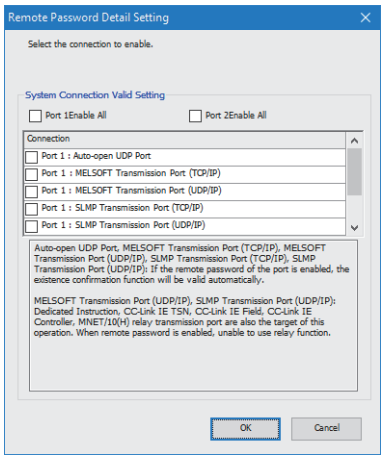


1. Click the [Password] button, and register the remote password on the "Register Password" window.

[Password] button



2. Select the module for which the remote password is to be applied, and set the start I/O number.



3. Set the target connection on the "Remote Password Detail Setting" window.

"Detail Setting" for the target module.

4. Write the remote password to the CPU module.
5. The remote password is enabled when the CPU module is reset or powered off and on.

■PING

This function uses the PING command to perform an alive check of external devices whose access is permitted in UDP communications. Therefore, if external devices do not respond to PING, an alive check error (event code 00906) occurs. When this function is used for UDP communications, check if the security setting of external devices (such as a firewall) is set to respond to PING.

Access permit/prohibit processing operation

This section describes the processing for permitting or prohibiting access of the CPU module with remote password by the external device.

■Access permit processing (Unlock processing)

The external device trying to communicate unlocks the remote password set for the connected the CC-Link IE TSN Plus module.

If the password is not unlocked, the CC-Link IE TSN Plus module to which the external device is connected prohibits access, so an error occurs in the external device.

The unlocking method is shown below.

- SLMP dedicated command (Remote Password Unlock)
- Input password from engineering tool

■Access processing

Access to the specified station is possible when the remote password is correctly unlocked. Execute the arbitrary access.

■Access prohibit processing (Lock processing)

When access to the specified station ends, lock the remote password from the external device to disable subsequent access.

The locking method is shown below.

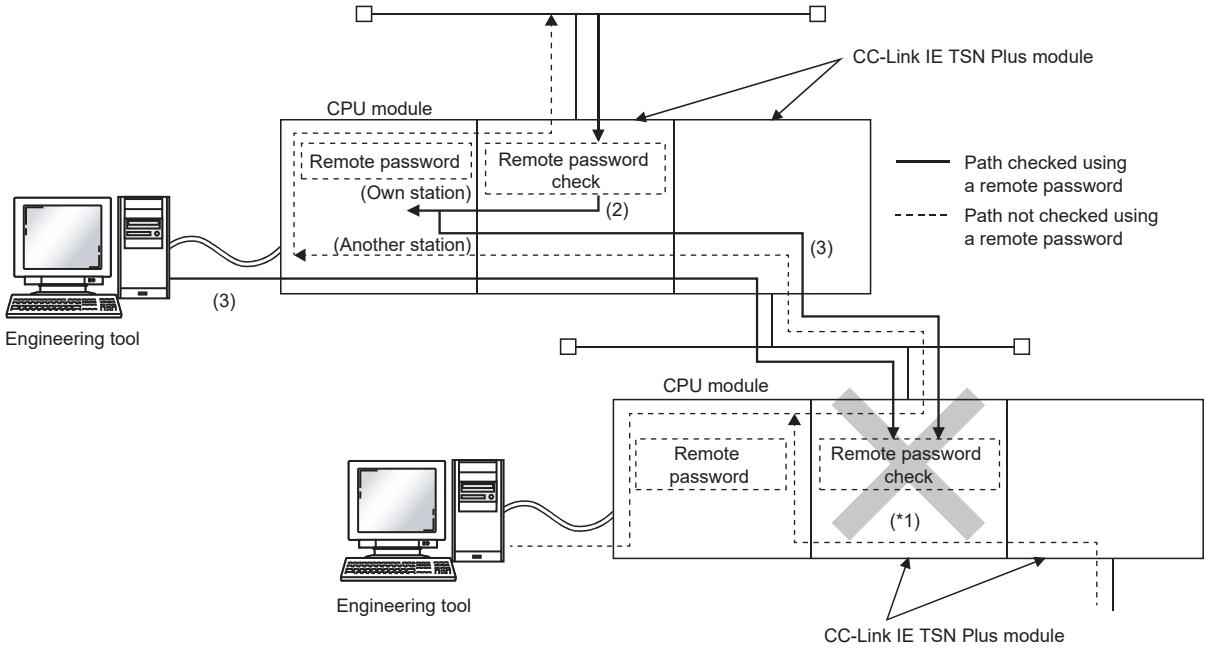
- SLMP dedicated command (Remote Password Lock)
- Lock with engineering tool (executed automatically)

Remote password check operation

■Communication that is checked

The CC-Link IE TSN Plus module checks the remote password for a communication request made to the own station or other station received from the external device.

When checking a remote password for modules with multiple connections, the connection for which the remote password is set.



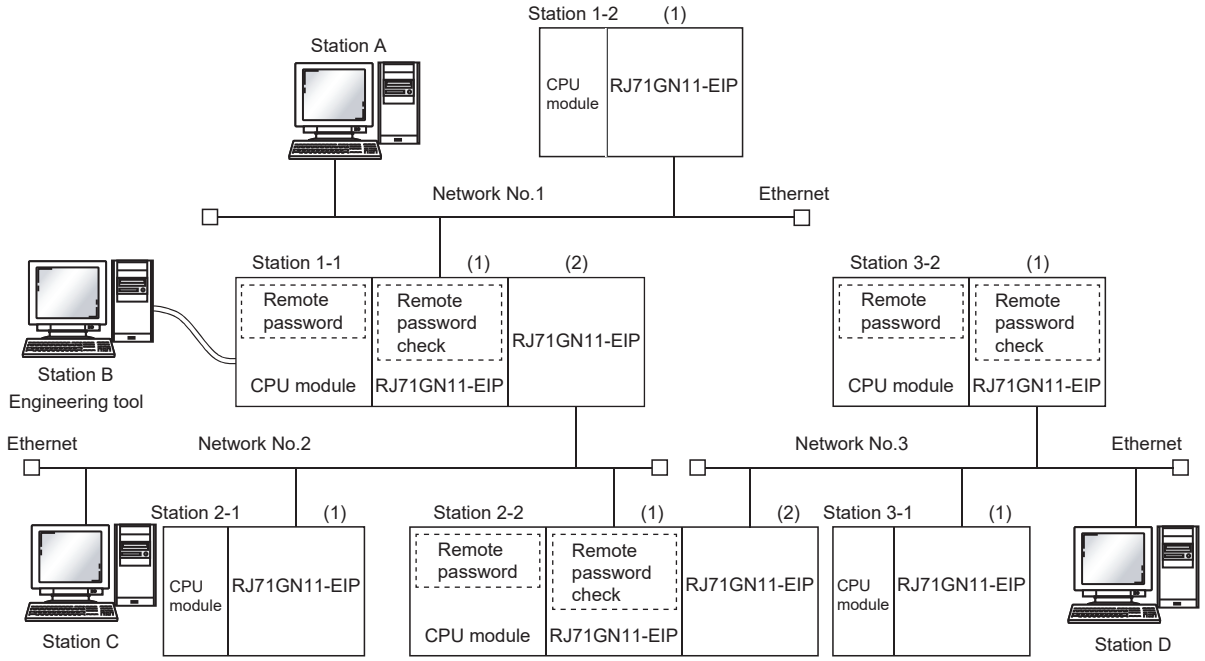
*1 The remote password check is set, so the communication request from the external device is not accepted. If the remote password check is not set, the communication request can be accepted and data can be exchanged from the external device.

■Accessible station

The station accessible from the external device when a remote password is set for the CPU module and the station that can unlock/lock the remote password are limited to those in the same network number.

The following figure shows an example of when the remote password is set for multiple stations in the system.

Ex.



The password can be unlocked and locked by the following external devices.

- 1-1 station (1): A station only
- 2-2 station (1): C station only
- 3-2 station (1): D station only

The A station accesses the ○ station after the remote password for 1-1 station (1) is unlocked and access the △ station if the communication line is open.

The B station accesses the △ station if the communication line is open.

The C station accesses the ○ station after the remote password for 2-2 station (1) is unlocked and access the △ station if the communication line is open.

The D station accesses the ○ station after the remote password for 3-2 station (1) is unlocked and access the △ station if the communication line is open.

○: Station accessible from external device after remote password is unlocked

△: Station accessible from external device even if remote password is not unlocked

×: Station that cannot be accessed from external device

External device (Request source)	Target programmable controller (request source)					
	1-1 station CPU	1-2 station CPU	2-1 station CPU	2-2 station CPU	3-1 station CPU	3-2 station CPU
A station	○	△	○	×	×	×
B station	△	△	△	×	×	×
C station	△	△	△	○	○	×
D station	△	△	△	△	△	○

Precautions

The following section lists the precautions for using remote password.

■Set connection

Set the remote password for the connection used to exchange data with an external device that can execute the unlock/lock processing.

■When remote password is set for UDP/IP connection

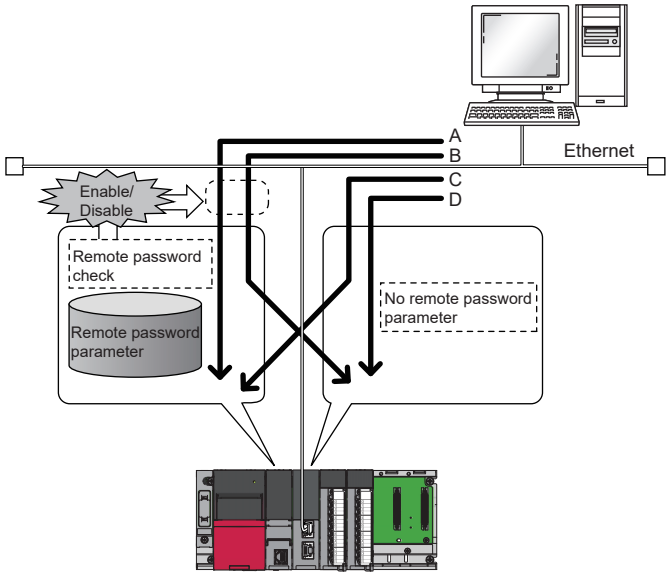
- Determine the external device to communicate with and exchange the data. (With UDP/IP, after the remote password is unlocked data can be exchanged with devices other than the unlocked external device too. Determine the communication device before starting use.)
- Always lock the remote password after data communication is finished. (If the remote password is not locked, the unlocked state is held until timeout occurs.)

■TCP/IP close processing

If the TCP/IP is closed before the TCP/IP is locked, the CPU module will automatically start the lock processing.

■Remote password valid range

The remote password is valid only for access from the CC-Link IE TSN Plus module for which the parameters are set. When using multiple CPU modules in a multi-CPU system, set a remote password for each CPU module for requiring a remote password.



The remote password is checked when accessing with path A or B.
The remote password is not checked when accessing with path C or D.

■Accessing a programmable controller on another station

When the external device is accessing a programmable controller on another station via the CC-Link IE TSN Plus module, it may not be possible to access the programmable controller if a remote password is set for the CPU module at the relay station or access station.

9.6 RAS

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

Device station disconnection

Data link of the station where an error occurred is stopped, and the data link continues only for stations that are operating normally.

Automatic return

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

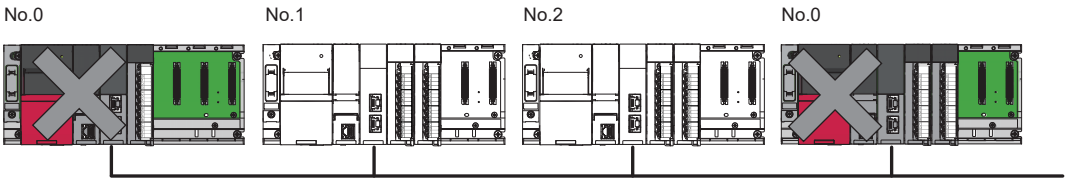
Precautions

- When removing a device station while the system is operating, check that the device station is either performing cyclic transmission or is disconnected.
- When removing the CC-Link IE TSN Plus module, check that the D LINK LED is either on or off.

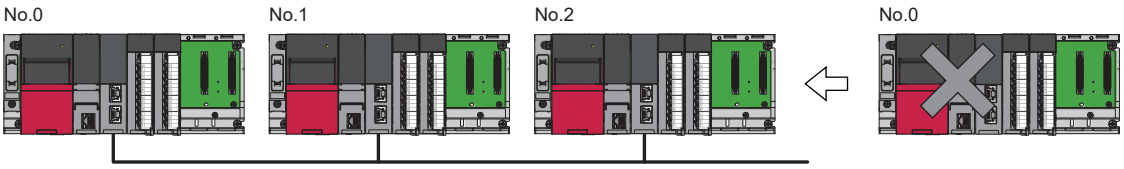
Master station duplication detection

If one network has multiple master stations, an overlap is detected.

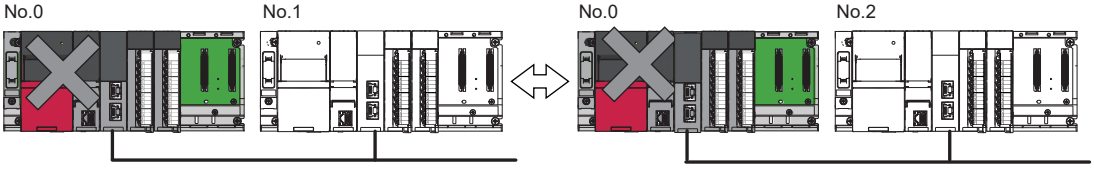
- When multiple master stations are simultaneously powered on, or when multiple master stations are simultaneously connected, Master station duplication detection (error code: 300FH) is detected in all master stations and cyclic transmission cannot be performed in all stations. (Transient transmission available)



- If another master station is added to the network during data link, Master station duplication detection (error code: 300FH) is detected in the added master station and cyclic transmission cannot be performed. (Transient transmission available) Other stations continue data link.



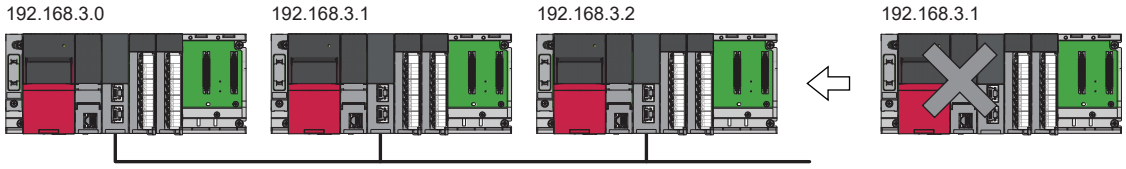
- If two networks are connected during data link, Master station duplication detection (error code: 300FH) is detected in master stations on both networks and cyclic transmission cannot be performed in all stations. (Transient transmission with IP address specification is available)



IP address duplication detection

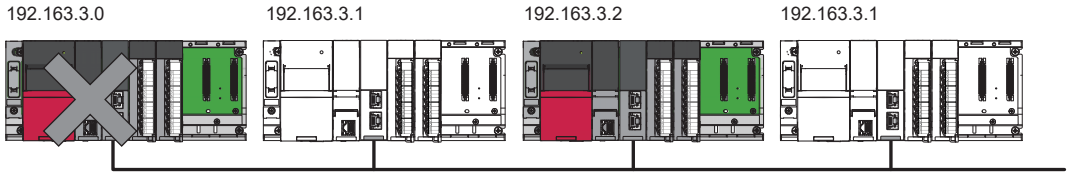
If one network has stations with the same IP address, an overlap is detected.

- When adding a device station, if a station with the same IP address already exists, IP address duplication detection (error code: 2160H) is detected in a station to be added and data link cannot be performed. Other stations continue data link.



Precautions

- When adding a device station, which has already been connected (linked up) with a TSN hub and the TSN hub is added to the network, an overlapping IP address is not detected in a station to be added. If IP address duplication detection (error code: 1802H) is detected in the master station, disconnect the relevant device station from the network. Otherwise, multiple stations with the same IP address will exist on the same network, possibly leading to transient transmission being sent to an unintended station.
- If the startup processing of cyclic transmission is executed by powering off and on the master station, when a station with the same IP address is in the network, Device IP address duplication (error code: 3021H) is detected in the master station and data link cannot be performed.



- During cyclic transmission, an overlapping IP address is regularly checked in the master station. When there are overlapping IP addresses, IP address duplication detection (error code: 1802H) is detected in the master station and cyclic transmission cannot be performed with the relevant device station. Other stations continue data link.

Restriction

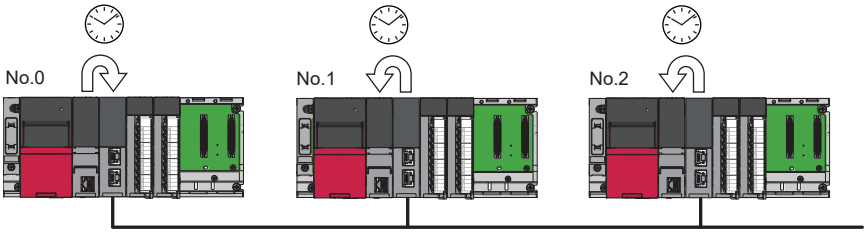
- An overlapping IP address between an Ethernet device and a CC-Link IE TSN device, and an overlapping IP address between Ethernet devices are not detected at cyclic transmission startup of the master station.
- Station number duplication is not detected.

Methods of recovery from an overlapping IP address

If IP address duplication detection (error code: 1802H) or Device IP address duplication (error code: 3021H) is detected on the master station, change the IP address of the relevant station, and power off and on or reset the master station.

Time synchronization

The time of device stations is synchronized with the time synchronization source (CPU module of the master station).



Setting method

The time synchronization is set with the buffer memory. (☞ Page 513 Time synchronization)
Set the same time zone and daylight savings time to the CPU modules of the master and local stations.

Point

When the CC-Link IE TSN Plus module is used as the master station, do not connect time synchronization devices whose time synchronization priority is 0 to 15.
A priority is a value that is assigned to a time synchronization device from the devices in a network to determine the grandmaster. The smaller the value, the higher the priority.
For the priority verification method and setting method, refer to the manual of the time synchronization device.

Precautions

- If this function is used, the time setting function (SNTP client) of the Ethernet-equipped module cannot be used. (MELSEC iQ-R Ethernet User's Manual (Application))
- If multiple CC-Link IE TSN Plus modules are mounted to a CPU module on the same base unit, set time synchronization for only one CC-Link IE TSN Plus module. If time synchronization is set for multiple, they are overwritten by the time that is synchronized later.
- When using the multiple CPU system configuration, the CPU module No.1 becomes the time synchronization source, even if the control CPU of the master station and local stations is a module other than CPU No.1.
- When "Connection Device Information" is set to "CC-Link IE TSN Class B Only", use a TSN hub. If a hub other than a TSN hub is used, the data link may stop for local stations and device stations connected to a hub other than a TSN hub.

9.7 CC-Link IE TSN Network Synchronous Communication Function

This section describes the CC-Link IE TSN network synchronous communication function.
For details, refer to the following.
📖 MELSEC iQ-R Inter-Module Synchronization Function Reference Manual

Restriction

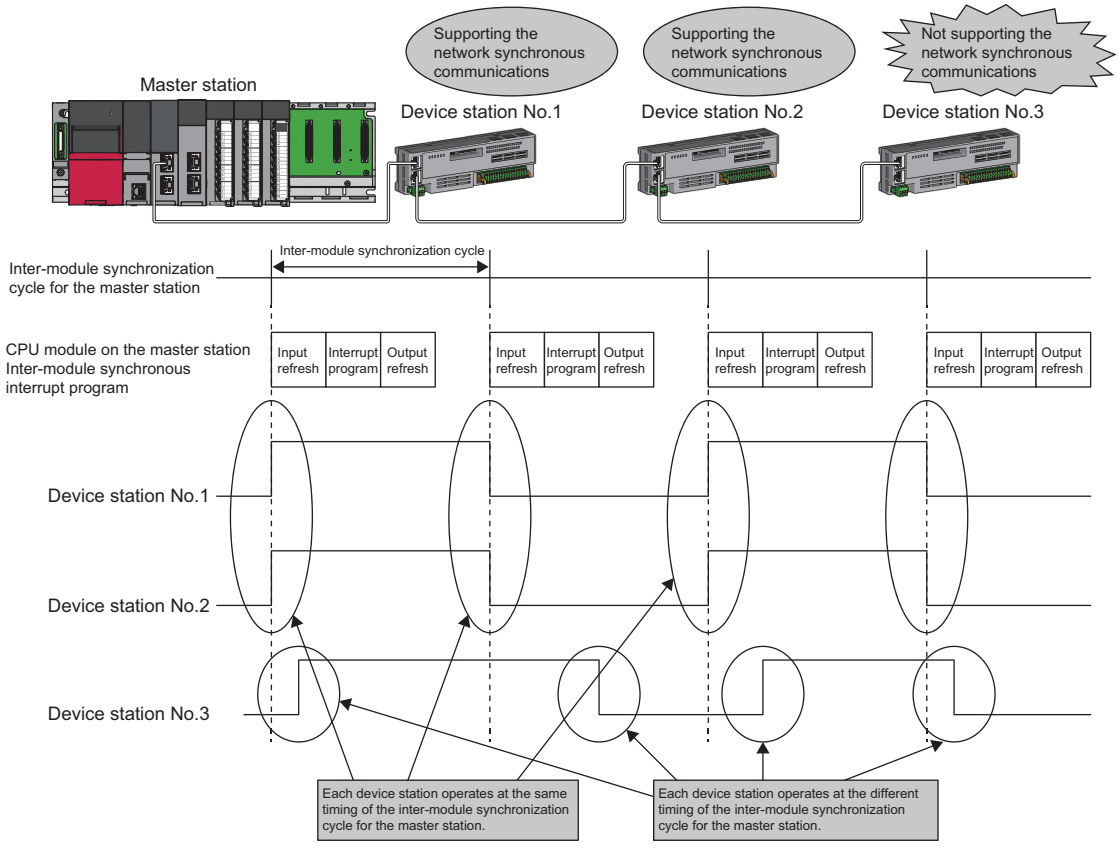
For the CPU module compatible with the CC-Link IE TSN network synchronous communication function, refer to the following.
📖 MELSEC iQ-R CPU Module User's Manual (Application)

Overview

This function synchronizes control cycles between device stations over CC-Link IE TSN according to the inter-module synchronization cycle specified in the master station. This adjusts the operation timing with the timing of different device stations connected on the same network.

Point

The following device stations can be connected: device stations not supporting the CC-Link IE TSN network synchronous communication function and device stations in which the network synchronous communication setting is not set. However, they cannot synchronize with the inter-module synchronization cycle.



Setting method

For the setting method, refer to the following manual.

MELSEC iQ-R Inter-Module Synchronization Function Reference Manual

■Inter-module synchronization cycle

To use the CC-Link IE TSN network synchronous communication function, set the same cycle for the following two items.

- "Fixed Scan Interval Setting" under "Inter-module Synchronization Setting" in "System Parameter".
- "Communication Period Interval Setting" under "Basic Settings" of the module parameter

Set the cycle in the following range.

0.25 to 10.0ms (in units of 0.05ms)

■How to calculate an inter-module synchronization cycle

For the cycle to be set, set a value greater than a value obtained by one of the following formulas.

Condition	Calculation formula*1
Execution time of the inter-module synchronous interrupt program (I44) > cyclic transmission time	Execution time of the inter-module synchronous interrupt program (I44) + cyclic processing time
Execution time of the inter-module synchronous interrupt program (I44) ≤ cyclic transmission time	Cyclic transmission time + cyclic processing time

*1 For the values obtained by the calculation formulas, refer to the following.
Execution time of the inter-module synchronous interrupt program (I44) (User's manual of the CPU module used)
Cyclic transmission time and cyclic processing time (Page 568 Communication cycle intervals)

■Precautions

To use the CC-Link IE TSN network synchronous communication function, do not set "Not Set" for "0.05ms Unit Setting" of "Fixed Scan Interval Setting of Inter-module Synchronization" in "System parameter".

None of the inter-module synchronization cycles 0.222ms, 0.444ms, 0.888ms, 1.777ms, 3.555ms, and 7.111ms can be used by the CC-Link IE TSN network synchronous communication function. Therefore, neither the SSCNET/H supported Simple Motion module nor Motion CPU can synchronize with the inter-module synchronization cycle.

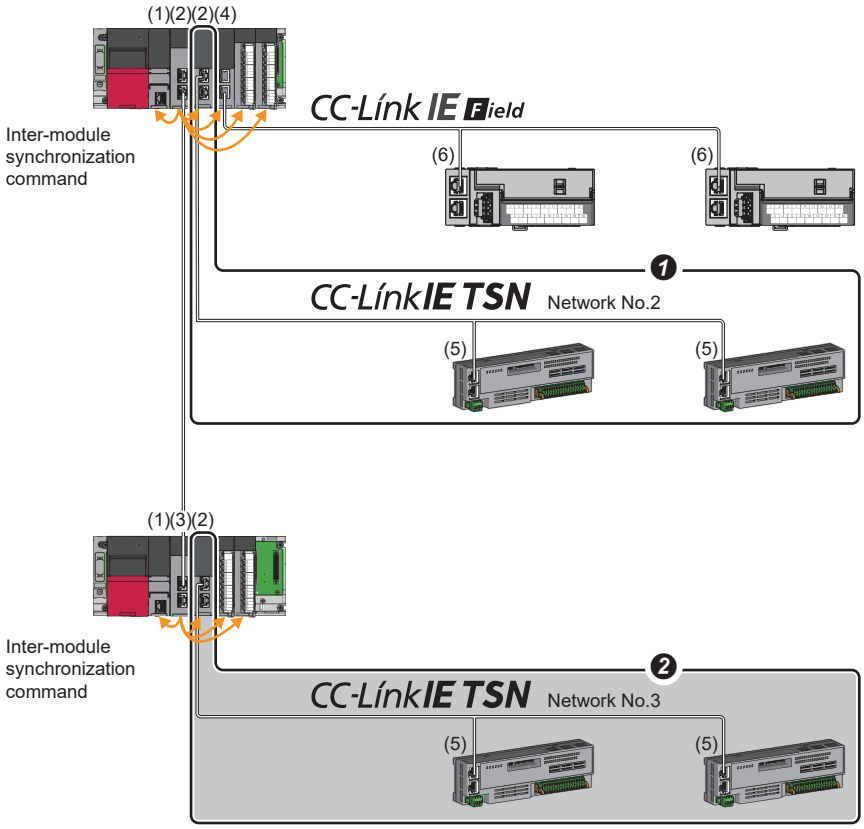
Synchronizable range

To use this function, set the master station as an inter-module synchronous master.

The communication cycles match based on time synchronization between the master station and device stations. This allows a device supporting the CC-Link IE TSN network synchronous communication function to operate in synchronization with the inter-module synchronization cycle of the programmable controllers of the master station.

The following shows the synchronizable ranges.

- Operation can be performed by synchronizing a module supporting the inter-module synchronization function on the same base unit as the master station with device stations.
- The local station sends an inter-module synchronization command to the module mounted on the base unit of the local station at the start timing of the communication cycle. Operation can be performed in synchronization with a module supporting the inter-module synchronization function mounted on the base unit of the local station.
- When a CC-Link IE Field Network-equipped master/local module (master station) exists on the same base unit as the master station, operation can be performed in synchronization with device stations supporting the CC-Link IE Field Network synchronous communication function.



(1) CPU module
(2) CC-Link IE TSN Plus module (master station)
(3) CC-Link IE TSN master/local module (local station)
(4) CC-Link IE Field Network-equipped master/local module (master station)
(5) Device station on CC-Link IE TSN
(6) Device station on CC-Link IE Field Network
❶ Multiple CC-Link IE TSN Plus modules (master stations) on the same base unit can be synchronized with the inter-module synchronization cycle. Set the leftmost CC-Link IE TSN Plus module (master station) on the same base unit as the inter-module synchronous master.
❷ Networks after the first local station cannot be synchronized.

Compatible device

The following table shows the devices that can be synchronized by the CC-Link IE TSN network synchronous communication function.

○: Synchronizable, ×: Not synchronizable

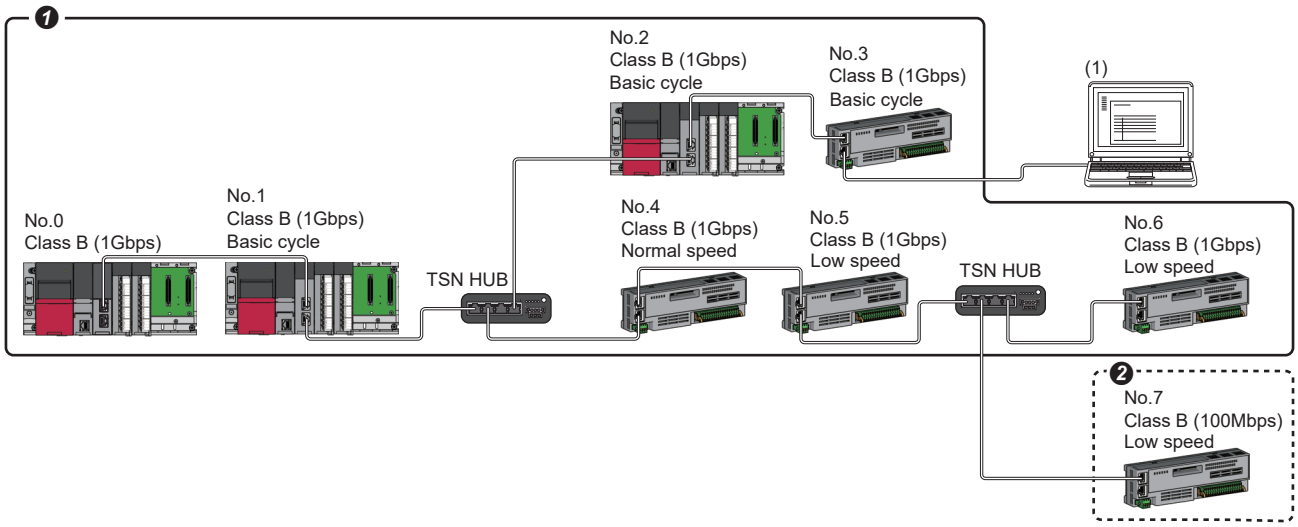
Support of the CC-Link IE TSN Network synchronous communication function	CC-Link IE TSN Class	Communication speed	Communication cycle setting	Synchronizability
Not supported	—	—	—	×
Supported	CC-Link IE TSN Class A device	—	—	×
	CC-Link IE TSN Class B device	1Gbps	Basic Period	○
			Normal-Speed	○
			Low-Speed	○
		100Mbps	Basic Period	○
			Normal-Speed	○
			Low-Speed	○

■Setting for a station not synchronizable

- When the network synchronous communication setting is set for a device station that is not synchronizable, Initialization failure (parameter mismatch between master and device stations) (event code: 00C71) is displayed in the event history in the master station. (Network synchronous communication and cyclic transmission with other device stations are continued.)
- In the local station for which "Network Synchronous Communication" in "Network Configuration Settings" under "Basic Settings" of the master station is set to "Synchronous", if "Select Inter-module Synchronization Target Module" in "System Parameter" on the local station side is set to "Asynchronous", Inter-module synchronization target mismatch (error code: 3601H) occurs.

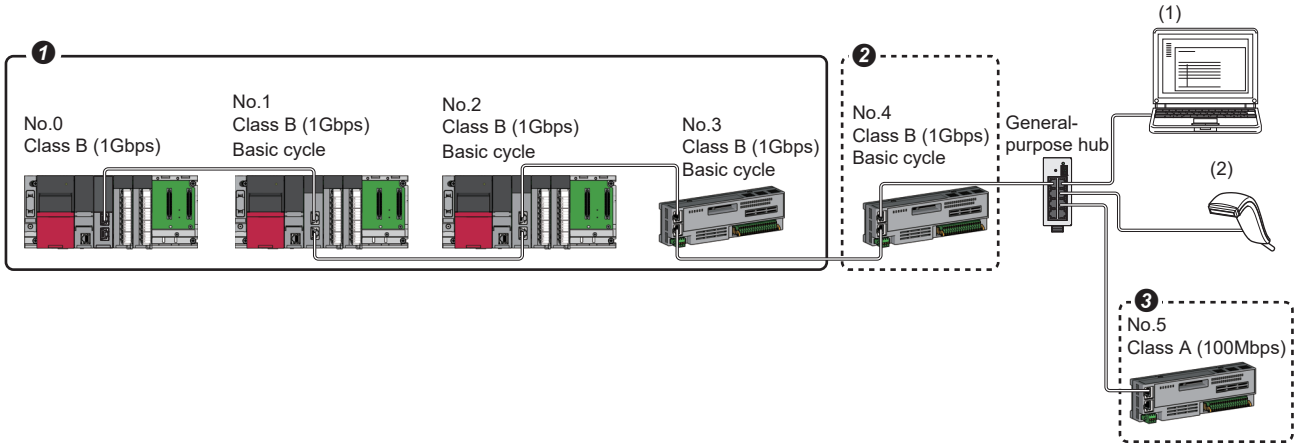
Available range of network synchronous communication

■Structure of CC-Link IE TSN Class B only



Class B: CC-Link IE TSN Class B device
No.0: Master station (CC-Link IE TSN Plus module)
No.1 and No.2: Local station (device where the network synchronous communication setting is set to "Synchronous")
No.3 and No.4: Local station (device where the network synchronous communication setting is set to "Asynchronous")
No.5, No.6, No.7, and No.8: Remote station (device where the network synchronous communication setting is set to "Synchronous")
No.9, No.10, and No.11: Remote station (device where the network synchronous communication setting is set to "Asynchronous")
(1) Ethernet device (1Gbps)
❶ Synchronization is possible using network synchronous communication.
❷ Even for a CC-Link IE TSN Class B device, synchronization is not possible if the network synchronous communication setting is set to "Asynchronous".

■Structure of Mixture of CC-Link IE TSN Class B/A

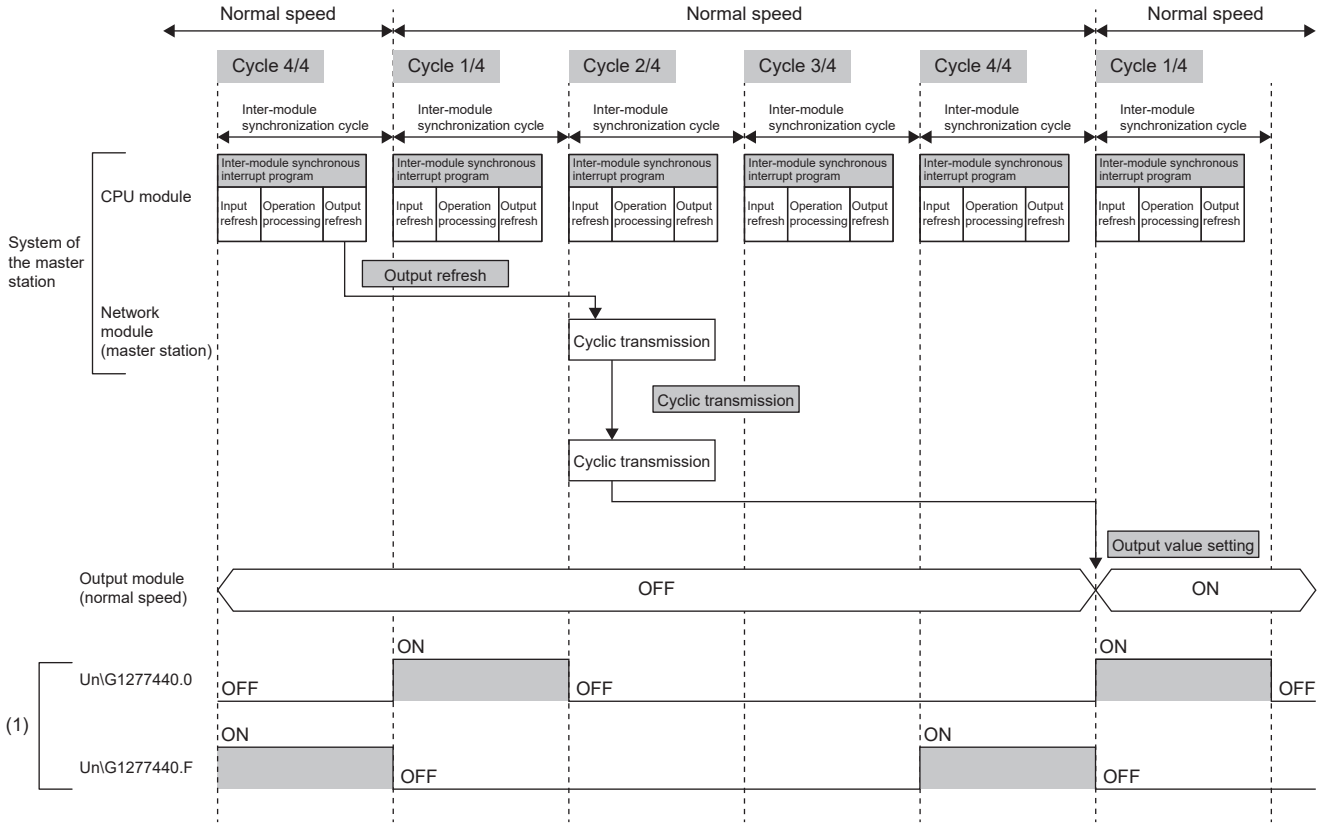


Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device
No.0: Master station (CC-Link IE TSN Plus module)
No.1 and No.2: Local station (device where the network synchronous communication setting is set to "Synchronous")
No.3: Remote station (device where the network synchronous communication setting is set to "Synchronous")
No.4: Remote station (device where the network synchronous communication setting is set to "Asynchronous")
No.5, No.6, and No.7: Remote station
(1) Ethernet device (1Gbps)
(2) Ethernet device (100Mbps)
❶ Synchronization is possible using network synchronous communication.
❷ Even for a CC-Link IE TSN Class B device, synchronization is not possible if the network synchronous communication setting is set to "Asynchronous".
❸ For a CC-Link IE TSN Class A device, synchronization is not possible using network synchronous communication.

Network synchronous communication with multiple cycles

When device stations with different communication cycles (excluding local stations) coexist, cyclic transmission between stations is performed according to the communication cycle. For the cyclic transmission of the master station and a remote station, data can be transmitted to other stations after two cycles.

The following figure shows the cyclic transmission timing when "Communication Period Setting" in "Network Configuration Settings" is set to "Normal-Speed".



(1) The communication cycle timing can be checked with the 'Communication cycle timing' (Un\G1277440 to Un\G1277441) of the buffer memory. The timing of data refreshed in the CPU module can also be checked with this buffer memory area. The 0th bit in this buffer memory area is turned on during the first (1/4) cycle for normal speed. In addition, the 15th bit in this buffer memory area is turned on during the last (4/4) cycle for normal speed. (☞ Page 514 Communication cycle timing)

Point

To perform network synchronous communication when multiple cycles coexist, set the setting of the local station to "Basic Period" for "Communication Period Setting" in "Network Configuration Settings".

Cyclic transmission assurance by watchdog counter

The watchdog counter is a function used to assure that normal cyclic transmission between stations on CC-Link IE TSN. Using the watchdog counter, the master station and a device station mutually monitor the data to be updated every communication cycle; the master station monitors data received from a device station and a device station monitors data received from the master station.

Point

Whether the device station is using the watchdog counter during a data link with the master station can be checked with 'Watchdog counter operation status of each station' (SW01D0 to SW01D7).

■Operation

When the master station is powered off and on (when the CPU module is reset) or a device station is disconnected and returned, the master station stores insufficient time for the transient transmission time in 'Transient transmission additional time (calculation value)' (SW007A).

If a value has been stored in 'Transient transmission additional time (calculation value)' (SW007A), add the value to the setting values for "Communication Period Interval Setting" and "Transient transmission time' of "Communication Period Setting" under "Basic Settings" for "System Parameter" of the master station.

■Setting method

The settings of the master station are not required to use the watchdog counter. However, the settings may be required depending on the device station used. (📖 Manual for the device station used)

■Precautions

- When the CC-Link IE TSN Plus module is used as a local station, the watchdog counter cannot be used.
- When a device station does not use the watchdog counter, 0 is stored in 'Transient transmission additional time (calculation value)' (SW007A).

Network synchronous communication with a local station

A local station can link network synchronous communication and the inter-module synchronization function, so the local station can operate in synchronization with the inter-module synchronization cycle of the master station. For details, refer to the following.

📖 MELSEC iQ-R Inter-Module Synchronization Function Reference Manual

Program example

For program examples using the CC-Link IE TSN network synchronous communication function, refer to the following.

📖 MELSEC iQ-R Inter-Module Synchronization Function Reference Manual

Point

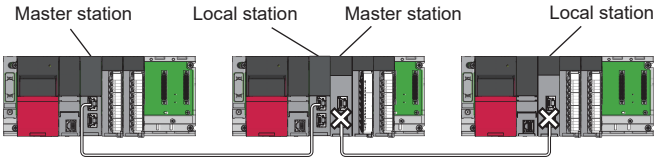
- The operating status of each station can be checked with 'Information of CC-Link IE TSN network synchronous communication function of each station' (SW01C0 to SW01C7) or 'Synchronous/asynchronous operating status information of each station' (SW01C8 to SW01CF). To perform I/O control, configure an interlock by using the corresponding bit of the special register (SW).
- When the CPU operating status of the relevant stations are currently STOP or PAUSE state, an inter-module synchronous interrupt program is not executed. At this time, the operating status of the network synchronous communication of each station ('Synchronous/asynchronous operating status information of each station' (SW01C8 to SW01CF)) stores an asynchronous setting (0) in bits of the relevant stations and bits of other stations are not changed.

Precautions

- For a CC-Link IE TSN Class A device, synchronization is not possible using network synchronous communication. (☞ Page 217 Compatible device)
- For the number of connectable modules or order of connection for CC-Link IE TSN supported devices to be connected, refer to the following.

☞ Page 26 CC-Link IE TSN SYSTEM CONFIGURATION

- To specify the CC-Link IE TSN Plus module as the target module for the inter-module synchronization, mount it to the main base unit.
- When a local station is specified as the target module for the inter-module synchronization, the master station cannot be set as the target module.
- When multiple CC-Link IE TSN Plus modules (master stations) are specified as the target modules for synchronization on the same base unit, set the slot number of the leftmost one for "Mounting Slot No." under "Inter-module Synchronization Master Setting" in "System parameter".
- In a multiple CPU system configuration, only the CC-Link IE TSN Plus module controlled by the CPU No.1 can be specified as the target for the inter-module synchronization.
- Set the same cycle for "Fixed Scan Interval Setting of Inter-module Synchronization" in "System Parameter" and "Communication Period Interval Setting" in "Basic Settings" of the module parameter.
- As shown in the figure below, networks after the first local station cannot be synchronized.



- Only a TSN hub can be used as a switching hub. An error will occur if a general-purpose hub is used. For the models and usage methods of the supported TSN hubs, refer to the CC-Link Partner Association website (www.cc-link.org).
- Do not set "Not set" for "0.05ms Unit Setting" of "Inter-module Synchronization Setting" in "System Parameter". Select "Set" for "0.05ms Unit Setting", and set a value in the range 0.25 to 10.0ms (in units of 0.05ms).
- When a switching hub is used, the local station may detect an error at start-up the system. In such a case, take corrective actions according to the error code.
- Do not perform the online change (ladder block) in the CPU module. If the online change (ladder block) is used in the CPU module, there may be a delay in the start of the inter-module synchronous interrupt program (I44) in the interrupt program. In this case, the total value of the execution time of the inter-module synchronous interrupt program (I44) and the cyclic processing time exceeds the next inter-module synchronization cycle (next communication cycle), and the inter-module synchronous transmission omission occurs. The watchdog counter also detects an error because cyclic transmission cannot be performed within the communication cycle.

9.8 Others

Reserved station setting

A reserved station is a device station that is set in the parameters and included as a station in the network when its number is counted. This station is reserved for network extension in the future, and thus the station is not actually connected, and is not detected as a faulty station despite being not connected. (☞ Page 96 "CC-Link IE TSN Configuration" window)
By setting a reserved station, link device assignment will not change even if the device station is connected (or the reservation is cleared). Therefore, modification of the program is not required.

Error invalid station setting

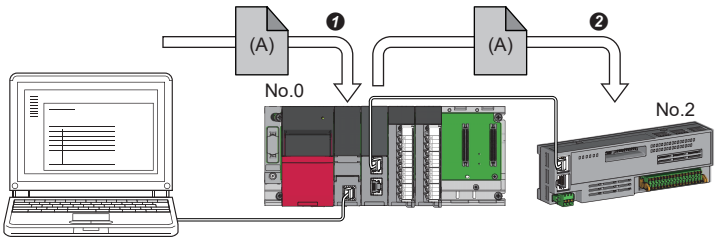
An error invalid station is a device station that is set to be not detected as a faulty station by the master station. It is also set when a device station is to be replaced during data link. (☞ Page 96 "CC-Link IE TSN Configuration" window)

Device station parameter automatic setting

Parameters of the device station are saved to the master station and are automatically set when the device station is connected or returned to the network.

Device station parameter automatic setting from the master station

1. Parameters of the device station set using the engineering tool are saved in the memory of the CPU module in the master station or the SD memory card by writing.
2. When the device station is connected/returned by power-on, saved parameters are automatically set from the master station.



❶ Save parameter (A) of the device station to the CPU module on the master station.
❷ When the device station is returned/connected, saved parameter (A) is automatically set from the master station to the device station.

Point

- The master station starts data link with the device station after parameters of the device station are automatically set.
- The device station parameter automatic setting is also executed for device stations set as reserved stations.

Setting method

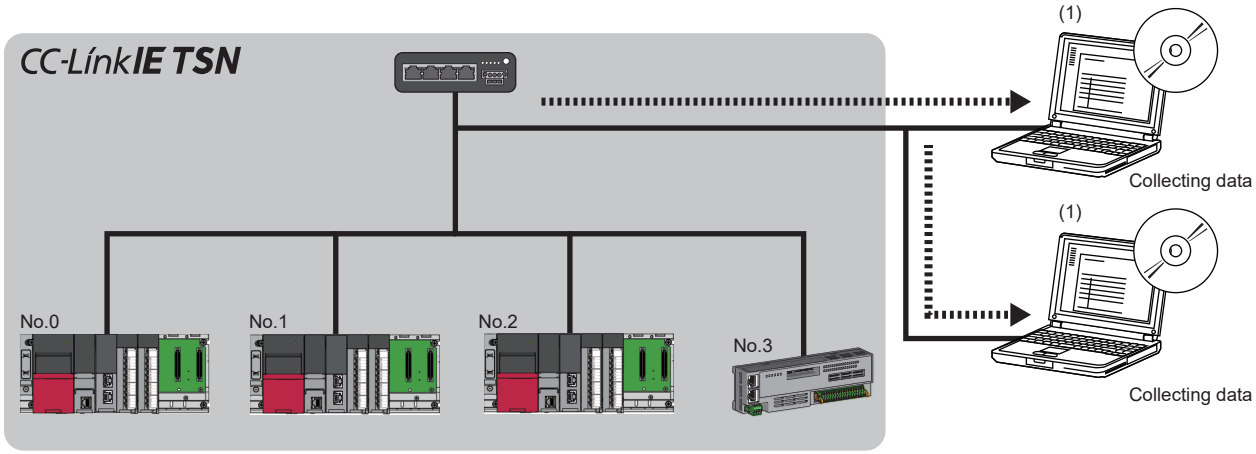
Set in the "Parameter of Device Station" window. (☞ Page 103 Parameter Processing of Device Station)

Precautions

- A device station whose device station parameter automatic setting abnormally ended does not start data link, and 'Execution result of device station parameter automatic setting function' (SW0160 to SW0167) turns on. Check 'Detailed execution result of device station parameter automatic setting' (SW0194) and the event history and perform corrective actions according to Action of the error codes list.
- Check if the checkbox of "Parameter Automatic Setting" of the device station is selected in "Network Configuration Settings" under "Basic Settings".
- Check if the IP address of the device station in the "Network Configuration Settings" under "Basic Settings" matches the actual IP address of the device station.
- When different communication speeds are set for the master station and the station where device station parameter automatic setting is performed, the device station parameter automatic setting may end abnormally. If the setting ends abnormally, check if the communication speed is matched.
- When the parameters of a device station are stored in the SD memory card, set "Use" of "Device Station Parameter" in "Setting of File/Data Use or Not in Memory Card" under "Memory Card Parameter" for CPU module.
- In "Network Configuration Settings" in "Basic Settings" in all master stations controlled by the CPU module, set 1024 or smaller to the total number for the device station parameter automatic setting including extension modules.

Data collection using the CC-Link IE TSN Communication Software

The cyclic data of each CC-Link IE TSN station is received using the CC-Link IE TSN Communication Software.
For details on the CC-Link IE TSN Communication Software, refer to the following.
CC-Link IE TSN Communication Software for Windows User's Manual



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3: Remote station
(1) CC-Link IE TSN Communication Software (number of connectable modules: 2)

System configuration

For system configuration, refer to the following.
Page 54 Structure When CC-Link IE TSN Communication Software Is Used

Setting method

When connecting the CC-Link IE TSN Communication Software, set multicast mode to the communication mode.

[Module Parameter] ⇨ [Application Settings] ⇨ [Communication Mode] ⇨ [Multicast]

Precautions

■CC-Link IE TSN/CC-Link IE Field diagnostics

The CC-Link IE TSN Communication Software information cannot be displayed using the CC-Link IE TSN/CC-Link IE Field diagnostics.

■Network configuration settings

- Do not add devices on the "CC-Link IE TSN Configuration" window.
- CC-Link IE TSN Communication Software is not detected using the "Connected/Disconnected Module Detection" function.

[Module Parameter] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting] ⇨ [Connected/Disconnected Module Detection]

10 DEDICATED INSTRUCTION

This section describes dedicated instructions that can be used in the CC-Link IE TSN Plus module and the transient transmission ranges.

Point

For details on dedicated instructions, refer to the following.
MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

Precautions

■Data change

Do not change any data specified (such as control data) until execution of the dedicated instruction is completed.

■When the dedicated instruction is not completed

If execution of dedicated instructions does not complete, check whether the module operation mode of the CC-Link IE TSN Plus module is online. (☞ Page 86 Module Operation Mode)
A dedicated instruction cannot be executed when the mode is offline or module communication test.

10.1 Link Dedicated Instructions

The following table lists the instructions used for transient transmission to or from programmable controllers on other stations. Each link dedicated instruction allows access to a station on a network other than CC-Link IE TSN.

Instruction	Description
READ	Reads the data in units of words from devices in the programmable controller of another station.
SREAD	Reads the data in units of words from devices in the programmable controller of another station. When reading of the data is completed, another station devices are turned on.
WRITE	Writes the data in units of words to devices in the programmable controller of another station.
SWRITE	Writes the data in units of words to devices in the programmable controller of another station. When writing of the data is completed, another station devices are turned on.
SEND	Sends data to the programmable controller of another station.
RECV	Reads the data received from the programmable controller of another station. (For a main routine program)
REQ	Requests the remote RUN/STOP to the programmable controller of another station.
	Reads/writes clock data from/to the programmable controller of another station.

Transient transmission ranges

In a single network system, communication with all stations on the network is possible.
In multi-network system, communications can be made with stations up to eight networks apart.

Precautions

■When multiple link dedicated instructions are executed simultaneously

When executing multiple link dedicated instructions simultaneously, check that the channels for the instructions are not duplicated. Link dedicated instructions with a same channel number cannot be executed simultaneously. To use the same channel for multiple link dedicated instructions, configure an interlock so that an instruction is executed after completion of another.

■When different communication speeds are set for the master station and target station

- When executing a dedicated instruction, execute it on the master station.
- Do not execute multiple dedicated instructions simultaneously. If multiple dedicated instructions are executed simultaneously, the other dedicated instruction may not be executed. When executing multiple dedicated instructions, configure an interlock so that an instruction is executed after completion of another.

10.2 Remote Instructions

The following table lists the instructions used for transient transmission to the remote station.

Instruction	Description
REMFR	Reads data in units of words from the buffer memory in the remote station. (16-bit address specification)
REMFRD	Reads data in units of words from the buffer memory in the remote station. (32-bit address specification)
REMFRIP	Reads data in units of words from the buffer memory in the remote station. (Target station IP address specification) (16-bit address specification)
REMFRDIP	Reads data in units of words from the buffer memory in the remote station. (Target station IP address specification) (32-bit address specification)
REMTO*1	Writes data in units of words to the buffer memory in the remote station. (16-bit address specification)
REMTOD*1	Writes data in units of words to the buffer memory in the remote station. (32-bit address specification)
REMTOIP*1	Writes data in units of words to the buffer memory in the remote station. (Target station IP address specification) (16-bit address specification)
REMTODIP*1	Writes data in units of words to the buffer memory in the remote station. (Target station IP address specification) (32-bit address specification)

*1 The instruction cannot be executed on the local station. Execute it on the master station.

Transient transmission ranges

In a single network system, communication with the remote station on the network is possible.
Communication is not available with stations in other networks.

Precautions

When using the REMFR, REMTO, REMFRD, or REMTOD instructions, configure an interlock with the following module labels.

- 'Data link error status of own station' (SB0049)
- 'Data link status of each station' (SW00B0 to SW00B7) of the target station

Check that the data link status is normal. ('Data link error status of own station' (SB0049) and 'Data link status of each station' (SW00B0 to SW00B7) of the target station are off.)

10.3 SLMP Communication Instruction

The following table lists the dedicated instruction used to send an SLMP frame to an SLMP-compatible device in the same network.

Instruction	Description
SLMPSND	Send an SLMP message to the SLMP-compatible device in the same network.

10.4 Socket Communications Instructions

The following table lists the Ethernet instructions used for socket communications.

Instruction	Description
CONOPEN	Establishes a connection.
CONCLOSE	Closes the connection.
SOCRCV	Reads the receive data from the external device.
SOCSND	Sends data to the external device.

Point

If the instruction has a completion device, do not change the various data (such as control data and request data) specified with the executed instruction until execution of the instruction is completed.

11 PROGRAMMING

This chapter describes programming and startup examples of CC-Link IE TSN.

11.1 Precautions for Programming

This section describes precautions to create CC-Link IE TSN programs.

Cyclic transmission program

For a cyclic transmission program, configure an interlock with the following module labels (link special relay (SB), link special register (SW)).

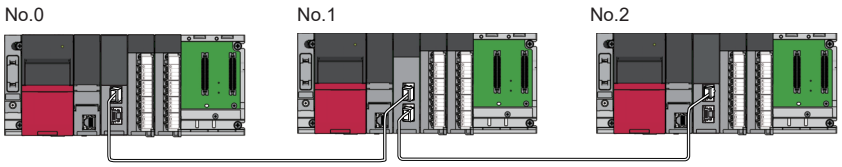
- 'Data link error status of own station' (SB0049)
- 'Data link status of each station' (SW00B0 to SW00B7)

11.2 Communication Example of the Master Station and Local Stations

The following system configuration is used to explain communication between the master station and local station.

System configuration

- Power supply module: R61P
- CPU module: R04CPU
- Master station (No.0): RJ71GN11-EIP (start I/O number: 0000H to 001FH)
- Local station (No.1): RJ71GN11-T2 (start I/O number: 0000H to 001FH)
- Local station (No.2): RJ71GN11-EIP (start I/O number: 0000H to 001FH)



No.0: Master station (station No.0)
No.1: Local station (station No.1)
No.2: Local station (station No.2)

Link device assignment

For RX, RY, RWr, and RWw, 256 points are assigned to each station.

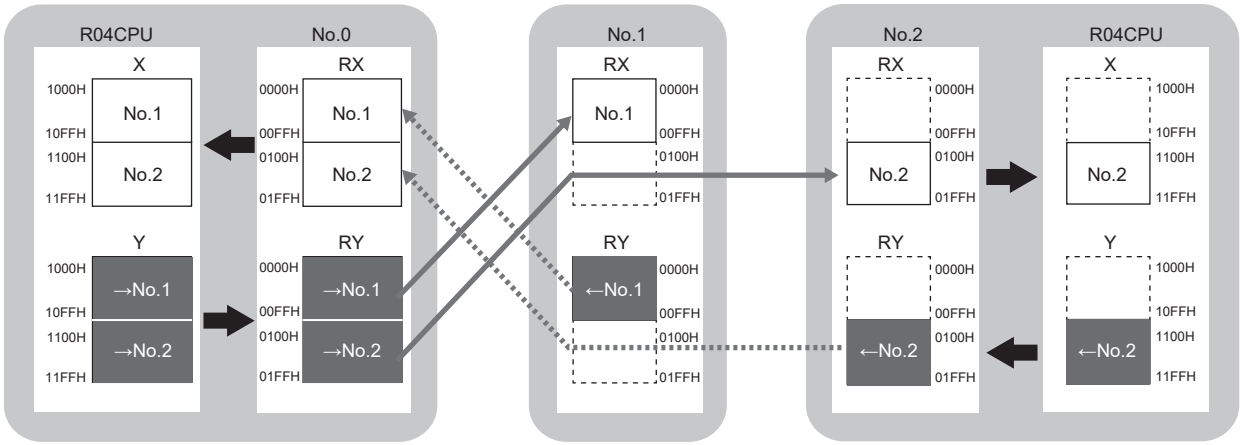
For LB and LW, 512 points are assigned to each station.

Unicast mode

■RX/RY assignment

Each of the following No.0 to No.2 represents a station number.

No.0 is master station, and No.1 and No.2 are local stations.



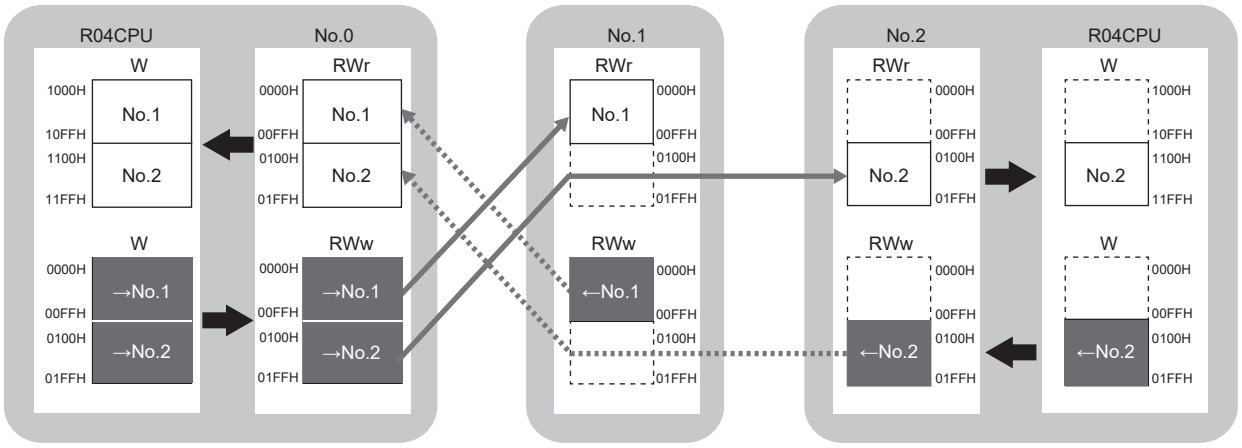
→No.1, →No.2: Send range to station No.1, send range to station No.2

←No.1, ←No.2: Send range from station No.1, send range from station No.2

■RWr/RWw assignment

Each of the following No.0 to No.2 represents a station number.

No.0 is master station, and No.1 and No.2 are local stations.



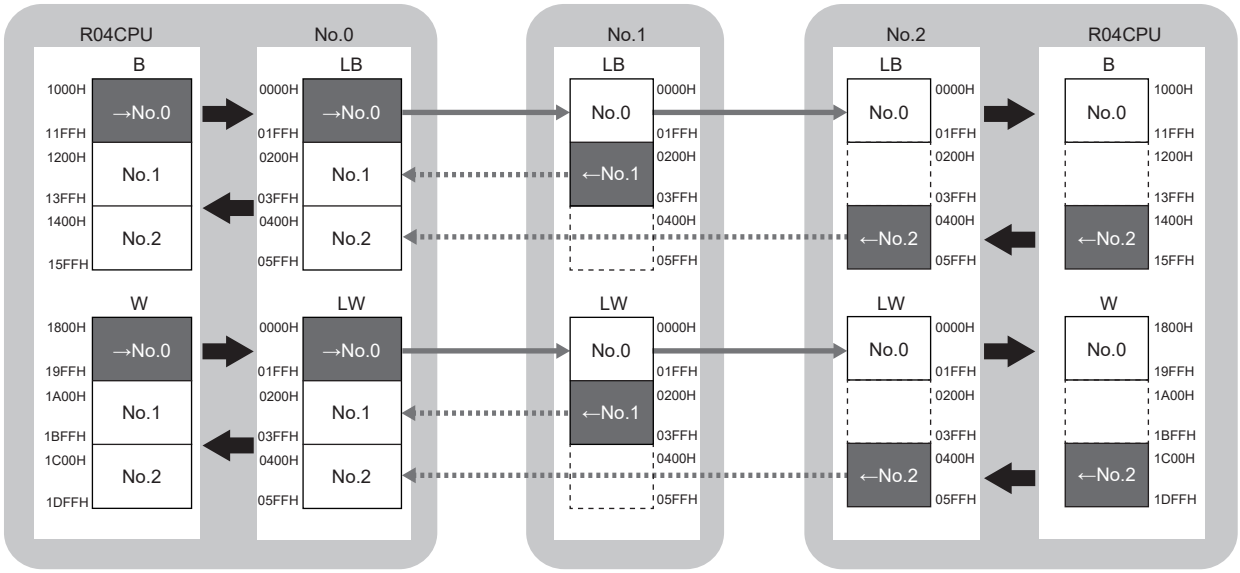
→No.1, →No.2: Send range to station No.1, send range to station No.2

←No.1, ←No.2: Send range from station No.1, send range from station No.2

■LB/LW assignment

Each of the following No.0 to No.2 represents a station number.

No.0 is master station, and No.1 and No.2 are local stations.



→No.0: Send range from station No.0

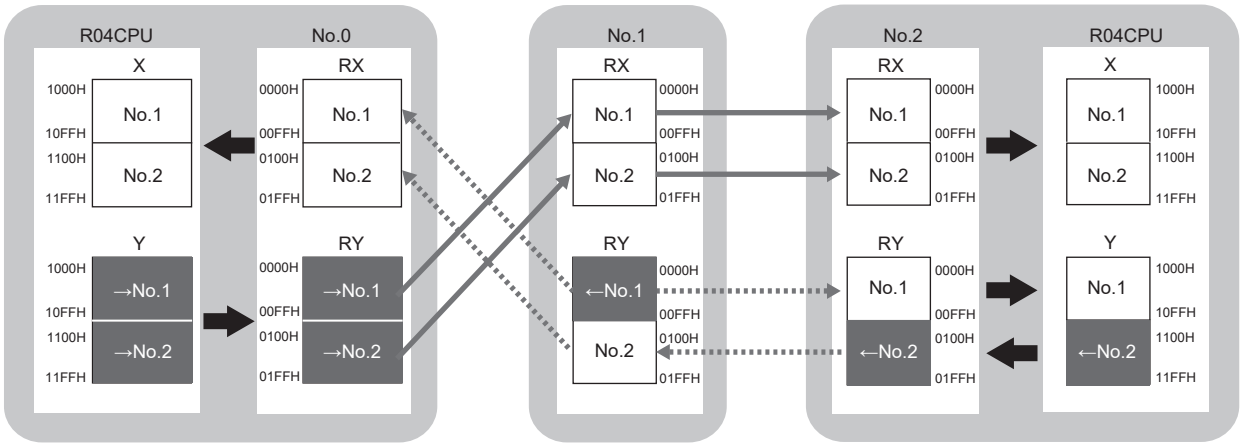
←No.1, ←No.2: Send range from station No.1, send range from station No.2

Multicast mode

■RX/RY assignment

Each of the following No.0 to No.2 represents a station number.

No.0 is master station, and No.1 and No.2 are local stations.



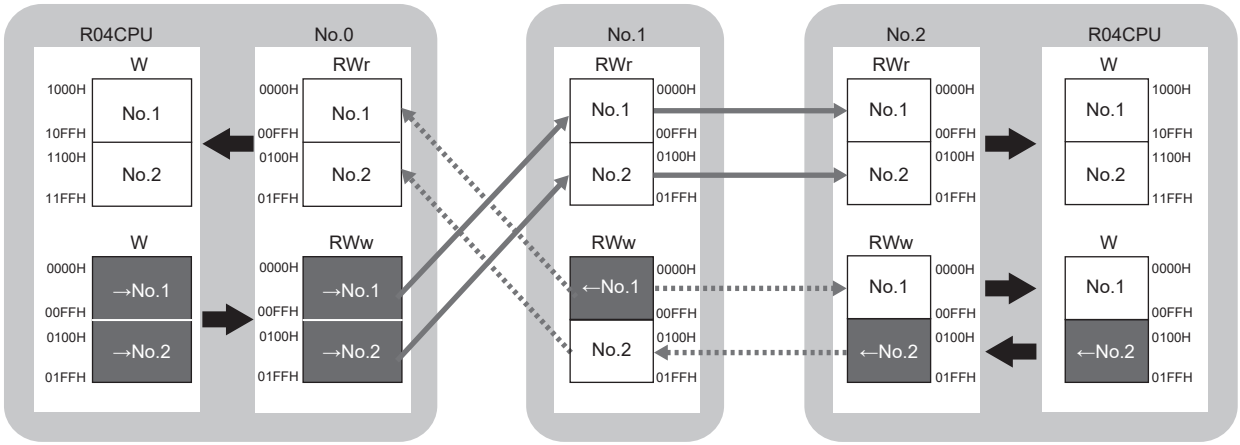
→No.1, →No.2: Send range to station No.1, send range to station No.2

←No.1, ←No.2: Send range from station No.1, send range from station No.2

■RWr/RWw assignment

Each of the following No.0 to No.2 represents a station number.

No.0 is master station, and No.1 and No.2 are local stations.



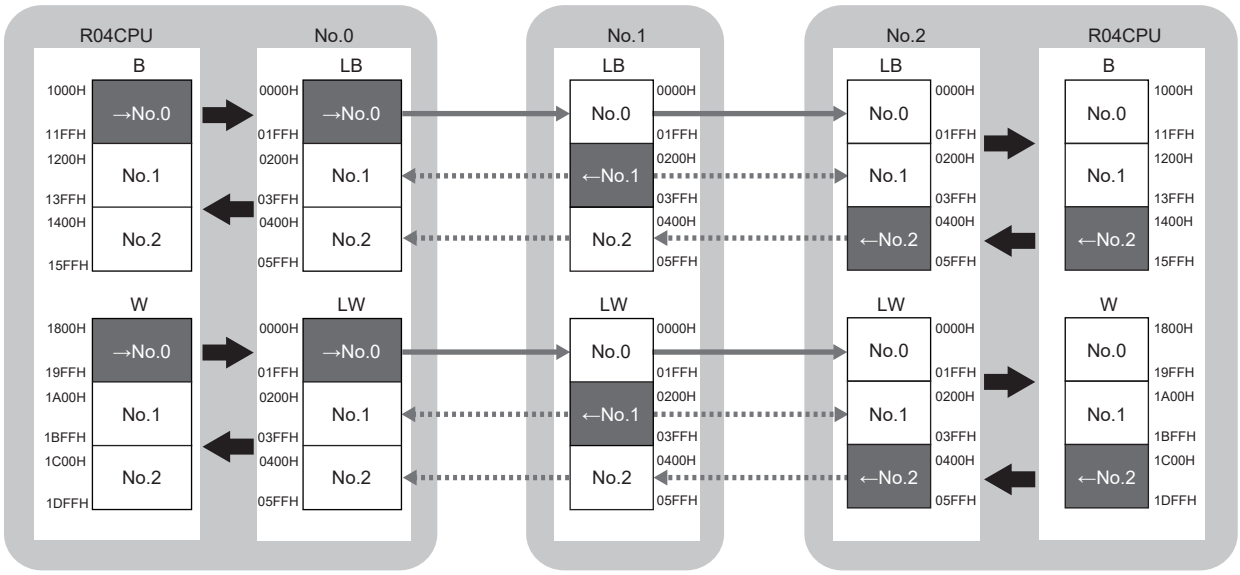
→No.1, →No.2: Send range to station No.1, send range to station No.2

←No.1, ←No.2: Send range from station No.1, send range from station No.2

■LB/LW assignment

Each of the following No.0 to No.2 represents a station number.

No.0 is master station, and No.1 and No.2 are local stations.



→No.0: Send range from station No.0

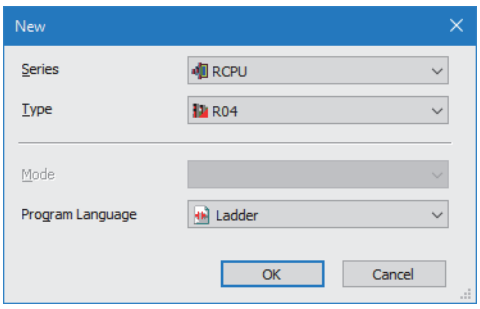
←No.1, ←No.2: Send range from station No.1, send range from station No.2

Setting in the master station

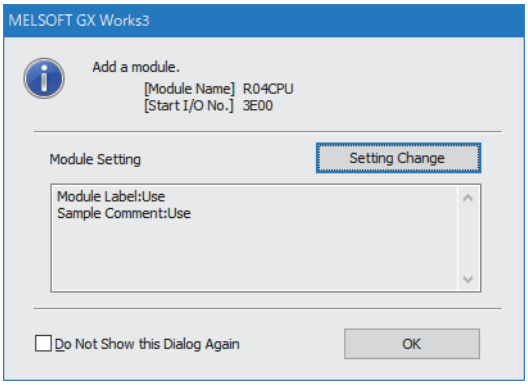
Connect the engineering tool to the CPU module on the master station and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]



2. Click the [Setting Change] button and set the item that is to use module labels.



3. Set "Link Direct Device Setting" in "CPU Parameter" to "Extended Mode (iQ-R Series Mode)".

[CPU Parameter] ⇨ [Memory/Device Setting] ⇨ [Link Direct Device Setting] ⇨ [Link Direct Device Setting]

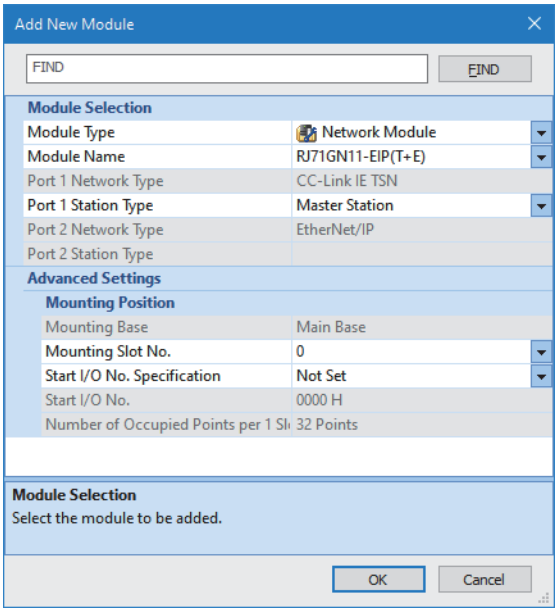
Item	Setting
Link Direct Device Setting	
Link Direct Device Setting	Extended Mode (iQ-R Series Mode)

Restriction

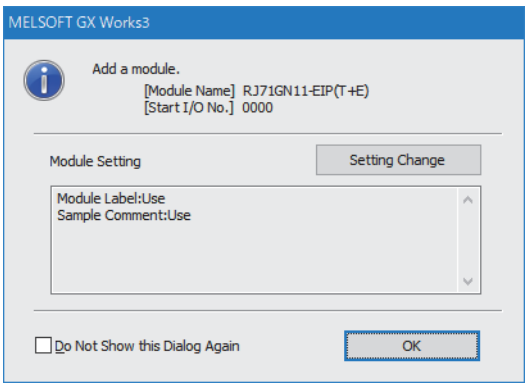
To write module parameters of the CC-Link IE TSN Plus module on a CPU module using an engineering tool, set "Link Direct Device Setting" to "Extended Mode (iQ-R Series Mode)".
If "Link Direct Device Setting" is "Q Series Compatible Mode", "Write to PLC" cannot be executed.

4. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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

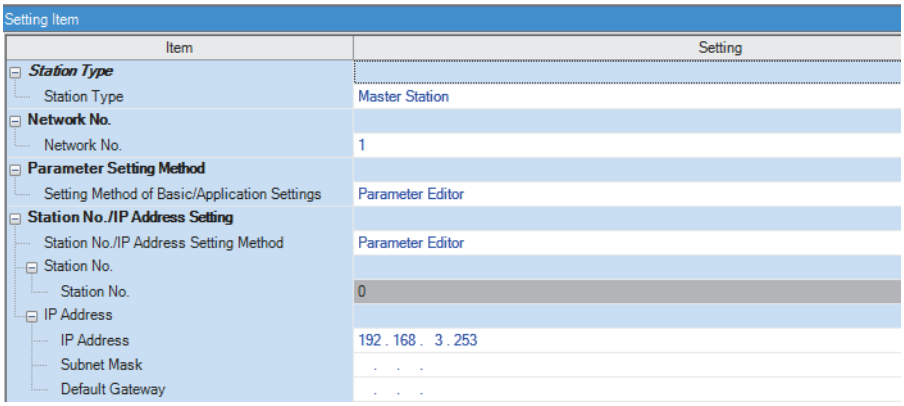


5. Click the [OK] button to add a module label of the CC-Link IE TSN Plus module.



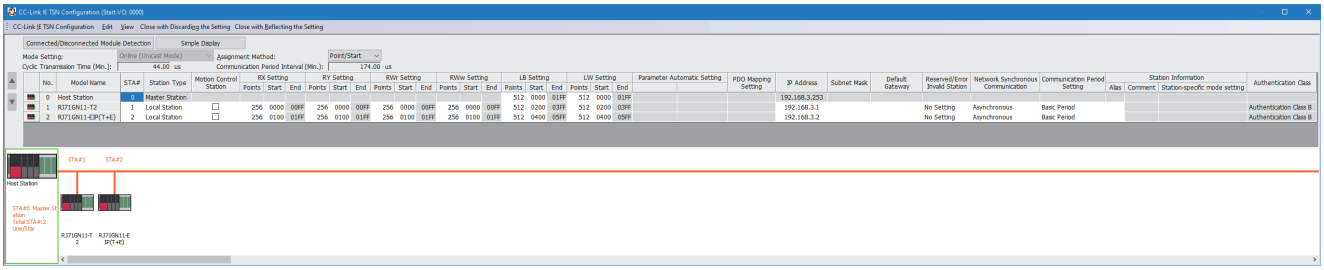
6. Set the items in "Required Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Required Settings]



7. Set the network configuration as follows. (Set the IP address for each station.)

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]



In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

8. Click the [Close with Reflecting the Setting] button to close the "CC-Link IE TSN Configuration" window.

9. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Refresh Settings] ⇨ [Detailed Setting]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	4096	00000	00FFF		Module Label				
-	SW	4096	00000	00FFF		Module Label				
1	RX	512	00000	001FF		Specify Device	X	512	01000	011FF
2	RY	512	00000	001FF		Specify Device	Y	512	01000	011FF
3	RWw	512	00000	001FF		Specify Device	W	512	00000	001FF
4	RWr	512	00000	001FF		Specify Device	W	512	01000	011FF
5	LB	1536	00000	005FF		Specify Device	B	1536	01000	015FF
6	LW	1536	00000	005FF		Specify Device	W	1536	01800	01DFF

10. In "Communication Mode" under "Application Settings", set "Unicast" or "Multicast".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Application Settings] ⇨ [Communication Mode]

11. Click the [Apply] button.

12. 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 example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 73 CC-Link IE TSN Parameter Settings

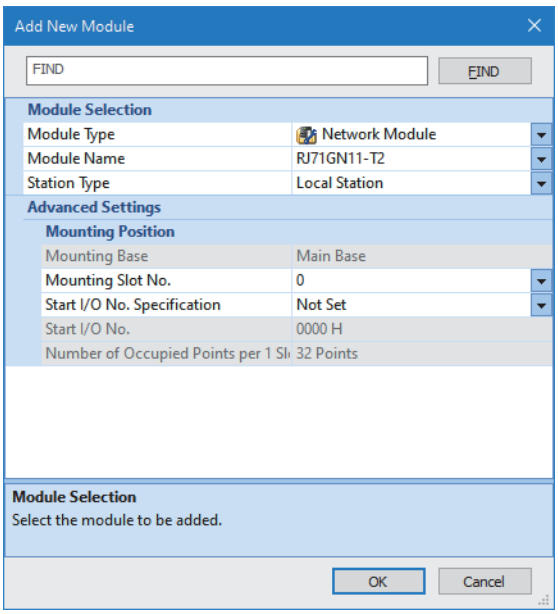
Settings in the local stations

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

Settings in the local station (station No.1)

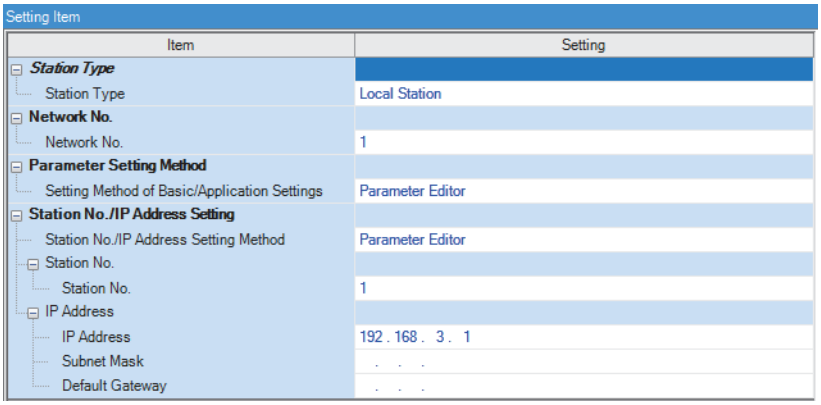
1. Set the CPU module and add the module labels of the CPU module. The setting method of the CPU module and addition method of the module label are the same as those of the master station. (☞ Page 233 Setting in the master station)
2. Set a local station (RJ71GN11-T2) as follows.

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



3. Add a module label of the local station. The addition method of the module label is the same as that of the master station. (☞ Page 233 Setting in the master station)
4. Set the items in "Required Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2] ⇨ [Required Settings]



5. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2] ⇨ [Basic Settings] ⇨ [Refresh Settings] ⇨ [Detailed Setting]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	4096	00000	00FFF		Module Label				
-	SW	4096	00000	00FFF		Module Label				
1	RX	512	00000	001FF		Specify Device	X	512	01000	011FF
2	RY	512	00000	001FF		Specify Device	Y	512	01000	011FF
3	RWw	512	00000	001FF		Specify Device	W	512	00000	001FF
4	RWr	512	00000	001FF		Specify Device	W	512	01000	011FF
5	LB	1536	00000	005FF		Specify Device	B	1536	01000	015FF
6	LW	1536	00000	005FF		Specify Device	W	1536	01800	01DFF

6. Click the [Apply] button.

7. Write the set parameters to the CPU module on the local station. Then, reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

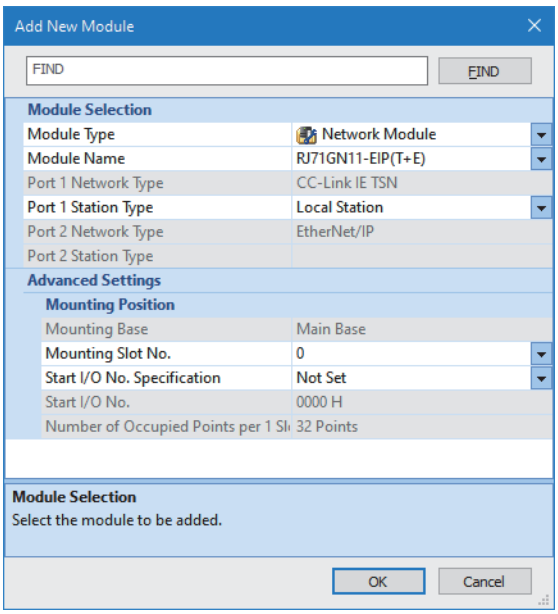
MELSEC iQ-R CC-Link IE TSN User's Manual (Application)

Settings in the local station (station No.2)

1. Set the CPU module and add the module labels of the CPU module. The setting method of the CPU module and addition method of the module label are the same as those of the master station. (☞ Page 233 Setting in the master station)

2. Set a local station (RJ71GN11-EIP) as follows.

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



3. Add a module label of the local station. The addition method of the module label is the same as that of the master station. (☞ Page 233 Setting in the master station)

4. Set the items in "Required Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Required Settings]

Setting Item

Item	Setting
Station Type	
Station Type	Local Station
Network No.	
Network No.	1
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor
Station No./IP Address Setting	
Station No./IP Address Setting Method	Parameter Editor
Station No.	
Station No.	2
IP Address	
IP Address	192 . 168 . 3 . 2
Subnet Mask	. . .
Default Gateway	. . .

5. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Refresh Settings] ⇨ [Detailed Setting]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	4096	00000	00FFF	⇔	Module Label				
-	SW	4096	00000	00FFF	⇔	Module Label				
1	RX	512	00000	001FF	⇔	Specify Device	X	512	01000	011FF
2	RY	512	00000	001FF	⇔	Specify Device	Y	512	01000	011FF
3	RWw	512	00000	001FF	⇔	Specify Device	W	512	00000	001FF
4	RWr	512	00000	001FF	⇔	Specify Device	W	512	01000	011FF
5	LB	1536	00000	005FF	⇔	Specify Device	B	1536	01000	015FF
6	LW	1536	00000	005FF	⇔	Specify Device	W	1536	01800	01DFF

6. Click the [Apply] button.

7. Write the set parameters to the CPU module on the local station. Then, reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 73 CC-Link IE TSN Parameter Settings

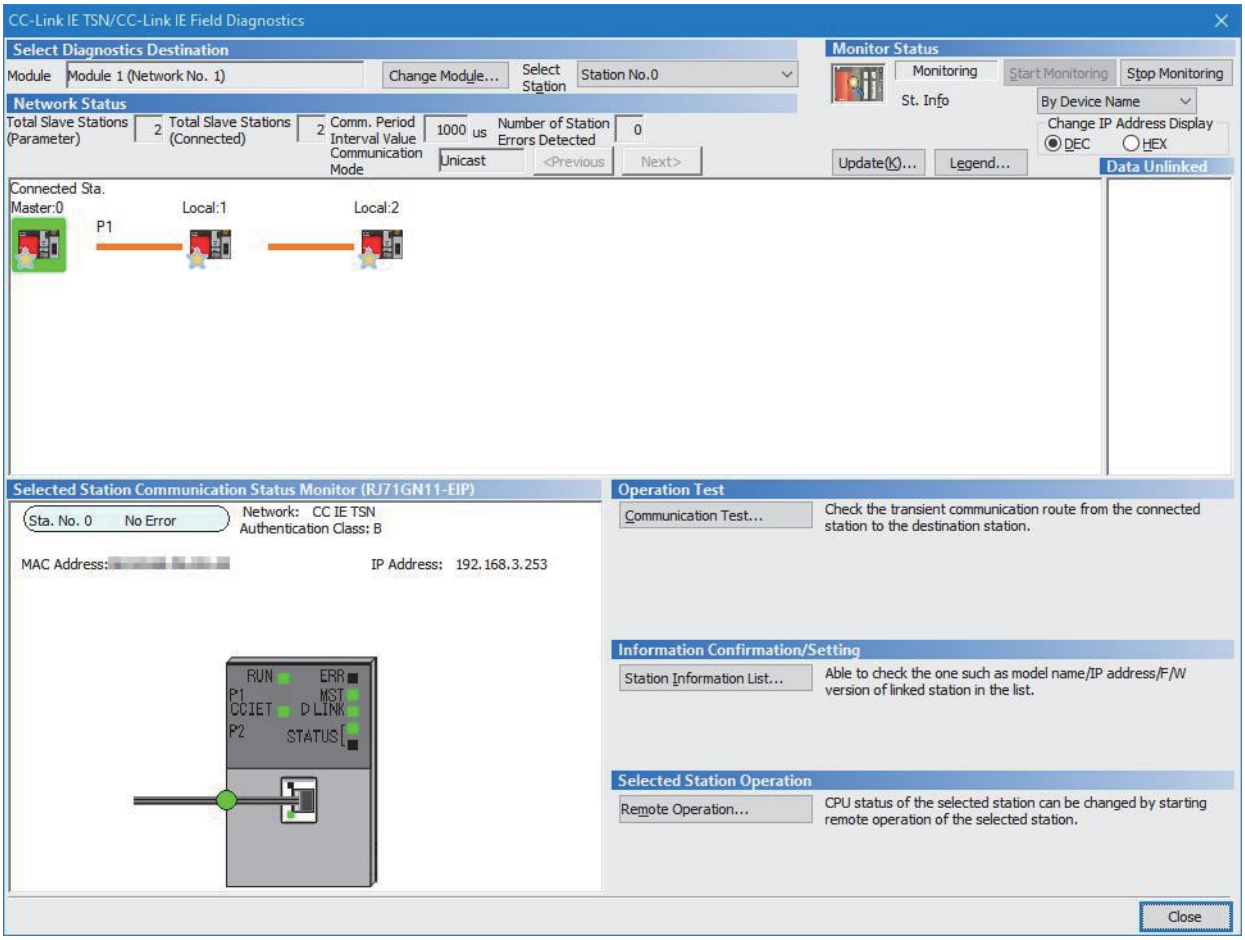
Checking the network status

Once parameters are set for the master station and local station, check whether data links between the master station and local station is normally operating. Use the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool to check the status.

1. Connect the engineering tool to the CPU module on the master station.
2. Start the CC-Link IE TSN/CC-Link IE Field diagnostics.

[Diagnostics] ⇨ [CC-Link IE TSN/CC-Link IE Field Diagnostics]

If the following display appears, a data link is normal.



In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

If an error icon appears in "Network Status" area, use the CC-Link IE TSN/CC-Link IE Field diagnostics to identify the cause of the error and take corrective actions. (☞ Page 398 CC-Link IE TSN/CC-Link IE Field Diagnostics)

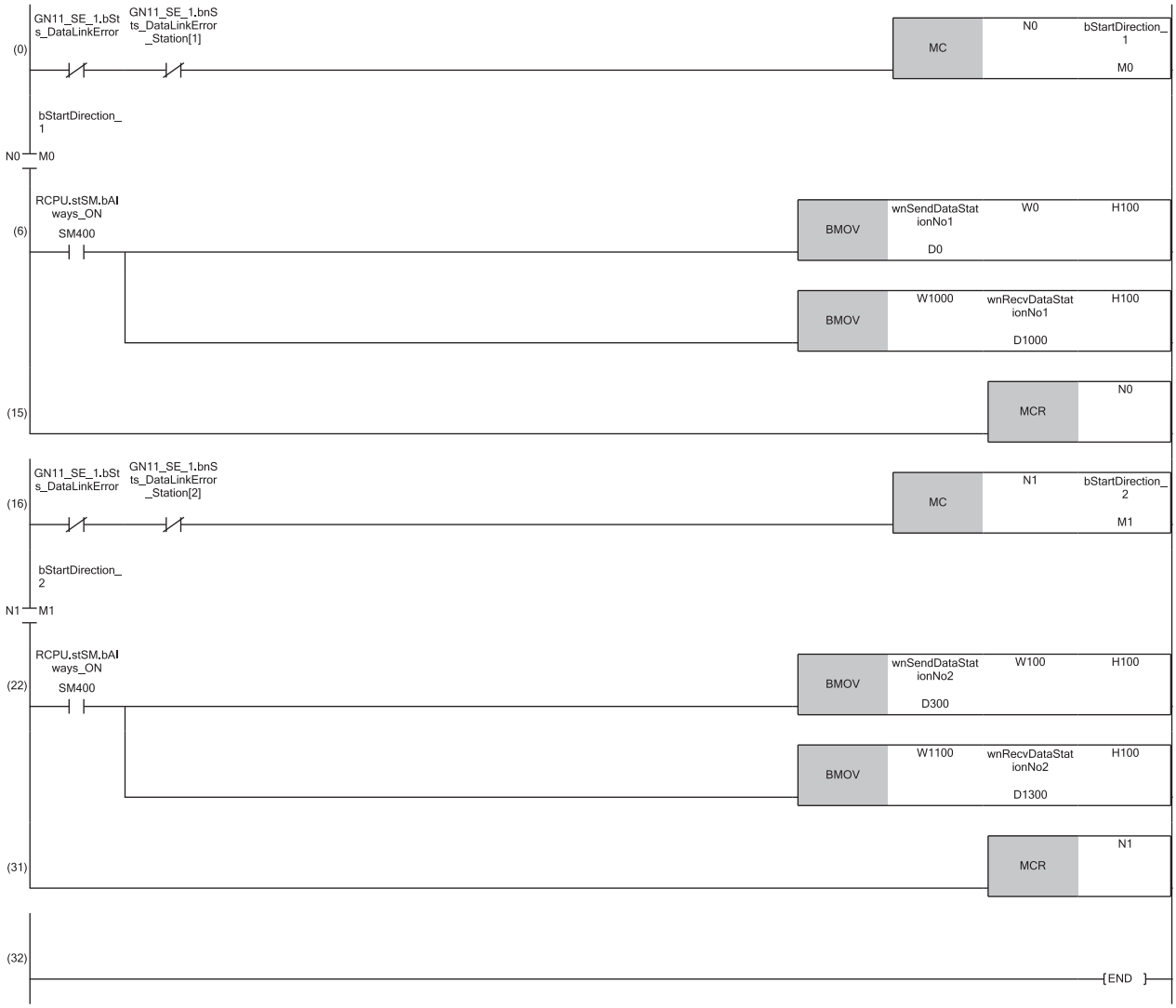
Program example (at unicast mode)

This section describes a program example when "Communication Mode" under "Application Settings" is set to "Unicast".

Master station (station No.0)

Classification	Label name	Description	Device
Module label	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_SE_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GN11_SE_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station No.1)	SW00B0.0
	GN11_SE_1.bnSts_DataLinkError_Station[2]	Data link status of each station (station No.2)	SW00B0.1
Label to be defined	Define global labels as shown below:		

Label Name	Data Type		Class	Assign (Device/Label)
bStartDirection_1	Bit	...	VAR_GLOBAL	M0
bStartDirection_2	Bit	...	VAR_GLOBAL	M1
wnSendDataStationNo1	Word [Signed]	...	VAR_GLOBAL	D0
wnRecvDataStationNo1	Word [Signed]	...	VAR_GLOBAL	D1000
wnSendDataStationNo2	Word [Signed]	...	VAR_GLOBAL	D300
wnRecvDataStationNo2	Word [Signed]	...	VAR_GLOBAL	D1300



(6) Communication program with a local station (station No.1)
(22)Communication program with a local station (station No.2)

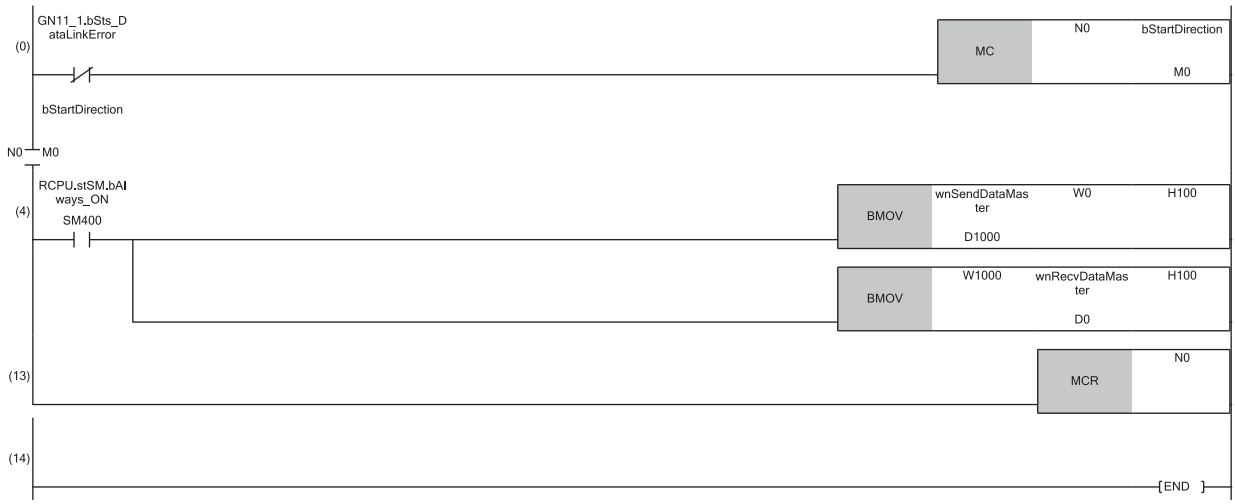
Point

If no response is received for several cycle, 'Data link status of each station' (SW00B0 to SW00B7) is determined to be a cyclic transmission faulty station.

Local station (station No.1, station No.2)

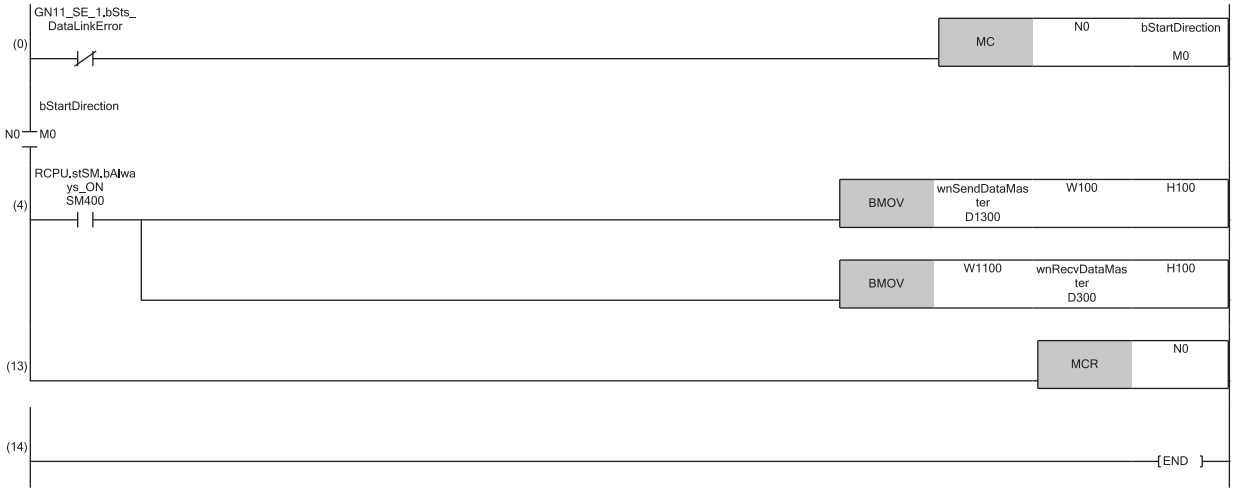
Classification	Label name	Description	Device
Module label (station No.1)	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_1.bSts_DataLinkError	Data link error status of own station	SB0049
Module label (station No.2)	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_SE_1.bSts_DataLinkError	Data link error status of own station	SB0049
Label to be defined	Define global labels as shown below: • Local station (station No.1) Label Name / Data Type / Class / Assign (Device/Label) bStartDirection / Bit / VAR_GLOBAL / M0 wnSendDataMaster / Word [Signed] / VAR_GLOBAL / D1000 wnRecvDataMaster / Word [Signed] / VAR_GLOBAL / D0 • Local station (station No.2) Label Name / Data Type / Class / Assign (Device/Label) bStartDirection / Bit / VAR_GLOBAL / M0 wnSendDataMaster / Word [Signed] / VAR_GLOBAL / D1300 wnRecvDataMaster / Word [Signed] / VAR_GLOBAL / D300		

■Local station (station No.1)



(4) Communication program with the master station (station No.0)

■Local station (station No.2)



(4) Communication program with the master station (station No.0)

Restriction

When "Communication Mode" is set to "Unicast", 'Data link status of each station' (SW00B0 to SW00B7) cannot be used as an interlock in the local station. Execute communications with other stations, taking into consideration of the operating status in stations to be communicated.

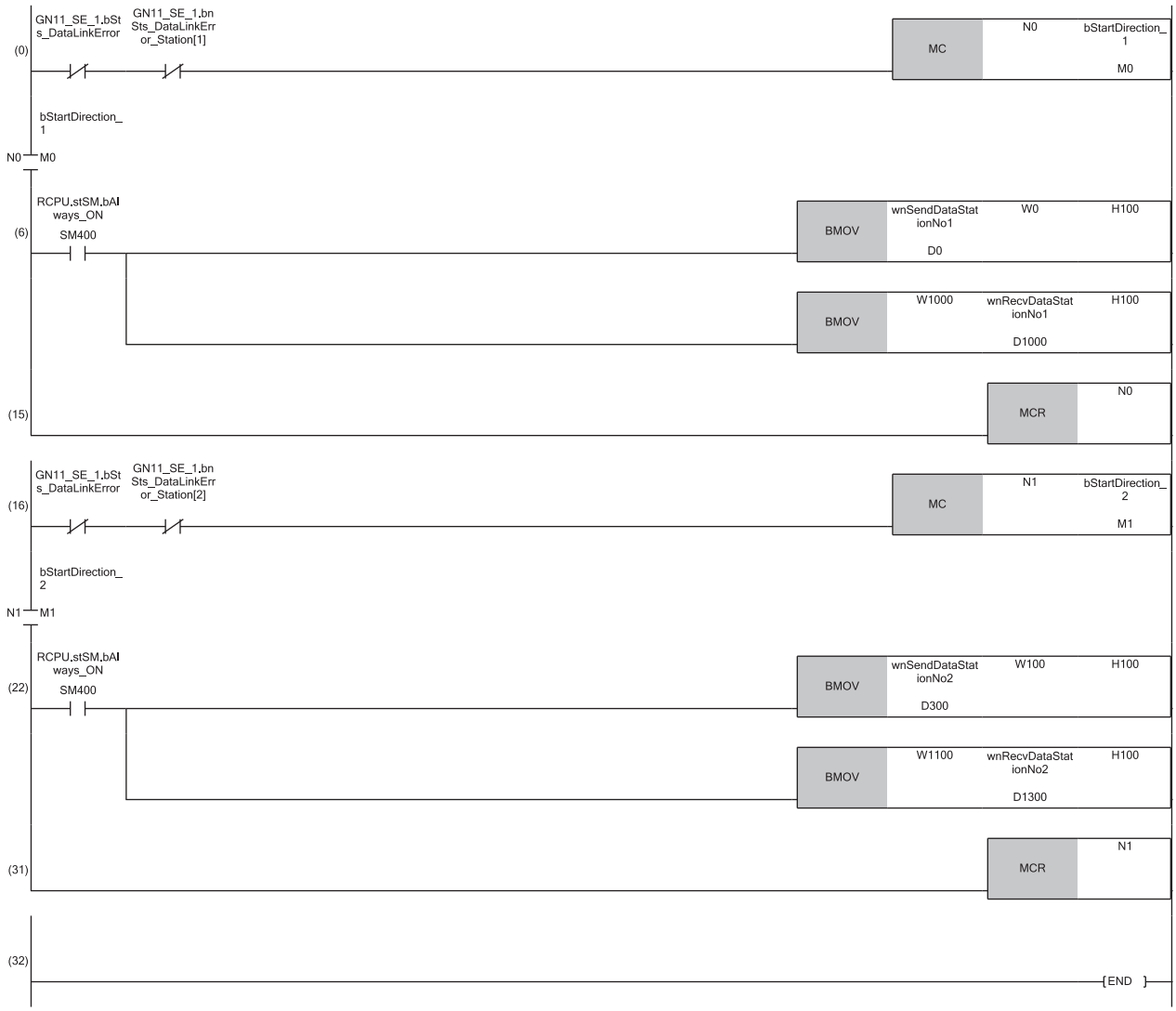
Program example (at multicast mode)

This section describes a program example when "Communication Mode" under "Application Settings" is set to "Multicast".

Master station (station No.0)

Classification	Label name	Description	Device
Module label	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_SE_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GN11_SE_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station No.1)	SW00B0.0
	GN11_SE_1.bnSts_DataLinkError_Station[2]	Data link status of each station (station No.2)	SW00B0.1
Label to be defined	Define global labels as shown below:		

Label Name	Data Type		Class	Assign (Device/Label)
bStartDirection_1	Bit	...	VAR_GLOBAL	M0
bStartDirection_2	Bit	...	VAR_GLOBAL	M1
wnSendDataStationNo1	Word [Signed]	...	VAR_GLOBAL	D0
wnRecvDataStationNo1	Word [Signed]	...	VAR_GLOBAL	D1000
wnSendDataStationNo2	Word [Signed]	...	VAR_GLOBAL	D300
wnRecvDataStationNo2	Word [Signed]	...	VAR_GLOBAL	D1300

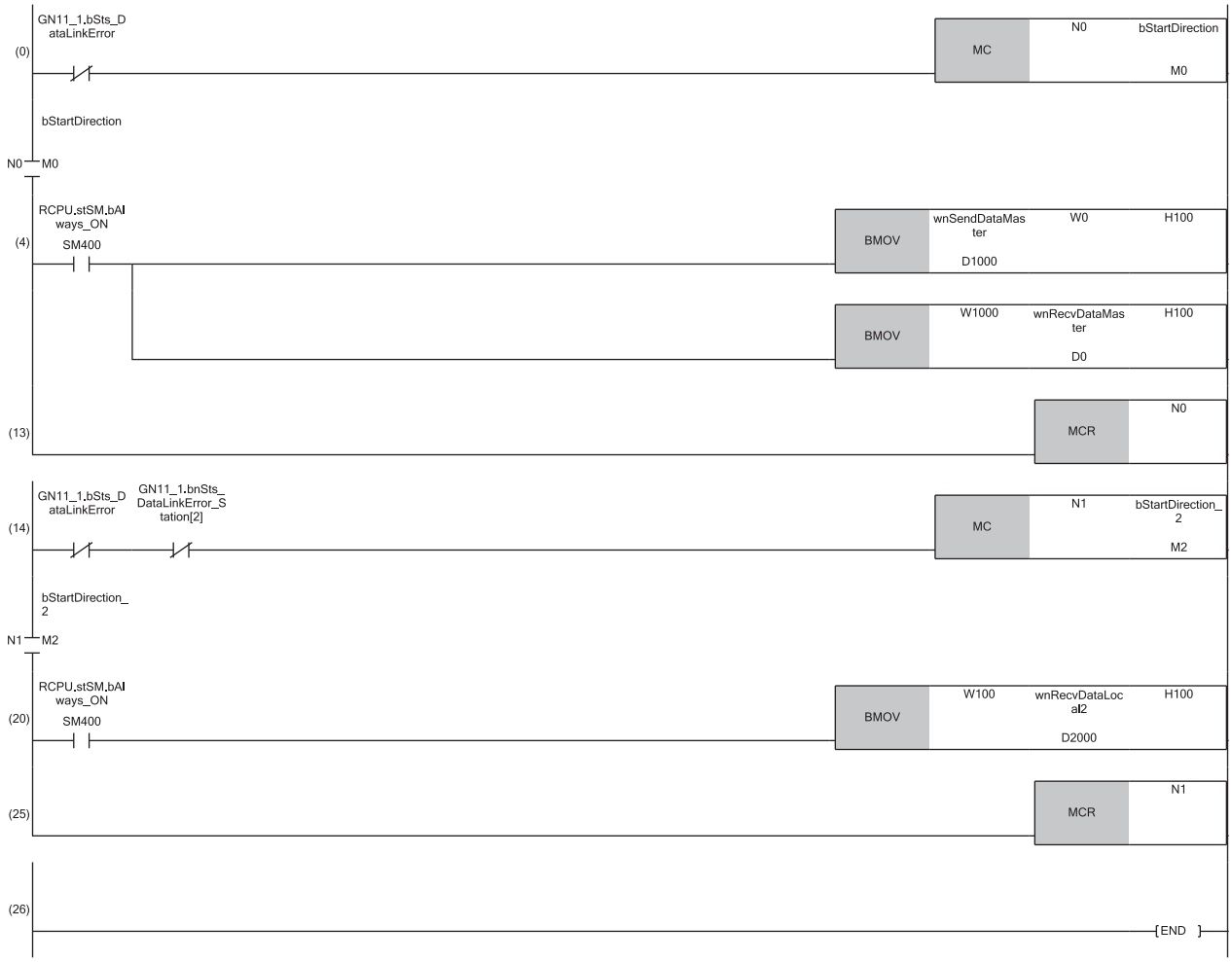


(6) Communication program with a local station (station No.1)
(22)Communication program with a local station (station No.2)

Local station (station No.1, station No.2)

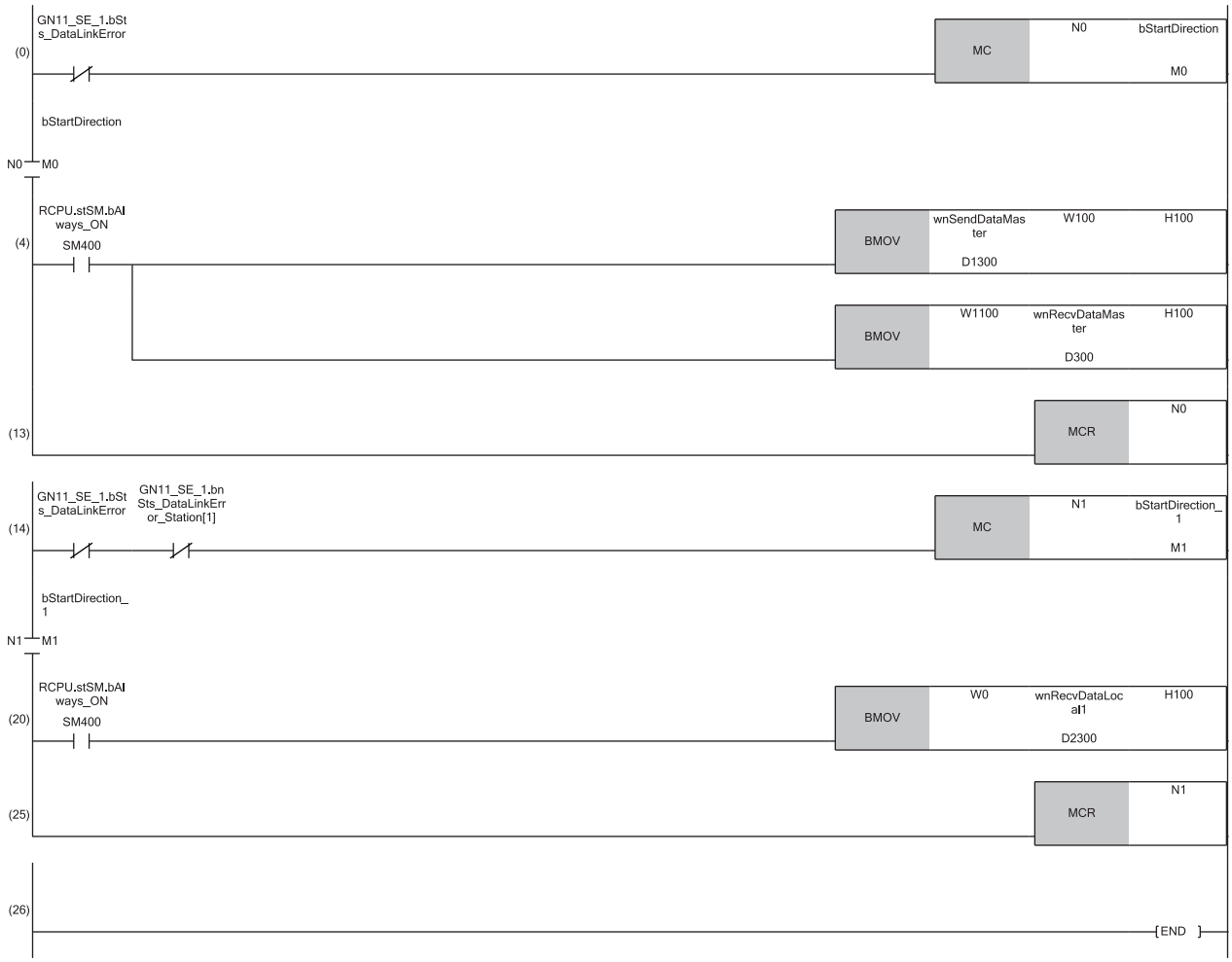
Classification	Label name	Description	Device
Module label (station No.1)	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GN11_1.bnSts_DataLinkError_Station[2]	Data link status of each station (station No.2)	SW00B0.1
Module label (station No.2)	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_SE_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GN11_SE_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station No.1)	SW00B0.0
Label to be defined	Define global labels as shown below: • Local station (station No.1) Label Name / Data Type / Class / Assign (Device/Label) bStartDirection / Bit / VAR_GLOBAL / M0 bStartDirection_2 / Bit / VAR_GLOBAL / M2 wnSendDataMaster / Word [Signed] / VAR_GLOBAL / D1000 wnRecvDataMaster / Word [Signed] / VAR_GLOBAL / D0 wnRecvDataLocal2 / Word [Signed] / VAR_GLOBAL / D2000 • Local station (station No.2) Label Name / Data Type / Class / Assign (Device/Label) bStartDirection / Bit / VAR_GLOBAL / M0 bStartDirection_1 / Bit / VAR_GLOBAL / M1 wnSendDataMaster / Word [Signed] / VAR_GLOBAL / D1300 wnRecvDataMaster / Word [Signed] / VAR_GLOBAL / D300 wnRecvDataLocal1 / Word [Signed] / VAR_GLOBAL / D2300		

■Local station (station No.1)



(4) Communication program with the master station (station No.0)
(20)Communication program with a local station (station No.2)

■Local station (station No.2)



(4) Communication program with the master station (station No.0)
(20)Communication program with a local station (station No.1)

11.3 Examples of Communication with CC-Link IE TSN Class A Remote Stations

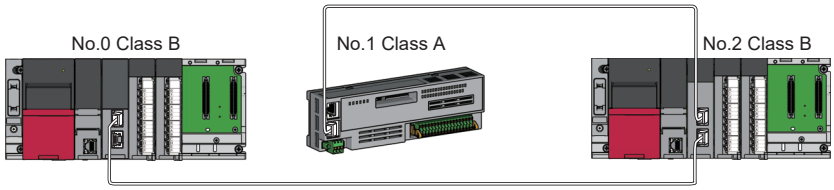
When "Communication Mode" is set to "Multicast", the local station cannot obtain data output by the CC-Link IE TSN Class A remote station. Use the following communication examples so that the local station can obtain data output by the CC-Link IE TSN Class A remote station.

System configuration

The following is an example of communications between the CC-Link IE TSN Class B master station (station No.0), CC-Link IE TSN Class A remote station (station No.1), and local station (station No.2).

System configuration

- Power supply module: R61P
- CPU module: R04CPU
- Master station (No.0): RJ71GN11-EIP
- Local station (No.2): RJ71GN11-T2
- Remote station (No.1): CC-Link IE TSN Class A remote



No.0: CC-Link IE TSN Class B master station (station No.0)
No.1: CC-Link IE TSN Class A remote station (station No.1)
No.2: CC-Link IE TSN Class B local station (station No.2)

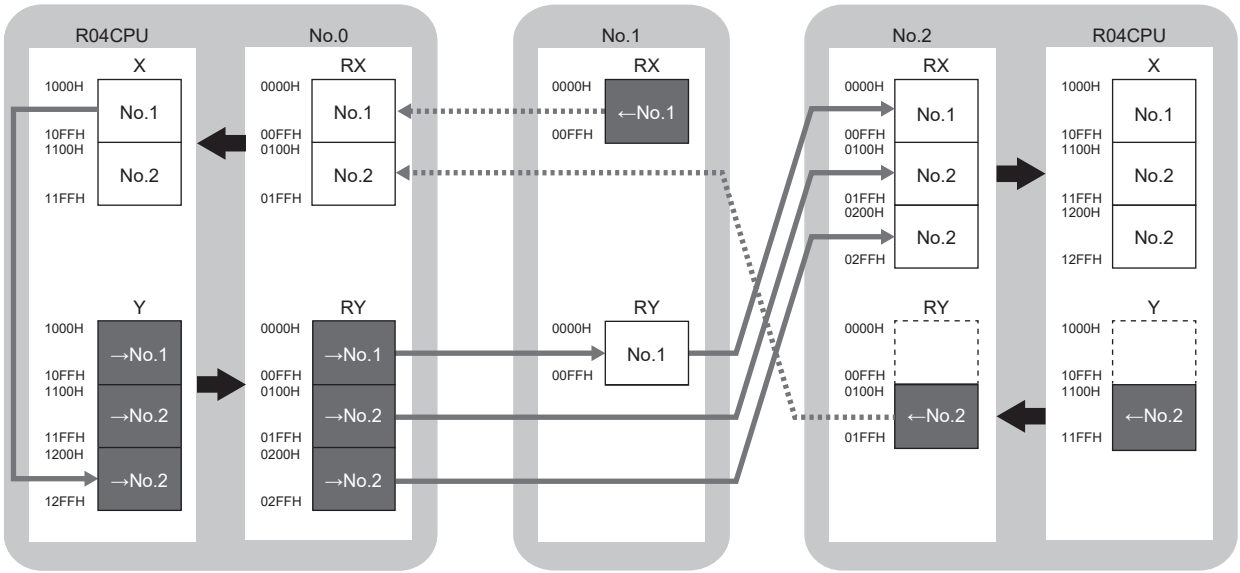
Link device assignment

For RX and RWr, 256 points are assigned to each station.
For RY and RWw, 256 points are assigned to a remote station and 512 points are assigned to a local station.

■RX/RY assignment

Each of the following No.0 to No.2 represents a station number.

- No.0: Master station (station No.0)
- No.1: Remote station (station No.1)
- No.2: Local station (station No.2)

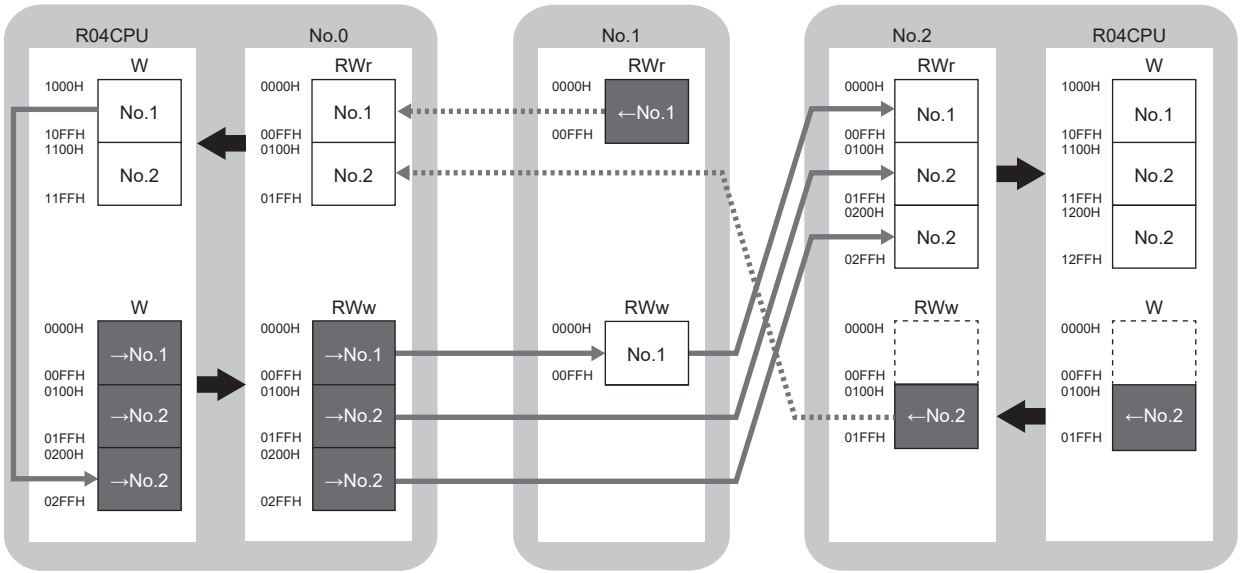


→No.1, →No.2: Send range to station No.1, send range to station No.2
←No.1, ←No.2: Send range from station No.1, send range from station No.2

■RWr/RWw assignment

Each of the following No.0 to No.2 represents a station number.

- No.0: Master station (station No.0)
- No.1: Remote station (station No.1)
- No.2: Local station (station No.2)



→No.1, →No.2: Send range to station No.1, send range to station No.2

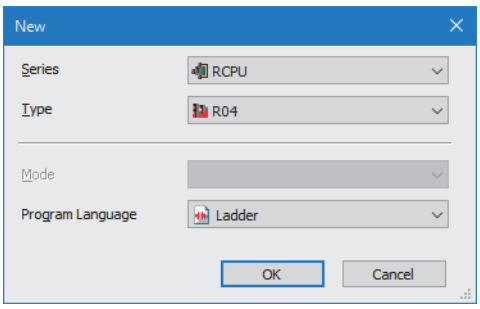
←No.1, ←No.2: Send range from station No.1, send range from station No.2

Setting in the master station

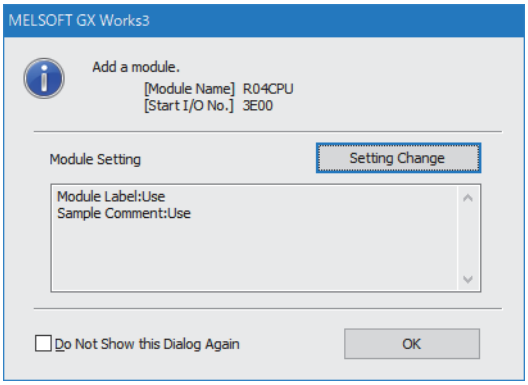
Connect the engineering tool to the CPU module on the master station and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]

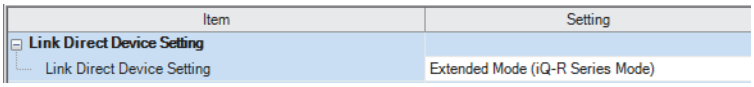


2. Click the [Setting Change] button and set the item that is to use module labels.



3. Set "Link Direct Device Setting" in "CPU Parameter" to "Extended Mode (iQ-R Series Mode)".

[CPU Parameter] ⇨ [Memory/Device Setting] ⇨ [Link Direct Device Setting] ⇨ [Link Direct Device Setting]



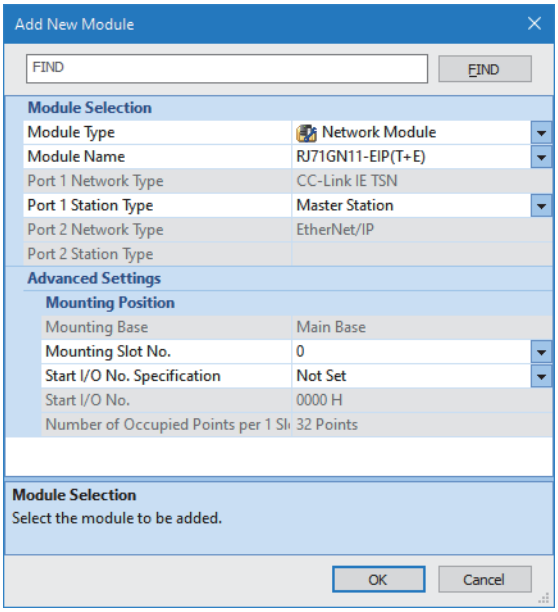
Item	Setting
Link Direct Device Setting	
Link Direct Device Setting	Extended Mode (iQ-R Series Mode)

Restriction

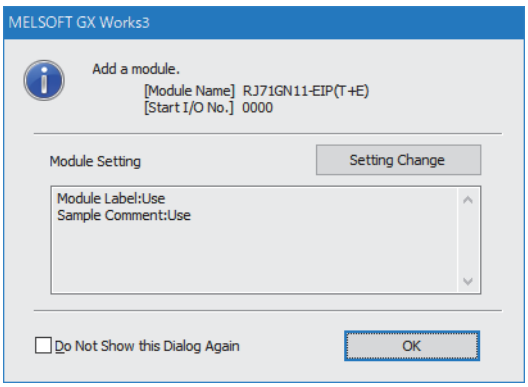
To write module parameters of the CC-Link IE TSN Plus module on a CPU module using an engineering tool, set "Link Direct Device Setting" to "Extended Mode (iQ-R Series Mode)".
If "Link Direct Device Setting" is "Q Series Compatible Mode", "Write to PLC" cannot be executed.

4. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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

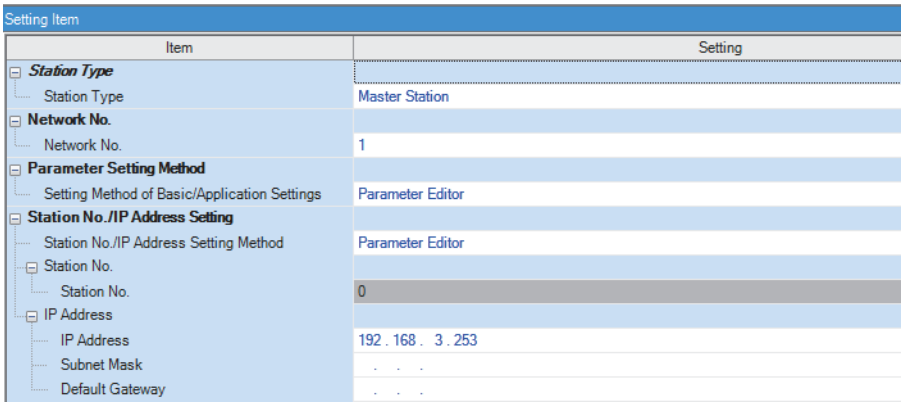


5. Click the [OK] button to add a module label of the CC-Link IE TSN Plus module.



6. Set the items in "Required Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Required Settings]



7. Set the items in "Basic Settings" as follows.

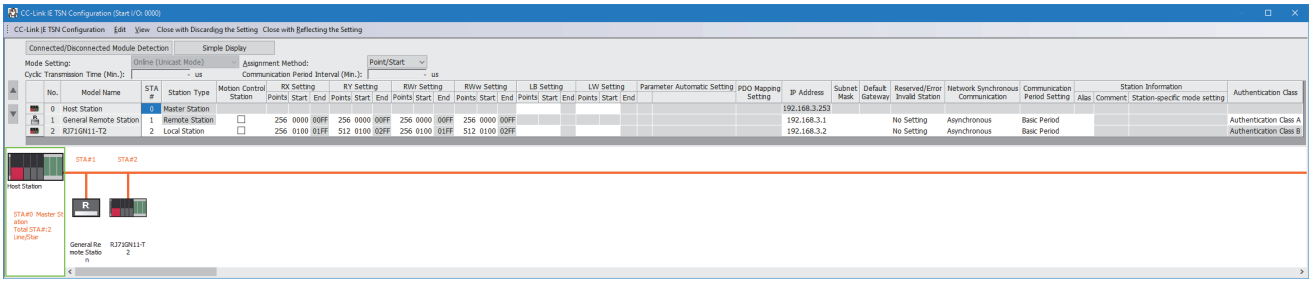
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings]

Item	Setting
Network Configuration Settings	
Network Configuration Settings	<Detailed Setting>
Refresh Settings	
Refresh Settings	<Detailed Setting>
Network Topology	
Network Topology	Line/Star
Communication Period Setting	
Basic Period Setting	
Setting in Units of 1us	Not Set
Communication Period Interval Setting (Do not Set it in Units of 1us)	4000.00 us
Communication Period Interval Setting (Set it in Units of 1us)	1000.00 us
System Reservation Time	200.00 us
Cyclic Transmission Time	3100.00 us
Transient Transmission Time	700.00 us
Multiple Period Setting	
Normal-Speed	x4
Low-Speed	x16
Connection Device Information	
Authentication Class Setting	Mixture of Authentication Class B/A or Authentication Class A Only
TSN HUB Setting	Not to Use TSN HUB
Device Station Setting	
Disconnection Detection Setting	4 times
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

8. Set the network configuration as follows. (Set the IP address for each station.)

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]



In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

9. Click the [Close with Reflecting the Setting] button to close the "CC-Link IE TSN Configuration" window.

10. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Refresh Settings] ⇨ [Detailed Setting]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	4096	00000	00FFF		Module Labe				
-	SW	4096	00000	00FFF		Module Labe				
1	RX	512	00000	001FF		Specify Devi	X	512	01000	011FF
2	RY	768	00000	002FF		Specify Devi	Y	768	01000	012FF
3	RWw	768	00000	002FF		Specify Devi	W	768	00000	002FF
4	RWr	512	00000	001FF		Specify Devi	W	512	01000	011FF

11. Set the items in "Application Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Application Settings]

Item	Setting
Communication Speed	
Communication Speed	100Mbps
Supplementary Cyclic Settings	
Station-based Block Data Assurance	Enable
I/O Maintenance Settings	
Output Hold/Clear Setting during CPU STOP	Hold
Data Link Error Station Setting	Clear
Output Mode upon CPU Error	Clear
Transient Transmission Group No.	
Transient Transmission Group No.	0
Communication Mode	
Communication Mode	Multicast
Parameter Name	
Parameter Name	
Dynamic Routing	
Dynamic Routing	Enable
Event Reception from Other Stations	
Event Reception from Other Stations	Enable
Module Operation Mode	
Module Operation Mode	Online
Security	
IP Filter Settings	
IP Filter	Disable
IP Filter Settings	<Detailed Setting>
Interlink Transmission Settings	
Interlink Transmission Settings	<Detailed Setting>
Timer Settings for Data Communication	
Change/Set Timer Value	No
TCP Resend Timer	10
Destination Alive Check Start Interval Timer	600
Destination Alive Check Interval Timer	10
Destination Alive Check Resend Count	3 Times
Advanced Settings	
Gateway Parameter Settings	
Gateway Other Than Default Gateway	Not Use
Gateway Information	

12. Click the [Apply] button.

13. 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 example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 73 CC-Link IE TSN Parameter Settings

Settings in the remote stations

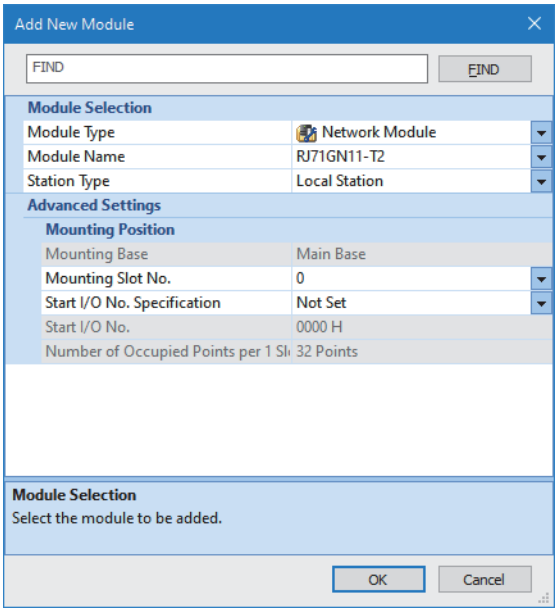
Set the setting of the IP address set in "Network Configuration Settings" of the master station.

Settings in the local stations

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

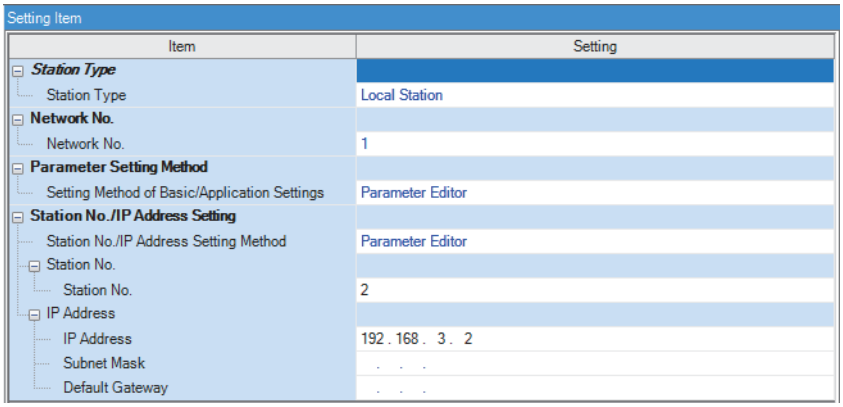
1. Set the CPU module and add the module labels of the CPU module. The setting method of the CPU module and addition method of the module label are the same as those of the master station. (☞ Page 249 Setting in the master station)
2. Set a local station (RJ71GN11-T2) as follows.

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



3. Set the item to use a module label of the local station. The addition method of the module label is the same as that of the master station. (☞ Page 249 Setting in the master station)
4. Set the items in "Required Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2] ⇨ [Required Settings]



5. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2] ⇨ [Basic Settings] ⇨ [Refresh Settings] ⇨ [Detailed Setting]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	4096	00000	00FFF		Module Labe				
-	SW	4096	00000	00FFF		Module Labe				
1	RX	768	00000	002FF		Specify Devi	X	768	01000	012FF
2	RY	512	00000	001FF		Specify Devi	Y	512	01000	011FF
3	RWw	512	00000	001FF		Specify Devi	W	512	00000	001FF
4	RWr	768	00000	002FF		Specify Devi	W	768	01000	012FF

6. Set the items in "Application Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2] ⇨ [Application Settings]

Setting Item

Item	Setting
Communication Speed	
Communication Speed	100Mbps
Supplementary Cyclic Settings	
I/O Maintenance Settings	
Output Hold/Clear Setting during CPU STOP	Hold
Data Link Error Station Setting	Clear
Output Mode upon CPU Error	Clear
Transient Transmission Group No.	
Transient Transmission Group No.	0
Parameter Name	
Parameter Name	
Dynamic Routing	
Dynamic Routing	Enable
Module Operation Mode	
Module Operation Mode	Online
Security	
IP Filter Settings	
IP Filter	Disable
IP Filter Settings	<Detailed Setting>

7. Click the [Apply] button.

8. Write the set parameters to the CPU module on the local station. Then, reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

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

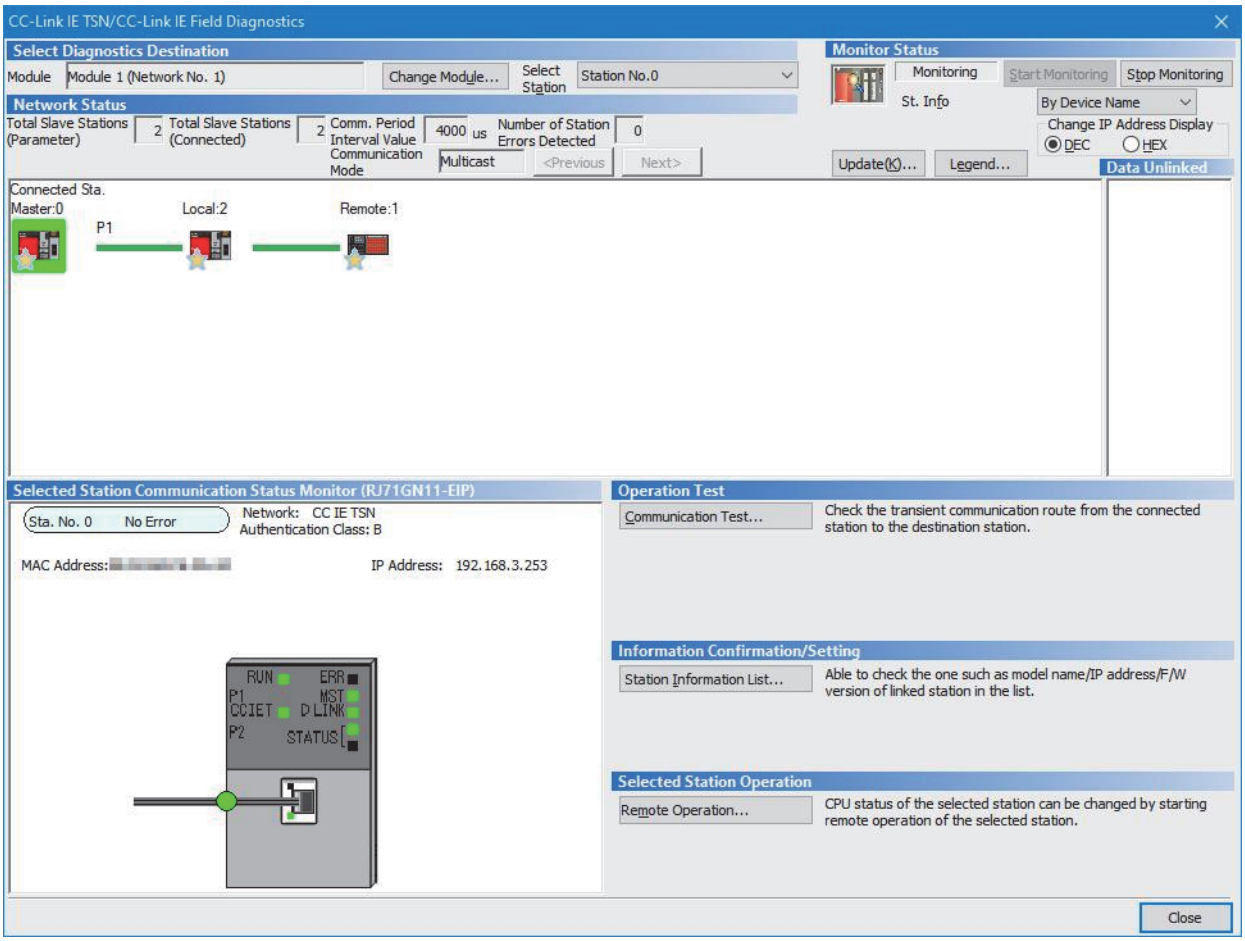
Checking the network status

After starting up the system, check whether data link can be normally performed. Use the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool to check the status.

1. Connect the engineering tool to the CPU module on the master station.
2. Start the CC-Link IE TSN/CC-Link IE Field diagnostics.

[Diagnostics] ⇨ [CC-Link IE TSN/CC-Link IE Field Diagnostics]

If the following display appears, a data link is normal.



In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

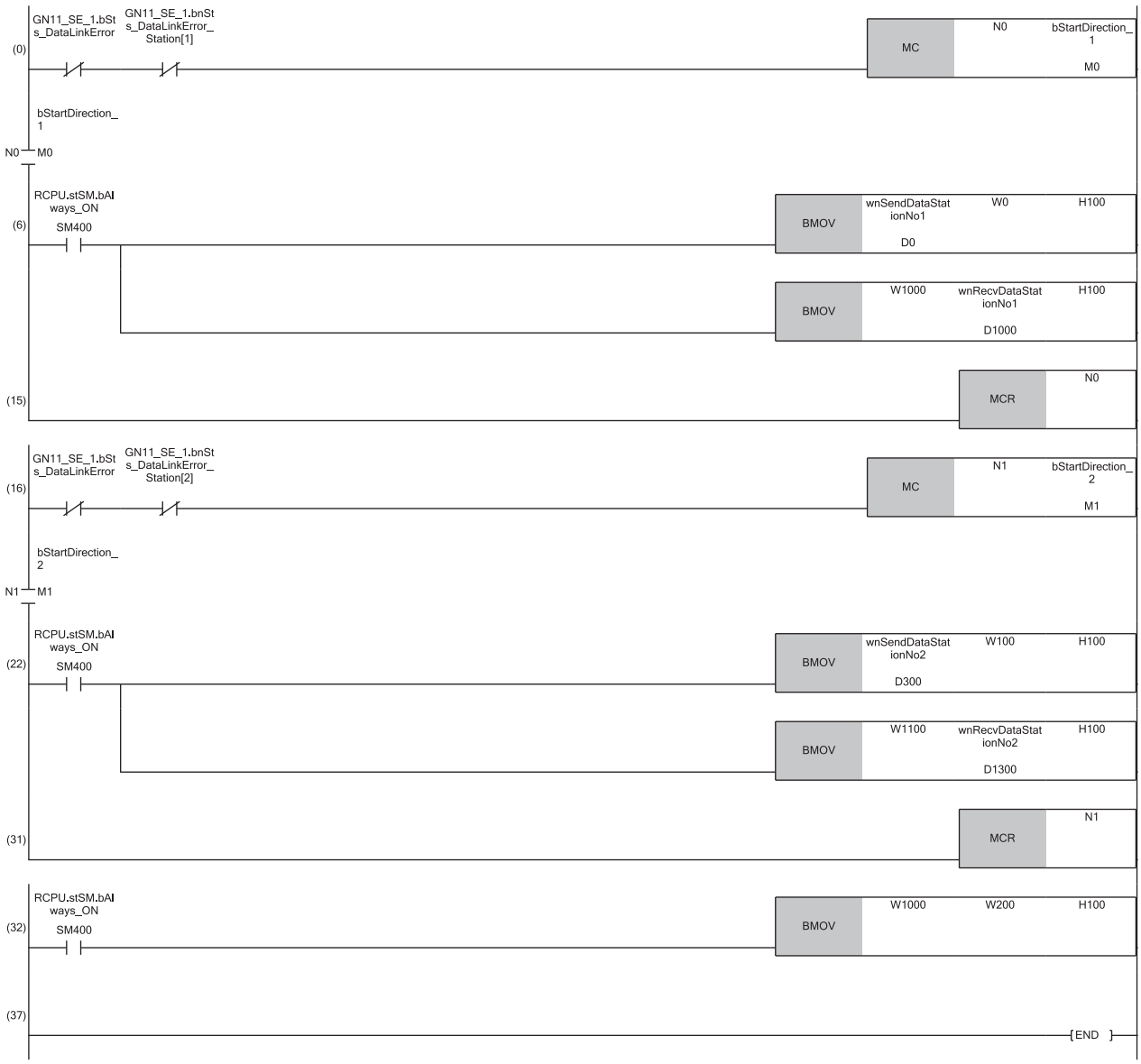
If an error icon appears in "Network Status" area, use the CC-Link IE TSN/CC-Link IE Field diagnostics to identify the cause of the error and take corrective actions. (☞ Page 398 CC-Link IE TSN/CC-Link IE Field Diagnostics)

Program example

The following is a program example of communications between the CC-Link IE TSN Class B master station (station No.0), CC-Link IE TSN Class A remote station (station No.1), and local station (station No.2).

Master station (station No.0)

Classification	Label name	Description	Device
Module label	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_SE_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GN11_SE_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station No.1)	SW00B0.0
	GN11_SE_1.bnSts_DataLinkError_Station[2]	Data link status of each station (station No.2)	SW00B0.1
Label to be defined	Define global labels as shown below: Label Name / Data Type / Class / Assign (Device/Label) bStartDirection_1 / Bit / VAR_GLOBAL / M0 bStartDirection_2 / Bit / VAR_GLOBAL / M1 wnSendDataStationNo1 / Word [Signed] / VAR_GLOBAL / D0 wnRecvDataStationNo1 / Word [Signed] / VAR_GLOBAL / D1000 wnSendDataStationNo2 / Word [Signed] / VAR_GLOBAL / D300 wnRecvDataStationNo2 / Word [Signed] / VAR_GLOBAL / D1300		

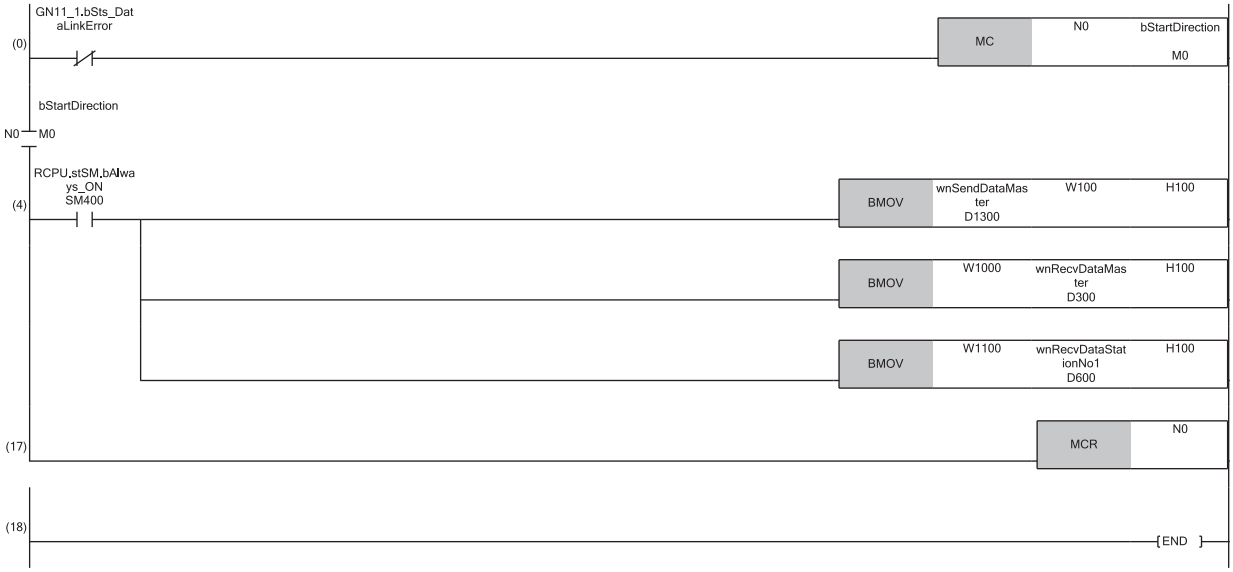


(6) Communication program with a remote station (station No.1)
(22)Communication program with a local station (station No.2)
(32)Program that sends the data received from a remote station (station No.1) to a local station (station No.2)

Local station (station No.2)

Classification	Label name	Description	Device
Module label	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_1.bSts_DataLinkError	Data link error status of own station	SB0049
Label to be defined	Define global labels as shown below:		

Label Name	Data Type		Class	Assign (Device/Label)
bStartDirection	Bit	...	VAR_GLOBAL	M0
wnSendDataMaster	Word [Signed]	...	VAR_GLOBAL	D1300
wnRecvDataMaster	Word [Signed]	...	VAR_GLOBAL	D300
wnRecvDataStationNo1	Word [Signed]	...	VAR_GLOBAL	D600



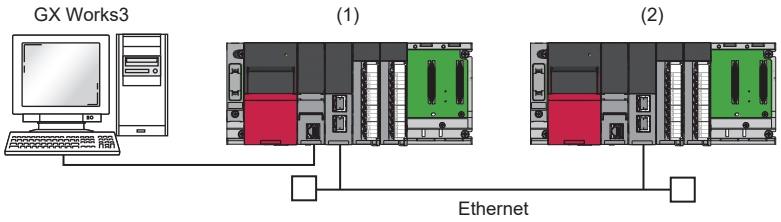
(4) Communication program with the master station (station No.0) and a remote station (station No.1)

11.4 Example of Socket Communications

This section describes the socket communications examples using Active open of TCP/IP communications.

System configuration

The following system configuration is used to explain socket communications.



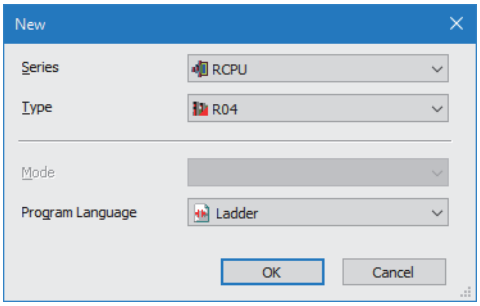
(1) Sending side (IP address: 192.168.3.253)
(2) Receiving side (IP address: 192.168.3.1)

Sending side

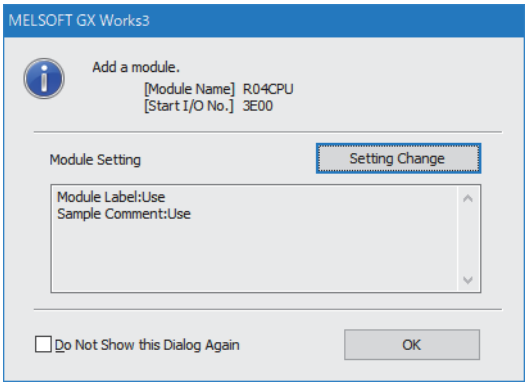
Connect the engineering tool to the CPU module on the sending side and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]



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



3. Set "Link Direct Device Setting" in "CPU Parameter" to "Extended Mode (iQ-R Series Mode)".

[CPU Parameter] ⇨ [Memory/Device Setting] ⇨ [Link Direct Device Setting] ⇨ [Link Direct Device Setting]

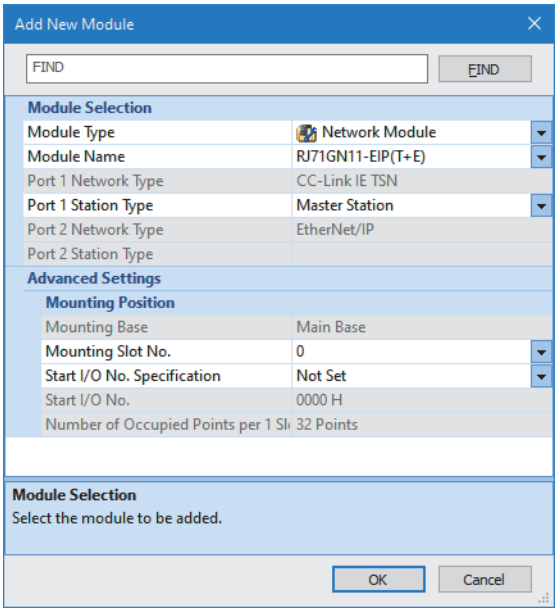
Item	Setting
Link Direct Device Setting	
Link Direct Device Setting	Extended Mode (iQ-R Series Mode)

Restriction

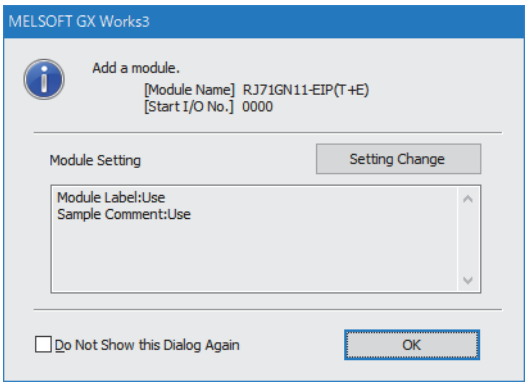
To write module parameters of the CC-Link IE TSN Plus module on a CPU module using an engineering tool, set "Link Direct Device Setting" to "Extended Mode (iQ-R Series Mode)".
If "Link Direct Device Setting" is "Q Series Compatible Mode", "Write to PLC" cannot be executed.

4. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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



5. Click the [OK] button in the following window to add a module label of the CC-Link IE TSN Plus module.



6. Set the items in "Basic Settings" as follows.

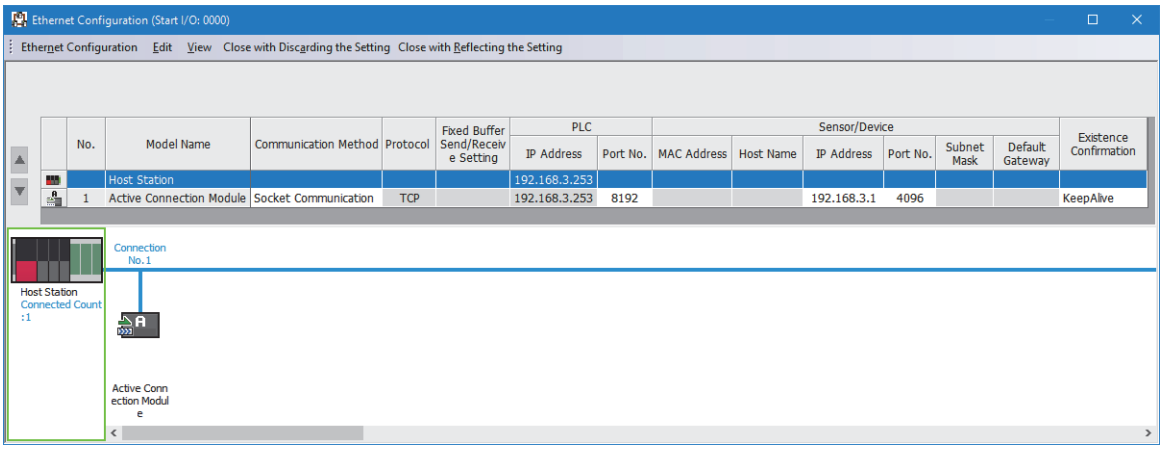
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings]

Item	Setting
Network Configuration Settings	
Network Configuration Settings	<Detailed Setting>
Refresh Settings	
Refresh Settings	<Detailed Setting>
Network Topology	
Network Topology	Line/Star
Communication Period Setting	
Basic Period Setting	
Setting in Units of 1us	Not Set
Communication Period Interval Setting (Do not Set it in Units of 1us)	1000.00 us
Communication Period Interval Setting (Set it in Units of 1us)	1000.00 us
System Reservation Time	20.00 us
Cyclic Transmission Time	500.00 us
Transient Transmission Time	480.00 us
Multiple Period Setting	
Normal-Speed	x4
Low-Speed	x16
Connection Device Information	
Authentication Class Setting	Authentication Class B Only
TSN HUB Setting	Not to Use TSN HUB
Device Station Setting	
Disconnection Detection Setting	4 times
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

7. Set the network configuration of socket communications as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Ethernet Communication Setting] ⇨ [External Device Configuration]



8. Click the [Close with Reflecting the Setting] button to close the "Ethernet Configuration" window.

9. Click the [Apply] button.

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 example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

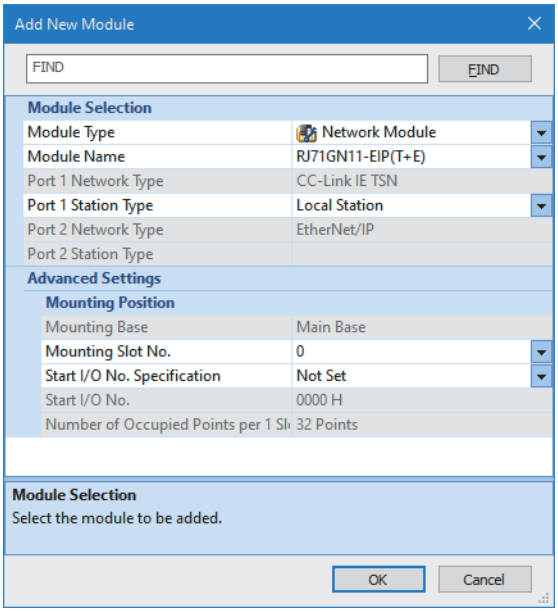
☞ Page 73 CC-Link IE TSN Parameter Settings

Receiving side

Connect the engineering tool to the CPU module on the receiving side and set the parameters.

1. Set the CPU module and add the module labels of the CPU module. The setting method of the CPU module and addition method of the module label are the same as those of when setting the sending side. (☞ Page 259 Sending side)
2. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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



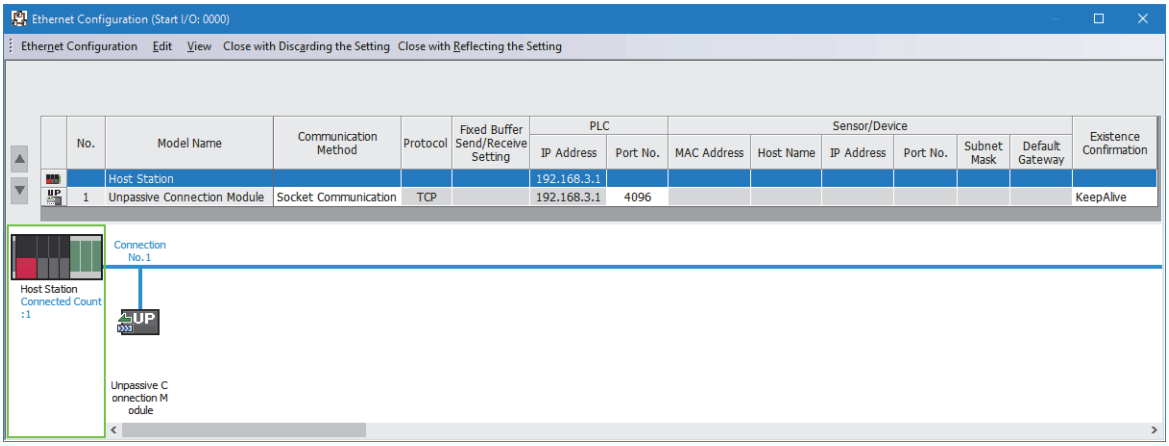
3. Add a module label of the CC-Link IE TSN Plus module. The module label addition method is the same as that of the sending side. (☞ Page 259 Sending side)
4. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings]

Item	Setting
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

5. Set the socket communications network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port1 Module Parameter (CC-Link IE TSN)] ⇨ [Basic Settings] ⇨ [Ethernet Communication Setting] ⇨ [External Device Configuration]



6. Click the [Close with Reflecting the Setting] button to close the "Ethernet Configuration" window.

7. Click the [Apply] button.

8. 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 example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 73 CC-Link IE TSN Parameter Settings

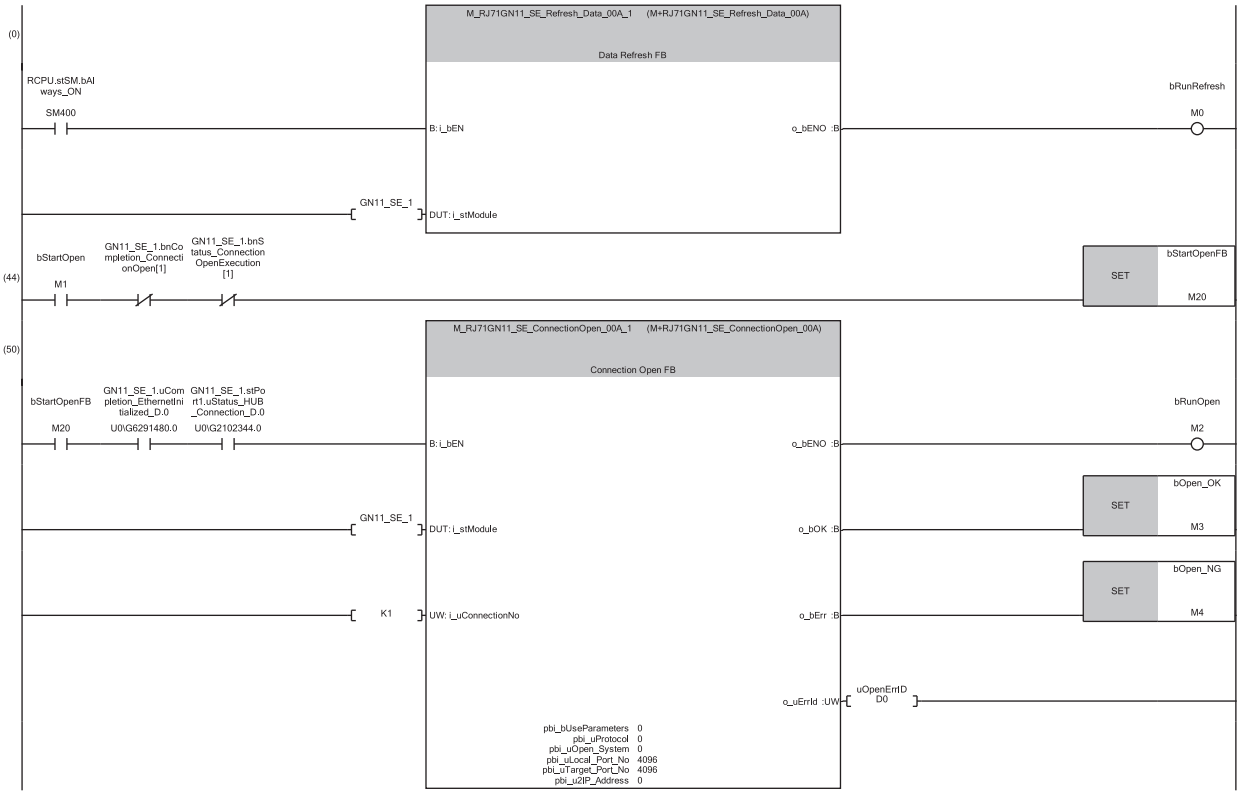
Program example

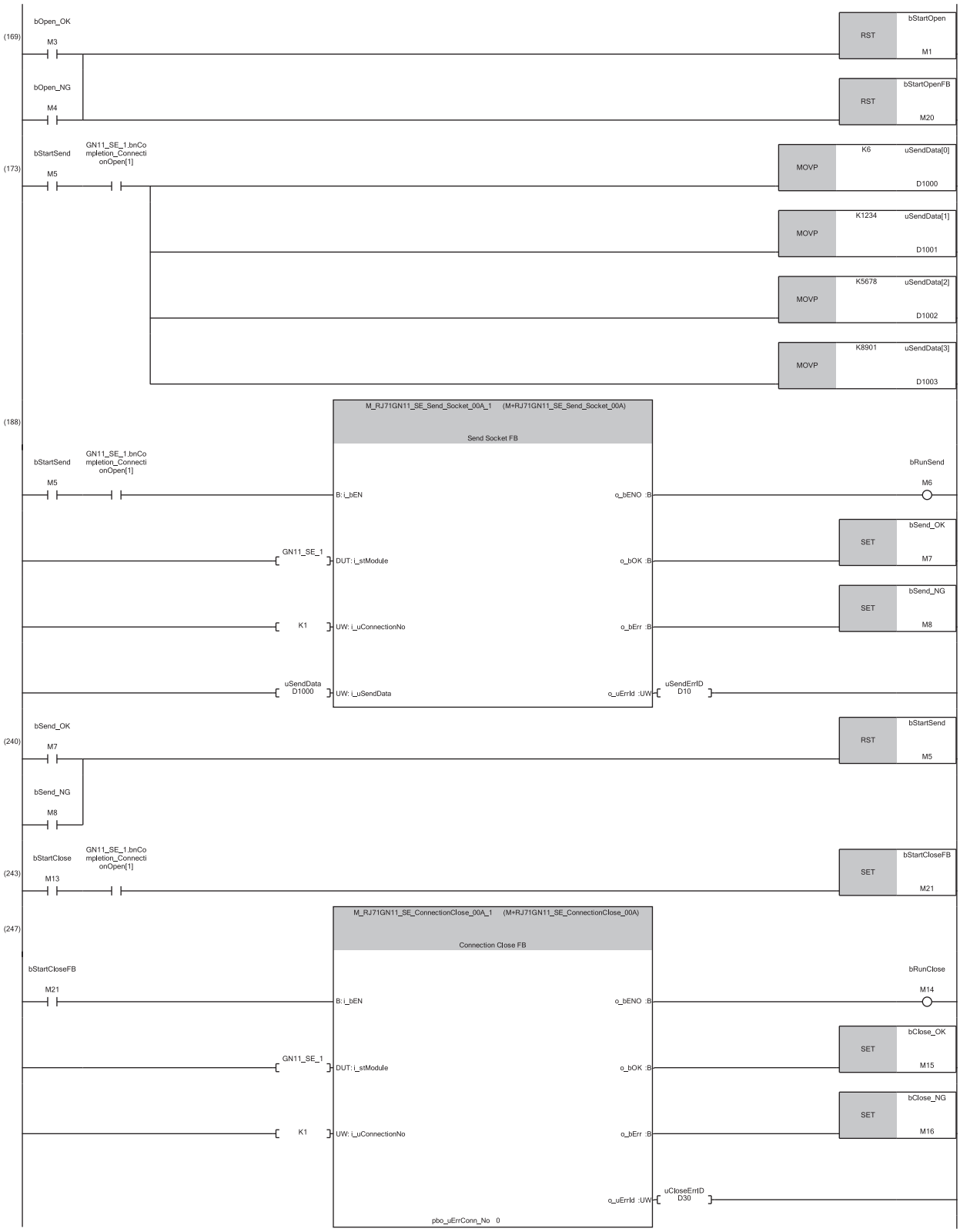
Sending side

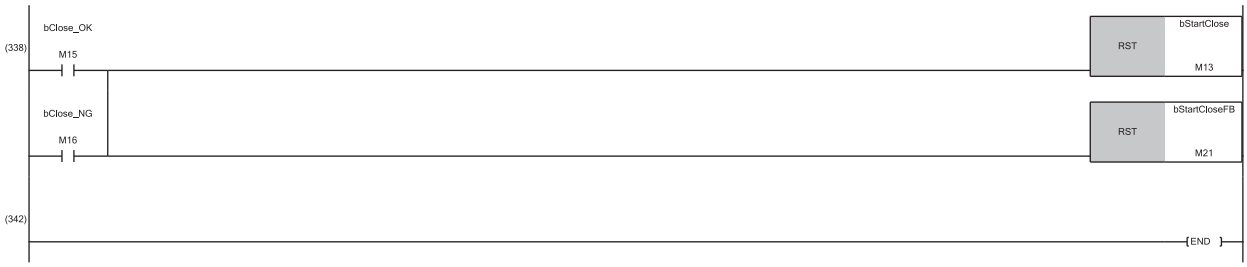
■Labels

Classification	Label name	Description	Device
Module label	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_SE_1.bnCompletion_ConnectionOpen[1]	Open completion status (connection No.1)	U0\G6291456.0
	GN11_SE_1.bnStatus_ConnectionOpenExecution[1]	Open request status (connection No.1)	U0\G6291464.0
	GN11_SE_1.uCompletion_EthernetInitialized_D.0	Initial completion status	U0\G6291480.0
	GN11_SE_1.stPort1.uStatus_HUB_Connection_D.0	Switching hub connection status	U0\G2102344.0
Label to be defined	Define global labels as shown below:		
FBs to be used	• M+RJ71GN11_SE_Refresh_Data • M+RJ71GN11_SE_ConnectionOpen • M+RJ71GN11_SE_Send_Socket • M+RJ71GN11_SE_ConnectionClose		

Label Name	Data Type		Class	Assign (Device/Label)
bRunRefresh	Bit	...	VAR_GLOBAL	M0
bStartOpen	Bit	...	VAR_GLOBAL	M1
bRunOpen	Bit	...	VAR_GLOBAL	M2
bOpen_OK	Bit	...	VAR_GLOBAL	M3
bOpen_NG	Bit	...	VAR_GLOBAL	M4
bStartSend	Bit	...	VAR_GLOBAL	M5
bRunSend	Bit	...	VAR_GLOBAL	M6
bSend_OK	Bit	...	VAR_GLOBAL	M7
bSend_NG	Bit	...	VAR_GLOBAL	M8
bStartClose	Bit	...	VAR_GLOBAL	M13
bRunClose	Bit	...	VAR_GLOBAL	M14
bClose_OK	Bit	...	VAR_GLOBAL	M15
bClose_NG	Bit	...	VAR_GLOBAL	M16
bStartOpenFB	Bit	...	VAR_GLOBAL	M20
bStartCloseFB	Bit	...	VAR_GLOBAL	M21
uOpenErrID	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D0
uSendErrID	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D10
uCloseErrID	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D30
uSendData	Word [Unsigned]/Bit String [16-bit](0..3)	...	VAR_GLOBAL	D1000




(169)
bOpen_OK
M3
RST
bStartOpen
M1
bOpen_NG
M4
RST
bStartOpenFB
M20
(173)
bStartSend
M5
GN11_SE_1.bnCompletion_ConnectionOpen[1]
MOVP
K6
uSendData[0]
D1000
MOVP
K1234
uSendData[1]
D1001
MOVP
K5678
uSendData[2]
D1002
MOVP
K8901
uSendData[3]
D1003
(188)
M_RJ71GN11_SE_Send_Socket_00A_1 (M+RJ71GN11_SE_Send_Socket_00A)
Send Socket FB
bStartSend
M5
GN11_SE_1.bnCompletion_ConnectionOpen[1]
B: i_bEN
o_bENO :B
bRunSend
M6
GN11_SE_1
DUT: i_stModule
o_bOK :B
SET
bSend_OK
M7
K1
UW: i_uConnectionNo
o_bErr :B
SET
bSend_NG
M8
uSendData
D1000
UW: i_uSendData
o_uErrId :UW
uSendErrID
D10
(240)
bSend_OK
M7
RST
bStartSend
M5
bSend_NG
M8
(243)
bStartClose
M13
GN11_SE_1.bnCompletion_ConnectionOpen[1]
SET
bStartCloseFB
M21
(247)
M_RJ71GN11_SE_ConnectionClose_00A_1 (M+RJ71GN11_SE_ConnectionClose_00A)
Connection Close FB
bStartCloseFB
M21
B: i_bEN
o_bENO :B
bRunClose
M14
GN11_SE_1
DUT: i_stModule
o_bOK :B
SET
bClose_OK
M15
K1
UW: i_uConnectionNo
o_bErr :B
SET
bClose_NG
M16
o_uErrId :UW
uCloseErrID
D30
pbo_uErrConn_No 0



(0) The refresh processing of the module label is performed. (The processing is required when using the module function block.)
When the refresh processing is completed, 'Refresh execution status' (M0) is turned on.

(44) When M1 is turned on, open processing of connection No.1 is performed. When the open processing is completed successfully, M3 is turned on.

(173) When M5 is turned on, the send data is stored and data is sent to the external device of connection No.1. When the data send is completed successfully, M7 is turned on.

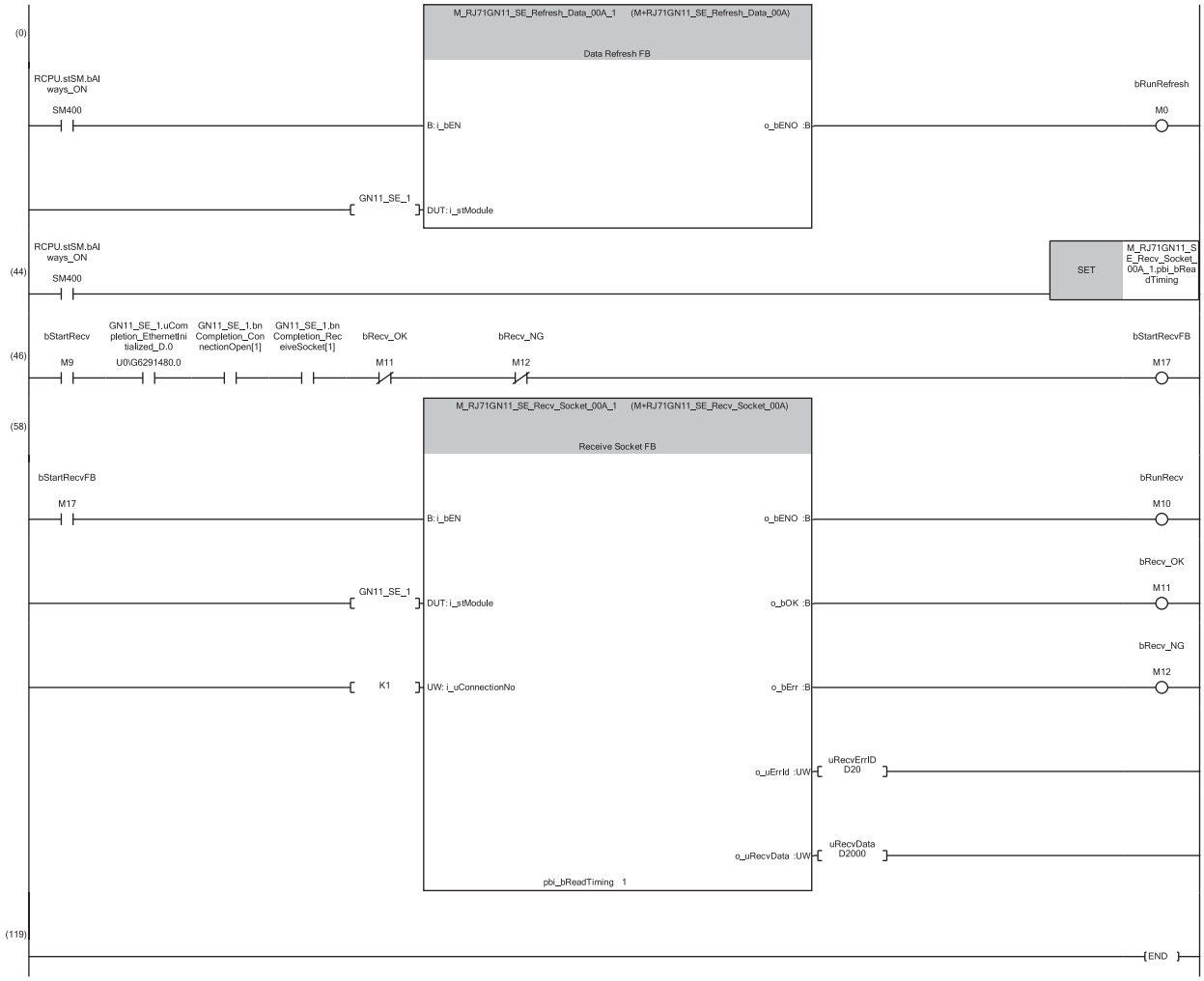
(243) When M13 is turned on, the close processing of connection No.1 is performed. When the close processing is completed successfully, M15 is turned on.

Receiving side

■Labels

Classification	Label name	Description	Device
Module label	RCPU.stSM.bAlways_ON	Always on	SM400
	GN11_SE_1.uCompletion_EthernetInitialized_D.0	Initial completion status	U0\G6291480.0
	GN11_SE_1.bnCompletion_ConnectionOpen[1]	Open completion status (connection No.1)	U0\G6291456.0
	GN11_SE_1.bnCompletion_ReceiveSocket[1]	Socket reception status (connection No.1)	U0\G6291472.0
Label to be defined	Define global labels as shown below:		
FBs to be used	• M+RJ71GN11_SE_Refresh_Data • M+RJ71GN11_SE_Recv_Socket		

Label Name	Data Type		Class	Assign (Device/Label)
bRunRefresh	Bit	...	VAR_GLOBAL	M0
bStartRecv	Bit	...	VAR_GLOBAL	M9
bRunRecv	Bit	...	VAR_GLOBAL	M10
bRecv_OK	Bit	...	VAR_GLOBAL	M11
bRecv_NG	Bit	...	VAR_GLOBAL	M12
bStartRecvFB	Bit	...	VAR_GLOBAL	M17
uRecvErrID	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D20
uRecvData	Word [Unsigned]/Bit String [16-bit](0..5119)	...	VAR_GLOBAL	D2000



(0) The refresh processing of the module label is performed. (The processing is required when using the module function block.)
When the refresh processing is completed, M0 is turned on.

(46) When M9 is turned on, the data sent by the external device of connection No.1 is received and stored in D2000.
(The device range in which data is stored varies depending on the data length of the received data.) When the data receive is completed successfully, M11 is turned on.

Point

- Secure sufficient device areas according to the maximum length of data sent from the send source to prevent the device areas used for other purposes from being overwritten by the receive data.
- When the data receive is consecutively executed, turn on pbi_bReadTiming (read timing) as shown in the above program.
- To receive data at shorter intervals than the scan time of the CPU module, add the normally closed contact of 'Receive normal completion' (M11) and 'Receive error completion' (M12) to the execution conditions of FB for receiving as shown in the above program. When there is no normally closed contact of 'Receive normal completion' (M11) and 'Receive error completion' (M12), 'Receive instruction (for starting FB)' (M17) is not turned on and the FB for receiving may not be executed.

PART 5 EtherNet/IP (P2) DETAILS

This part consists of the following chapters.

12 FUNCTIONS

13 PROGRAMMING

14 MESSAGE COMMUNICATION SUPPORT COMMANDS

12 FUNCTIONS

This section describes the functions of EtherNet/IP.

12.1 Function List

EtherNet/IP communications

These functions perform data communication between the CC-Link IE TSN Plus module and the EtherNet/IP device on the network.

Function	Description		Reference
Cyclic transmission function	This function establishes a connection and periodically perform data communications between the CC-Link IE TSN Plus module and the EtherNet/IP device.	■Class1 instance communications Periodically performs data communications between EtherNet/IP devices using an instance ID (number) for the connection. This function is used for periodically communicating with an adapter. ■Class1 tag communications Using a tag name (character string) for the connection, data communications are periodically performed between EtherNet/IP devices. This function is used for periodically communicating with a scanner.	Page 273 Cyclic Transmission Function
Message communication function (client)	This function performs Explicit message communications point-to-point between the client (message sending side) and the server (message receiving and processing side).	■UCMM message communications Without establishing a connection between the CC-Link IE TSN Plus module and the external device (server), message communications are performed at any timing. ■Class3 message communications By establishing a connection between the CC-Link IE TSN Plus module and the external device (server), message communications are performed periodically. ■UCMM tag communications Without establishing a connection between the CC-Link IE TSN Plus module and the external device (server), data is read and written periodically for a tag through message communications. ■Class3 tag communications By establishing a connection between the CC-Link IE TSN Plus module and the external device (server), data is read and written periodically for a tag through message communications.	Page 299 Message Communication Function (Client)
Message communication function (server)	This function executes the service specified by a command request sent by the client and returns a response.	■UCMM message communications Without establishing a connection between the CC-Link IE TSN Plus module and the external device (server), the command request accepted from the client is processed and response data is sent. ■Class3 message communications By establishing a connection between the CC-Link IE TSN Plus module and the external device (server), the command request accepted from the client is processed and response data is sent. ■UCMM tag communications Without establishing a connection between the CC-Link IE TSN Plus module and the external device (server), data is read and written for the set tag. ■Class3 tag communications By establishing a connection between the CC-Link IE TSN Plus module and the external device (server), data is read and written for the set tag.	Page 314 Message Communication Function (Server)
Cyclic transmission stop and restart	Stop or restart of cyclic transmission is enabled individually for each connection with 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823).		Page 297 Cyclic transmission stop and restart
Communication status setting function at the occurrence of a CPU stop error	Sets whether to stop or continue EtherNet/IP communications when RUN state is changed to STOP state or a stop error occurs on a CPU module on which the CC-Link IE TSN Plus module is mounted.		Page 320 Communication Status Setting Function at the Occurrence of a CPU Stop Error

Function	Description	Reference
EtherNet/IP communication automatic start function	With this function, EtherNet/IP communications can be started without any program when the programmable controller is powered off and on.	Page 321 EtherNet/IP Communication Automatic Start Function

Ethernet connection

These functions connect an Ethernet device to one module without interfering with EtherNet/IP.

Function	Description	Reference
Connection with SLMP-compatible devices	This type of connection allows SLMP-compatible devices (such as a personal computer or a vision sensor) to be connected to the CC-Link IE TSN Plus module.	Page 196 Connection with SLMP-compatible devices
Socket communications	Using dedicated instructions, arbitrary data can be exchanged with an external device connected by Ethernet over TCP/IP or UDP/IP.	Page 197 Socket communications

Security

Security depending on the network environment can be structured by restricting access by each communication path to the CPU module.

Function	Description	Reference
IP filter	Identifies the IP address of the access source, and prevents unauthorized access.	Page 203 IP filter
Remote password	Permits or prohibits access from the external device to the CPU module via the CC-Link IE TSN Plus module.	Page 206 Remote password

RAS

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

Function	Description	Reference
IP address duplication detection	If one network has stations with the same IP address, an overlap is detected.	Page 212 IP address duplication detection

Others

Function	Description	Reference
Automatic detection of EtherNet/IP devices	This function detects EtherNet/IP devices on the same network connected to the CC-Link IE TSN Plus module and automatically adds them to the list of EtherNet/IP configuration devices.	Page 123 Automatic detection of EtherNet/IP devices

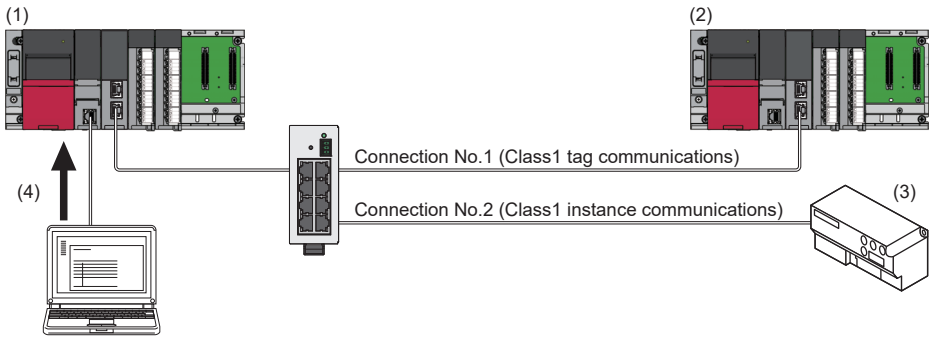
12.2 Cyclic Transmission Function

This function establishes a connection to periodically perform data communications between the CC-Link IE TSN Plus module and the EtherNet/IP device.

Function overview

In Class1 communications, the device on one end opens first a logical connection line called a "connection" for the device on the other end to perform data communications.

In addition, the originator can open multiple connections for the same target.



(1) Originator (scanner)
(2) Target A (scanner)
(3) Target B (adapter)
(4) Connection settings for connections No.1 and No.2 are configured in "EtherNet/IP Configuration".

Connection settings

Connection settings are settings for the originator to perform data communications with the target.

A connection to be opened is managed with a connection number (unique value for the own module to manage communications) and the connection settings corresponding to that number.

For connection settings, the following items can be set individually for each connection.

Item*1	Description
IP address	Set the IP address to identify the external device.
Data Size	Set the data size for communications.
RPI	Set the interval from the time data is sent until the next data is sent.
Timeout Multiplier	Set the time until a connection timeout occurs.*2*3
Connection type (input mode/output mode)	Set the method for data sending between the originator and the target. (☞ Page 274 Connection type)
Trigger Type	Set the data sending timing. (☞ Page 276 Trigger type)
Application Type	Set control related to data communication. (☞ Page 278 Application type) In "EtherNet/IP Configuration", the application type is committed when a connection is added.
Instance ID	Set a value for identifying data used for cyclic transmission. Specify which data held by the external device is accessed. (☞ Page 281 Instance ID and tag name)
Tag Name	

*1 For each item, set the engineering tool "EtherNet/IP Configuration" or buffer memory.
☞ Page 121 "EtherNet/IP Configuration" window
☞ Page 539 Class3/UCMM communication area

*2 If data is not received within the period of time in the following calculation formula, a connection timeout occurs.
RPI (communication cycle) × Timeout Multiplier
Example: When RPI is 100ms and Timeout Multiplier is × 8, if data is not received within 800ms, a connection timeout occurs.

*3 When (RPI (communication cycle) × Timeout Multiplier) is greater than (timeout time on the socket communications side), even if a timeout in this setting does not occur, the connection may be closed due to the occurrence of a timeout on the socket communications side.

Point

Depending on the application type, data sending can be set only for input or output.

When a connection set for only one of the input and output directions is used, a packet for checking the communication status (heartbeat) is sent for the unset direction to prevent the occurrence of timeouts.

Connection type

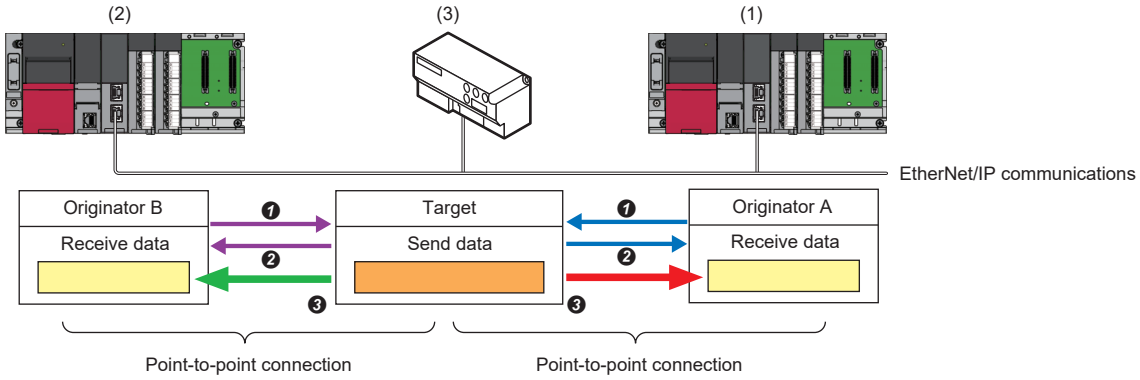
Set the method for data sending between the originator and the target.

For EtherNet/IP communications, the connection type can be set to point-to-point or multicast.

■Point-to-point

This connection type is set for one-to-one communication between the originator and the target.

When multiple originators establish a connection to one target point-to-point, the target sends a send frame for each originator separately through unicast.



(1) Originator A (scanner)
(2) Originator B (scanner)
(3) Target (adapter)
❶ Open a connection for which the connection type is set as point-to-point between the originator and the target.
❷ The target returns a response (normal) to the originator.
❸ The target sends data through unicast.

■Multicast

This connection type allows multiple originators to receive data sent by one target.

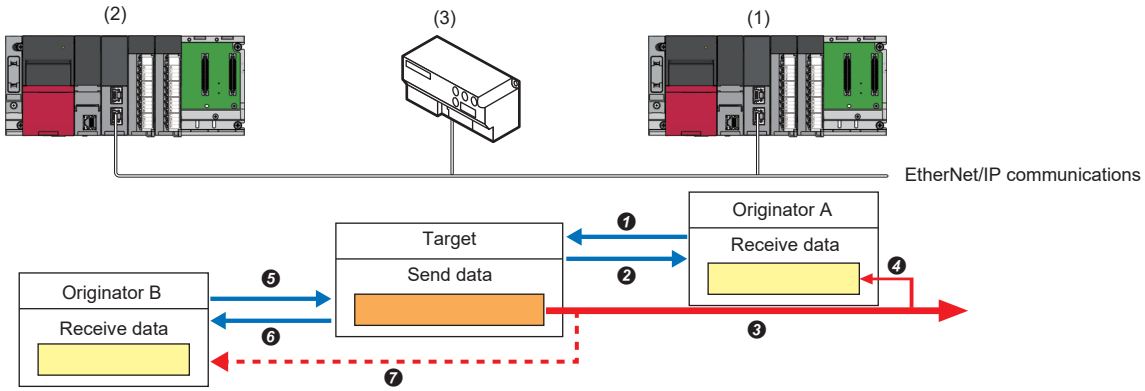
When multiple originators establish a connection through multicast, the target sends send data for all the originators by using one multicast packet. In addition, by using a switching hub with the IGMP snooping function, communication load on the network can be reduced.

Multicast can be used only for Class1 communications. It cannot be used for UCMM communications or Class3 communications.

For the connection of the target communicating with an originator through multicast, when another originator opens a connection through multicast, the same connection settings[*1] must be requested to the target.

If a request is made for communication based on connection settings different from those used for the active multicast communication, an error occurs.

*1 A connection setting in which all of the following are matched: RPI, connection type, data size, transmission trigger, instance ID (or tag name), and priority



(1) Originator A (scanner)
(2) Originator B (scanner)
(3) Target (adapter)

❶ Open a connection for which the connection type is set as multicast between originator A and the target.
❷ The target returns a response (normal) to originator A.
❸ The target sends data using a multicast packet.
❹ Originator A receives the multicast data sent in ❸.
❺ Originator B opens a connection with the same connection settings for the target.
(Connection settings with all of RPI, connection type, instance ID (or tag name), data size, transmission trigger, and priority being the same)
❻ The target returns a response (normal) to originator B.
❼ Originator B receives the multicast data sent in ❸.

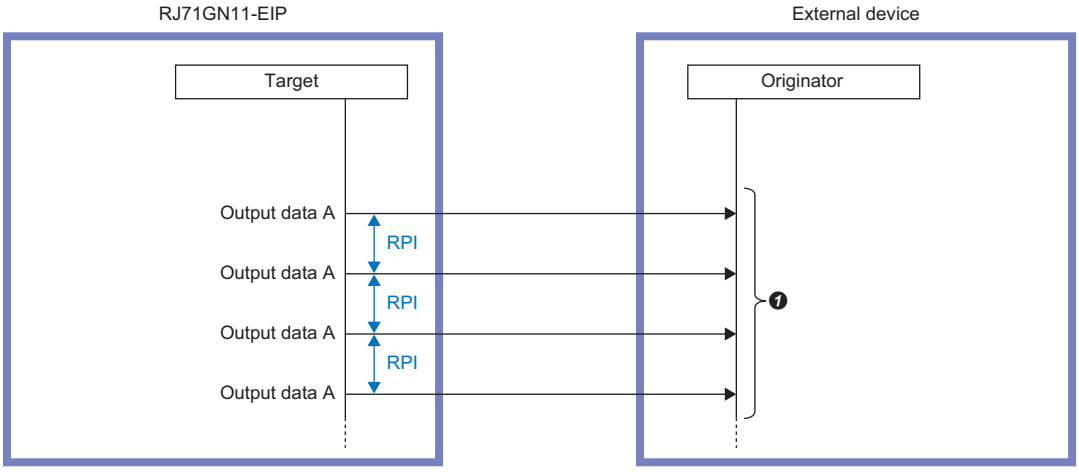
Trigger type

Set the data sending timing.

The CC-Link IE TSN Plus module supports Cyclic and Change of State.

■Cyclic

Data is sent at intervals of the set RPI (communication cycle).

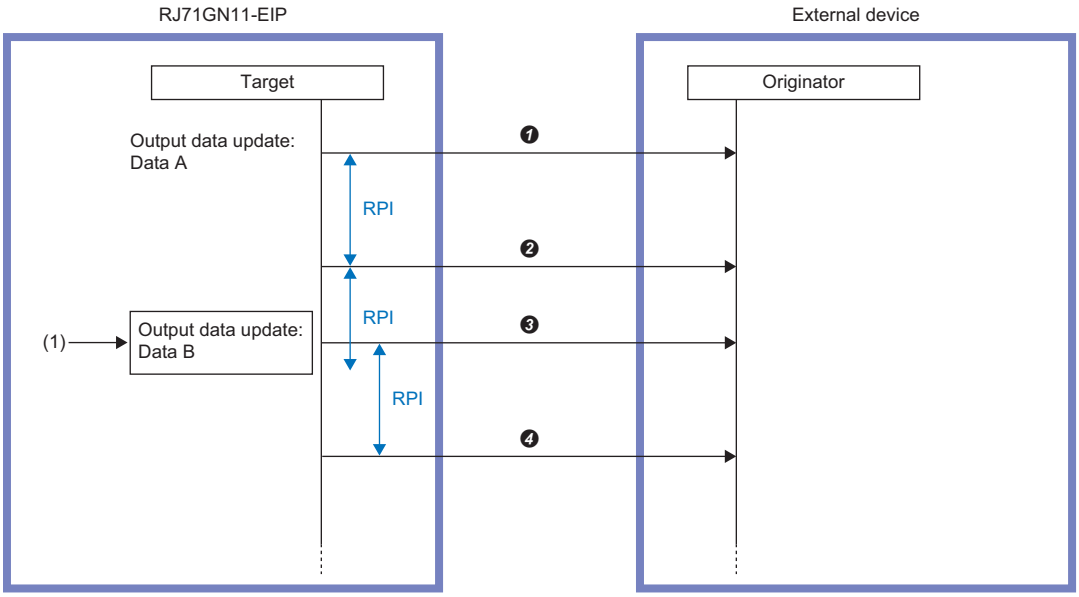


❶ Output data stored at the target side is automatically sent at RPI intervals.

■Change of State

When an output data update is detected, a new frame is sent on the line.

If the RPI (communication cycle) time has elapsed since the last transmission without an output data update, a frame with the same send data as the previous one is automatically sent on the line to maintain the connection.



(1) Change of State communication triggered by output data update

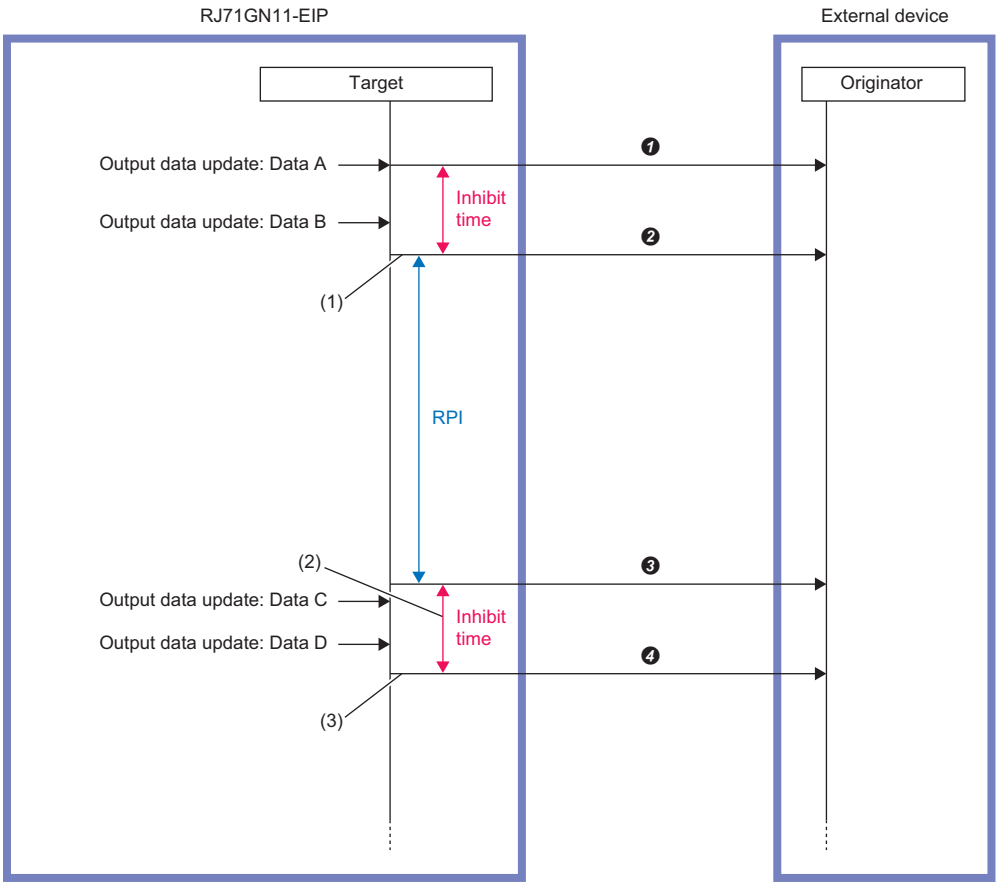
❶ Sending of output data A upon update detection

❷ Sending of output data A upon RPI time lapse (automatic sending)

❸ Sending of output data B upon update detection (ignoring RPI interval)

❹ Sending of output data B upon RPI time lapse (automatic sending)

A new frame cannot be sent on the line before the time (inhibit time) specified for "Inhibit Time" has elapsed since the last transmission.
(Inhibit time is managed on a per-connection basis, so even if a particular connection is inhibited from sending, other connections will still be able to send.)



(1) If the output data is updated within the time set for "Inhibit Time" since the last transmission, the transmission will wait until the Inhibit time has elapsed.
(2) If the RPI (communication cycle) time has elapsed since the last transmission without a send data update, the data is automatically sent, and from that point on, sending of new frames on the line is inhibited until the Inhibit time has elapsed.
(3) If the send data is updated again while waiting for transmission, a frame with the last updated output data is sent on the line.
❶ Sending of output data A upon update detection
❷ Sending of output data B upon update detection
❸ Sending of output data B upon RPI time lapse (automatic sending)
❹ Sending of output data D upon update detection (automatic sending)

Point

- When the CC-Link IE TSN Plus module is the originator, sending triggered by output data update is possible only when the application type is Exclusive Owner. Because there is no output data except for Exclusive Owner, no sending triggered by output data update can be performed. (If there is no output data, an alive check frame with data size of 0 called a heartbeat is sent to the target at the RPI interval set in "Output O->T".)
- When Change of State is used, use of auto refresh is recommended to prevent output data inconsistency. If auto refresh is not used, sending triggered by output data update may occur continuously or some data may be lost.
- Continuous sending of packets at intervals shorter than the minimum RPI available on the target side device may result in dropouts. Matching the "Inhibit Time" to the minimum RPI available on the target device is recommended.

Application type

Set control related to data communication.

The following table shows the support by Class1 communications for each application type.

- When the CC-Link IE TSN Plus module is an originator

○: Requests can be sent to the EtherNet/IP device, ×: Requests cannot be sent to EtherNet/IP device, —: No combination

Communication method	Connection settings							
	Application type	Trigger type			Input type (target to originator)		Output type (originator to target)	
		Cyclic	Application Trigger	Change of State*1	Fixed*2*5	Variable*3*5	Fixed*2*5	Variable*3*5
Class1 instance communications	Exclusive Owner	○	×	○	○	○	○	○*4
	Input Only	○	×	○	○	○	○	—*6
	Listen Only	○	×	○	○	○	○	—*6
	Redundant Owner	×	×	×	×	×	×	×
Class1 tag communications	Input Only	○	×	○	○	○	○	—*6

*1 A method to send data when the status changes.

*2 A method for communicating with a fixed size.

*3 A method for communicating with a variable size.

*4 Connection requests can be set, but are sent from the CC-Link IE TSN Plus module with a fixed size (value set for Size).

*5 Among the real time formats (RTF) specified by EDS in which requests can be accepted by the external device, to request the zero-length data format to the external device, it must be requested with Variable selected for the input type and output type.
To request the modeless format, 32-bit header format, or heartbeat to the external device, it must be requested with Fixed selected for the input type and output type.

*6 The data size of the heartbeat (alive check packet) used in the Input Only and Listen Only output types (originator → target) is fixed to 0 bytes.

- When the CC-Link IE TSN Plus module is a target

○: Requests can be accepted from the EtherNet/IP device, ×: Requests cannot be accepted from EtherNet/IP device, —: No combination

Communication method	Connection settings							
	Application type	Trigger type			Input type (target to originator)		Output type (originator to target)	
		Cyclic	Application Trigger	Change of State*1	Fixed*2*4	Variable*3*4	Fixed*2*4	Variable*3*4
Class1 instance communications	Exclusive Owner	○*6	×	○*6	○*6	×	○*6	×
	Input Only	○	×	○	○	×	○	—*5
	Listen Only	×	×	×	×	×	×	—*5
	Redundant Owner	×	×	×	×	×	×	×
Class1 tag communications	Input Only	○	×	○	○	×	○	—*5

*1 A method to send data when the status changes.

*2 A method for communicating with a fixed size.

*3 A method for communicating with a variable size.

*4 For real time formats (RTF) for the input type (target to originator), requests can be accepted in modeless format only. For real time formats (RTF) for the output type (originator to target), requests can only be accepted in heartbeat when the application type is Input Only and can only be accepted in modeless format when the application type is Exclusive Owner.

*5 The data size of the heartbeat (alive check packet) used in the Input Only and Listen Only output types (originator → target) is fixed to 0 bytes.

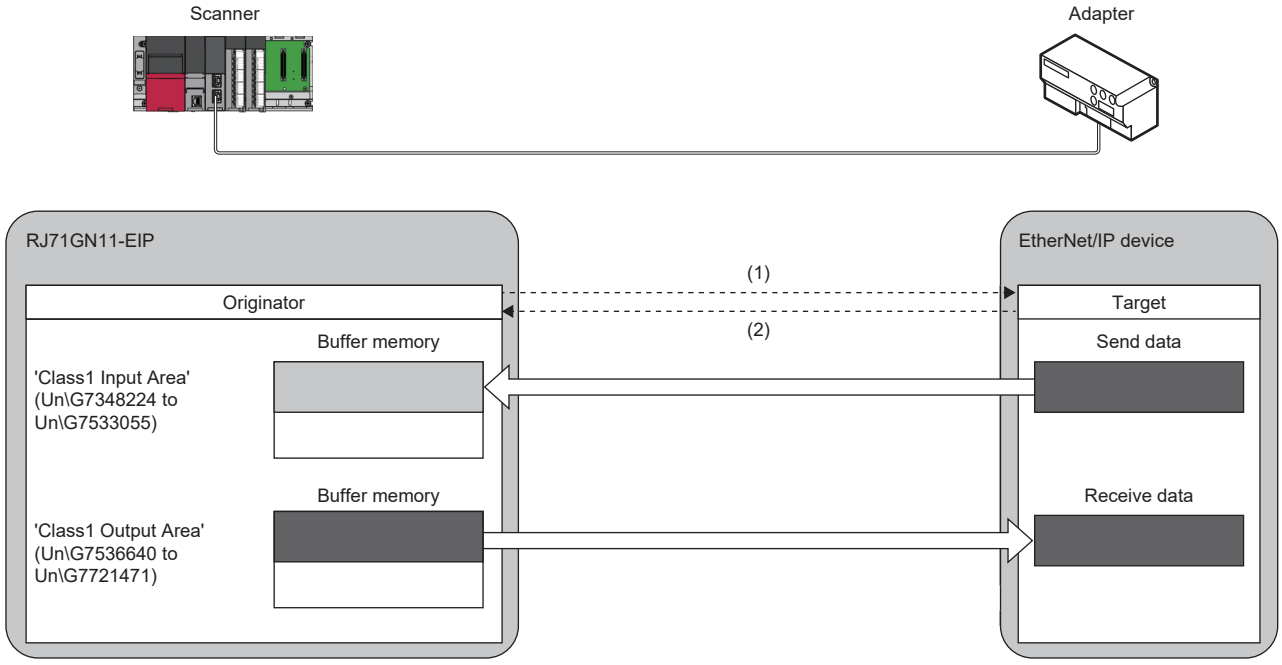
*6 This item can only be set when the CC-Link IE TSN Plus module firmware version is "05" or later, the EtherNet/IP Configuration tool version is 1.04E or later, and the GX Works3 version is 1.095Z or later.

■Exclusive Owner (originator)

Data sending from the CC-Link IE TSN Plus module (originator) to the target and data receiving from the target to the CC-Link IE TSN Plus module (originator) can be set simultaneously.

In the above case, the external device must support Exclusive Owner.

The CC-Link IE TSN Plus module supports both point-to-point and multicast for data receiving, and only point-to-point for data sending.

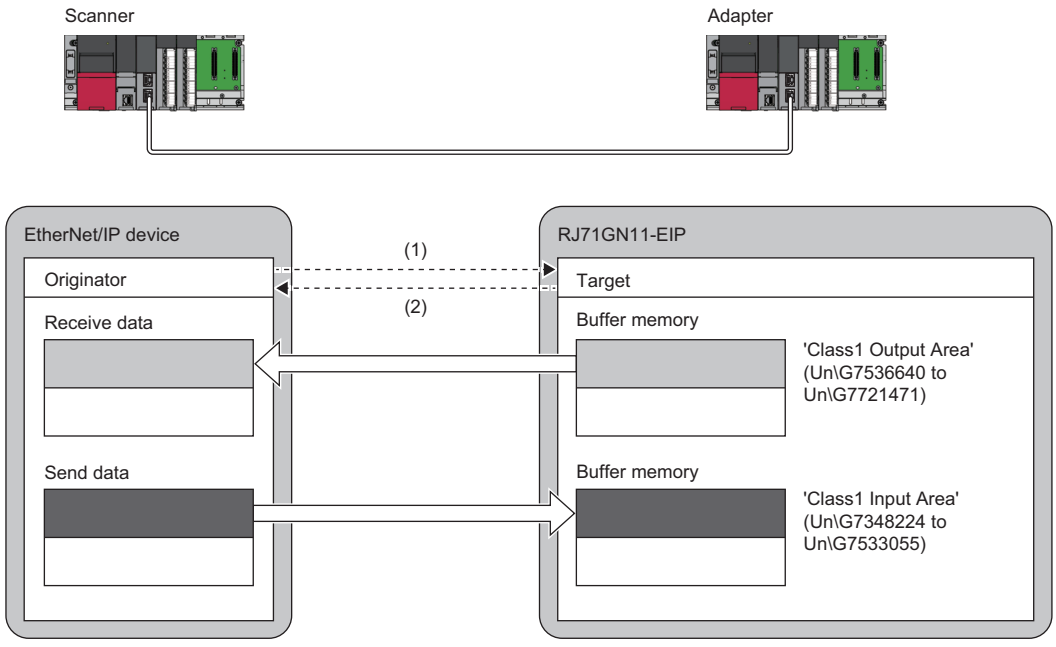


(1) Connection open
(2) Response (normal)

■Exclusive Owner (target)

Data sending from the CC-Link IE TSN Plus module (target) to the originator and data receiving from the originator to the CC-Link IE TSN Plus module (target) can be set simultaneously.

The CC-Link IE TSN Plus module (target) supports only point-to-point for data receiving and both point-to-point and multicast for data sending.

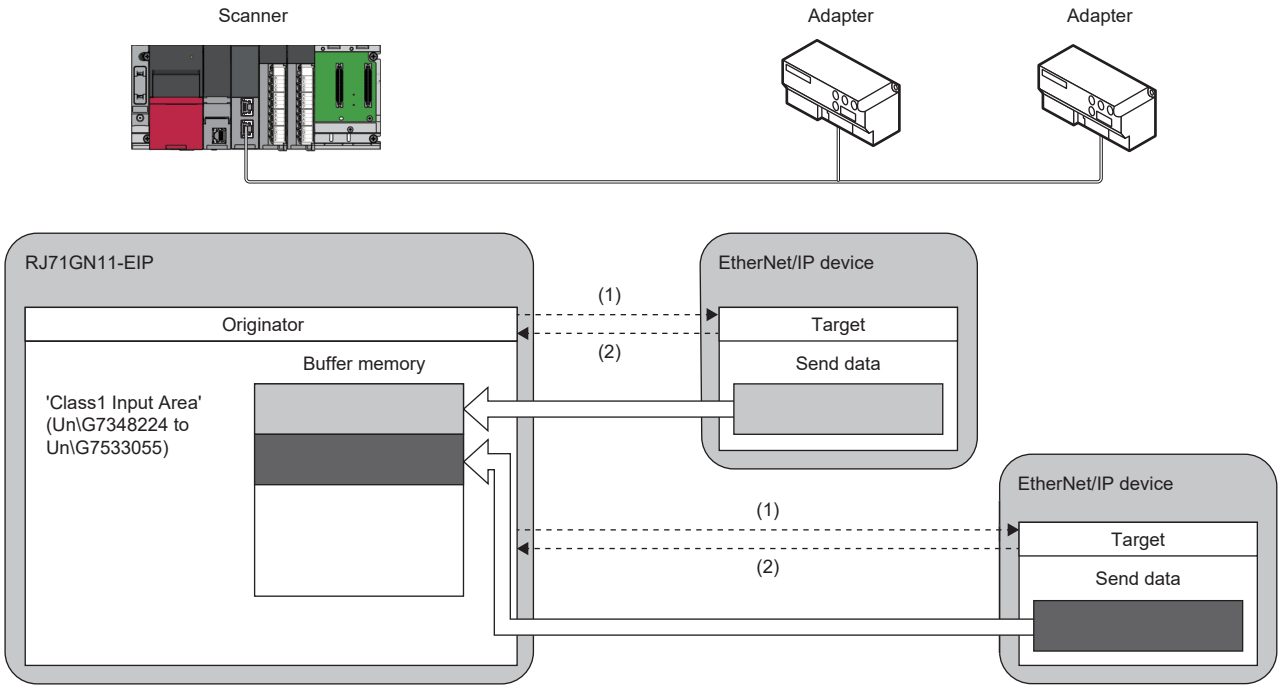


(1) Connection open
(2) Response (normal)

■Input Only (originator)

In this application type, only data receiving in the direction from the target to the CC-Link IE TSN Plus module (originator) is possible.

Both point-to-point and multicast are supported.



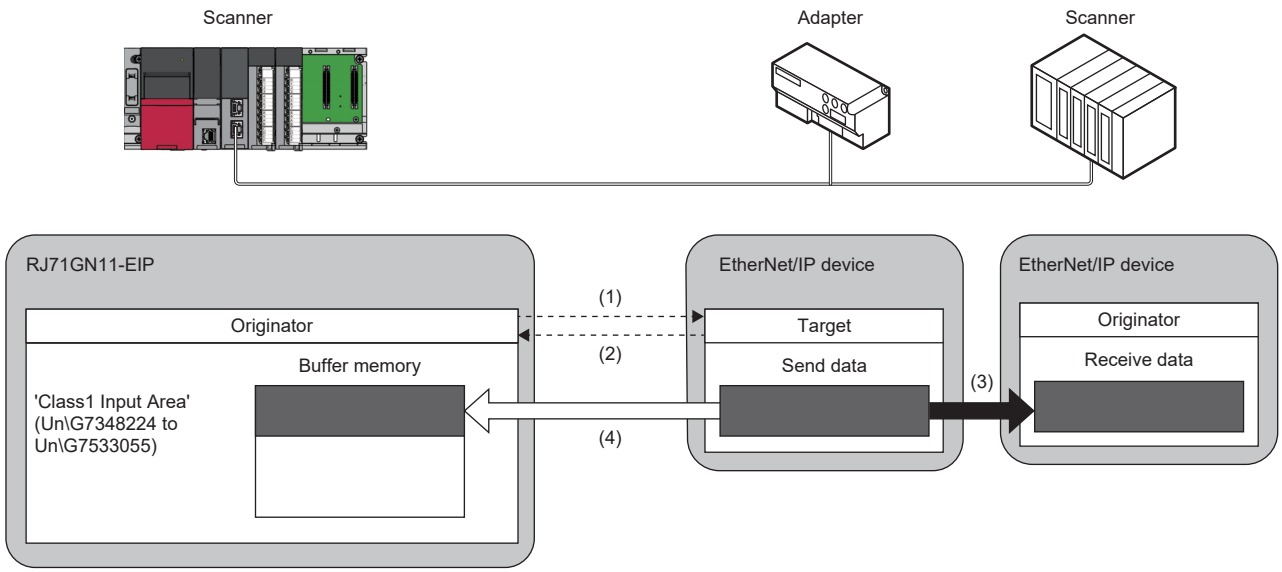
(1) Connection open
(2) Response (normal)

■Listen Only (originator)

This application type is for Exclusive Owner and Input Only, allowing only data receiving through multicast in the direction from the target where a multicast connection is already open to the CC-Link IE TSN Plus module (originator).

A connection cannot be opened for an external device where a connection through multicast is not open.

If all multicast connections for which the application type for the target is not set to Listen Only are disconnected, even if connections opened by using Listen Only are normal, the target stops data sending.



(1) Connection open
(2) Response
(3) Data sent over an Input Only or Exclusive Owner connection (data sending using a multicast packet)
(4) The same data as (3) is received.

Instance ID and tag name

An instance ID and tag name are cyclic data ID numbers for communicating with the external device.

■Instance ID

An instance ID is an ID number for cyclic data defined in an EDS file.

It is mainly used for communications with an adapter, and cyclic data is set individually for each instance ID. (operating status, current value, sensor output, and other data)

When multiple connections are made to the same adapter, an instance ID can be set individually for each connection.

By using the EDS file for each device, connection settings can be made without being aware of an instance ID in "EtherNet/IP Configuration".

Using the CC-Link IE TSN Plus module EDS file[*1] also allows instance communications that target the CC-Link IE TSN Plus module.[*2]

*1 Since the CC-Link IE TSN Plus module EDS file is registered as the initial setting in "EtherNet/IP Configuration", it is not necessary to perform a new registration when the CC-Link IE TSN Plus module is the originator. For details regarding the originator setting method when using another device as the originator, refer to the separate device manual.

*2 For the instance ID specified when performing instance communications targeting the CC-Link IE TSN Plus module, refer to the following.

☞ Page 285 Class1 instance communications

■Tag name

A tag name is an ID number related to the tag settings registered in the external device.

It is mainly used when the external device is a scanner. Cyclic data to be used for communications is determined based on the tag name registered in the external device.

At first, as tag settings, the external device registers in itself the tag name and the combination of the tag name and the device assigned to it.

Then, when the CC-Link IE TSN Plus module opens a connection for the tag of the external device, the external device sends the data of the assigned device to the CC-Link IE TSN Plus module at the RPI interval.

Point

When the CC-Link IE TSN Plus module is not the external device, for details on how to set the tag to the external device, refer to the manual for the external device.

Consistency check

The consistency check is a function used to check for consistency between the information of the target device set as the originator and the information of the target device that actually performs communication.
It checks whether the EDS file information used by the originator to configure communication with the target matches the device information of the target that requested a connection to be established.
A connection is only established if this information matches.

■Target device information

The device information used for the consistency check is as follows.

- Vendor ID number (vendor code)
- Device type (product type)
- Product ID number (product code)
- Major revision
- Minor revision

Point

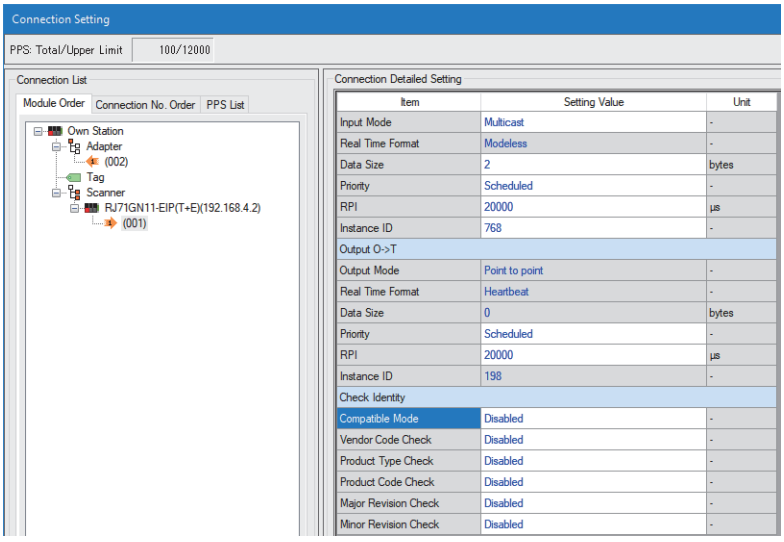
It is possible to check the CC-Link IE TSN Plus module device information setting values through the message communications support command identity object. For details, refer to the following.
☞ Page 378 Identity

■Setting method

When the CC-Link IE TSN Plus module is the target, for details on how to perform the consistency check, refer to the manual of the originator (external device).
If the consistency check fails, the following CIP code response is returned to the originator.

Response CIP code		Overview of CIP error	Information for the device that failed the consistency check
General Status	Extended Status		
01H	114H	Vendor code or product code mismatch	Vendor code
			Product code
	115H	Product type mismatch	Product type
	116H	Revision mismatch	Major revision
			Minor revision

If the CC-Link IE TSN Plus module is the originator, it is possible to set whether to perform the consistency check on the target via the "Connection Detailed Setting" window in "EtherNet/IP Configuration". (☞ Page 125 Connection Detailed Setting)



If the consistency check fails, it is stored in 'Class1 connection error status' (Un\G7734528 to Un\G7735551). (☞ Page 535 Class1 connection error status (Un\G7734528 to Un\G7735551))

■Combinations of settings

A consistency check can be performed according to the combination of the compatibility mode[*1] enabled/disabled setting and the device information settings.

*1 This mode allows not only exact matches but also values that can be emulated by the target.
(Example: Accepting communications configured using an old minor revision EDS file for a target with a minor revision)

For the values that the target is able to emulate, refer to the manual of the target device.

The following table shows the relationship between the combination of consistency check settings and connection establishment/disconnection.

Detailed connection setting items		Connection establishment/disconnection according to the consistency check
Compatible Mode	Item name[*1] check	
Disabled	Disabled	A connection is established. (No consistency check)
	Enabled	A connection is established if the item name value is an exact match.
Enabled	Disabled[*2]	The connection is disconnected.
	Enabled	A connection is established if the item name value is an exact match or emulation is possible.

*1 "Vendor code check", "Product type check", "Product code check", "Major revision check", and "Minor revision check".
*2 When the version of the EtherNet/IP Configuration tool is version 1.03D or later, this item cannot be disabled if "Compatible Mode" is set to "Enabled".

■If the consistency check fails

If the consistency check fails, please check the following.

Item	Description
Was there a mistake when specifying the target IP address?[*1]	• Confirm the set value is the same as the IP address of the target for communication. • Confirm that the IP address setting of the target for communication is correct.
Can the EDS file be used by the target for communication?	Confirm that the EDS file used has not undergone a version upgrade and it is not an old EDS file?
Are improper consistency check settings being used?	Refer to the following to review the consistency check settings. ☞ Page 283 Combinations of settings
Do the parameters of the target match the values in the EDS file?	Using the message communications support command, check that the following parameters match the values[*2] in the EDS file.[*3] ■Identity object (Class ID: 01H, Instance ID: 01H)[*4] • Attribute ID1: Vendor Id • Attribute ID2: Device Type • Attribute ID3: Product Code • Attribute ID4: Major Revision/Minor Revision • Attribute ID7: Product Name Although Attribute ID7 is not subject to the consistency check, it is possible to check whether it matches the name of the target you wish to use.

*1 For the Class1 communications parameter settings, refer to the following.
☞ Page 121 Parameter settings for EtherNet/IP devices
*2 These are the values for the device in the EDS file to be used.
*3 For details regarding how to use message communications support commands, refer to the following.
☞ Page 339 UCMM Message Communications Communication Example
*4 Depending on the target, there may be multiple instances of identification information. For more information regarding the instance ID to be specified in such a case, refer to the manual of the target.

■Precautions

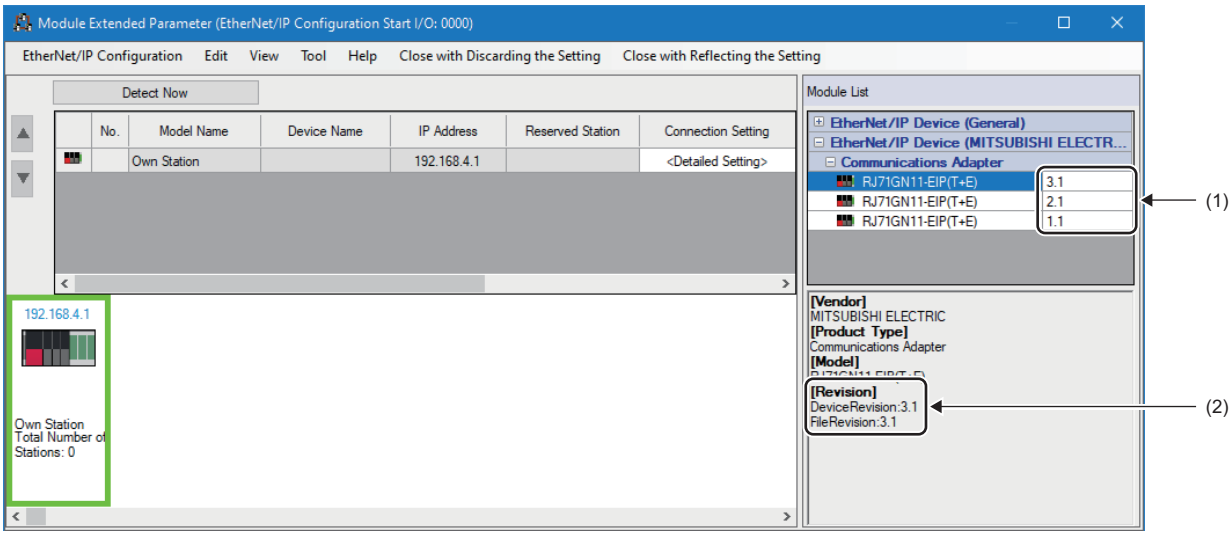
- When the CC-Link IE TSN Plus module is the target, the result of the major revision consistency check depends on the combination of the major revision of the CC-Link IE TSN Plus module and the revision of the EDS file. The results for the various combinations are shown below.

○: Consistency check passed, ×: Consistency check failed (error code 116H is returned. (☞ Page 282 Setting method))

■ When Compatible Mode is disabled			
CC-Link IE TSN Plus module major revision (firmware version)	**EDS file revision*1**		
	1.□*2	**2.□*2**	**3.□*2**
Major Revision: 1 (Firmware version "03" or earlier)	○	×	×
Major Revision: 2 (Firmware version "04")	×	○	×
Major Revision: 3 (Firmware version "05" or later)	×	×	○

■ When Compatible Mode is enabled			
CC-Link IE TSN Plus module major revision (firmware version)	**EDS file revision*1**		
	1.□*2	**2.□*2**	**3.□*2**
Major Revision: 1 (Firmware version "03" or earlier)	○	×	×
Major Revision: 2 (Firmware version "04")	○	○	×
Major Revision: 3 (Firmware version "05" or later)	○	○	○

*1 The major revision of the EDS file matches the major revision of the corresponding CC-Link IE TSN Plus module.
The EDS file revision and the corresponding CC-Link IE TSN Plus revision can be checked in the following window of the EtherNet/IP Configuration tool.



(1) Major/minor revision of the corresponding CC-Link IE TSN Plus module
(2) DeviceRevision: Major/minor revision of the corresponding CC-Link IE TSN Plus module
FileRevision: Major/minor revision of the EDS file

*2 The version of the EDS file should be described in □.

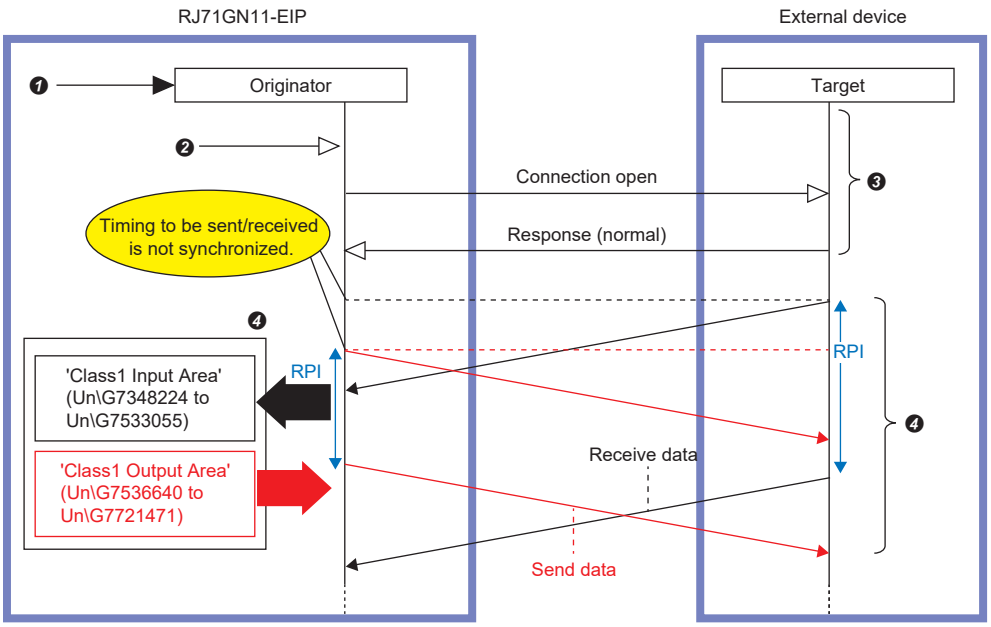
Class1 instance communications

This method is mainly used for communications with an adapter. A connection to be opened is managed by using the IP address of the external device and instance ID, and data communications are performed periodically between the originator and the target.

The CC-Link IE TSN Plus module performs connection open processing in the timing in which 'EtherNet/IP communication start request' (Un\G7340096) is changed from 0 (stop request).

When a connection is opened successfully, data communications are performed according to the connection settings.

The following figure shows data communications for which the application type is Exclusive Owner when the CC-Link IE TSN Plus module is the originator.



❶ Write the Class1 instance communications connection settings.
❷ 'EtherNet/IP communication in process' (X10) turns on.
❸ A connection is established.
❹ Data are sent and received.

Point

Since the timing of data sending differs between the originator and the target, the data communication timing is not synchronized. In addition, since RPI is managed on a connection basis, even when the same RPI is set, the data sending timing per connection is not synchronized.

Data communications procedure

1. Connection settings

Set a connection in "EtherNet/IP Configuration". (☞ Page 121 "EtherNet/IP Configuration" window)

2. Establishing a connection

'EtherNet/IP communication in process' (X10) turns on at the following timing, and a connection starts to open.

- A value other than 0 is set for 'EtherNet/IP communication start request' (Un\G7340096).
- When the EtherNet/IP communication automatic start function is enabled, initialization after power-on is completed.

3. Sending/receiving data

When a connection is opened normally, data is sent/received at the RPI interval as follows.

- The data sent by the target is stored in 'Class1 Input Area' (Un\G7348224 to Un\G7533055).
- The data set in 'Class1 Output Area' (Un\G7536640 to Un\G7721471) of the originator is sent to the target.

Connection settings

The following settings are required when performing instance communication using the CC-Link IE TSN Plus module as the originator.

- Check the instance ID set for the target[*1].
- Use "EtherNet/IP Configuration" to configure the scanner settings for the CC-Link IE TSN Plus module based on the instance ID set for the target[*2].

The instance IDs when using the CC-Link IE TSN Plus module as a target are shown as follows.

I/O (T: Target, O: Originator)	Connection No. (Specified when setting the CC-Link IE TSN Plus module adapter.)	Instance ID (Automatically generated according to the connection No.)
Input (T->O)	1	768
	2	769
	⋮	767 + Connection No.
	255	1022
	256	1023
Output (O->T) (When the application type is Input Only)	—	198 (fixed value)
Output (O->T) (When the application type is Exclusive Owner)	1	1024
	2	1025
	⋮	1023 + Connection No.
	255	1278
	256	1279

The following settings are required when performing instance communication using the CC-Link IE TSN Plus module as the target.

- Use "EtherNet/IP Configuration" to configure the adapter settings for the CC-Link IE TSN Plus module[*2].
- Set the originator device to perform communication with the instance ID that matches the adapter settings[*1*2].

*1 For the setting and checking method, refer to the manual for the external device. Depending on the device used, a fixed value may be specified in the EDS file and it may not be described in the manual.

*2 For the CC-Link IE TSN Plus module setting method, refer to the following.
☞ Page 121 "EtherNet/IP Configuration" window

Precautions

To start EtherNet/IP communications by setting a value other than 0 for 'EtherNet/IP communication start request (Un\G7340096)', set all 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823) to 0.
When 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823) is not all set to 0, EtherNet/IP communications will not start even if a value other than 0 is set for 'EtherNet/IP communication start request' (Un\G7340096).
In this case, 2 (cannot start) is stored for 'EtherNet/IP communication start status' (Un\G7340097).

Exclusive Owner (target) settings

This section describes the setting procedure and restrictions to be applied when the application type is set to Exclusive Owner for performing Class1 instance communications using the CC-Link IE TSN Plus module as the target. For Exclusive Owner, refer to the following.

Page 278 Application type

Point

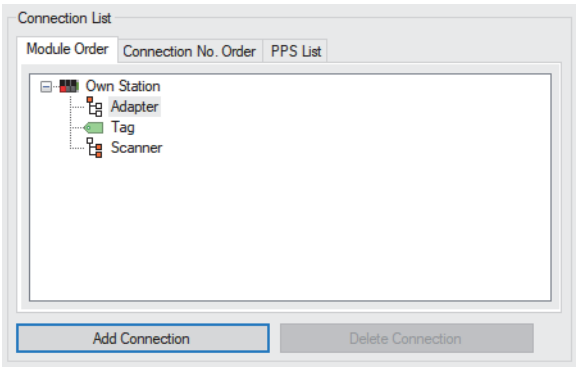
When the CC-Link IE TSN Plus module is the target, Exclusive Owner can be set only when Class1 instance communications are performed.

■Target side setting method

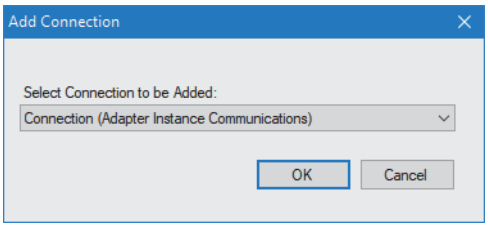
1. Open the "Connection Setting" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Port2 Module Extended Parameter]⇨ [Detailed Setting]

2. Select "Adapter" in "Connection List" and click the [Add Connection] button.

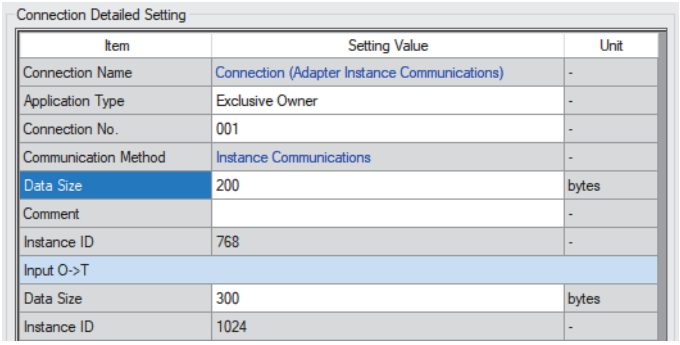


3. Select "Connection (Adapter Instance Communications)" in "Select Connection to be Added:" and click the [OK] button.



4. Set "Exclusive Owner" for "Application Type".

5. Set the data size to be sent from the target to the originator in "Data Size".



6. Set the data size that the target should receive from the originator in "Data Size" under "Input O->T".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Adapter Instance Communications)	-
Application Type	Exclusive Owner	-
Connection No.	001	-
Communication Method	Instance Communications	-
Data Size	200	bytes
Comment		-
Instance ID	768	-
Input O->T		
Data Size	300	bytes
Instance ID	1024	-

Point

The instance ID on the target side is automatically calculated in accordance with the connection number value. For the relationship between the connection number and instance ID, refer to the following.

☞ Page 273 Connection settings

■Originator side setting method

1. Open the "Connection Setting" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Port2 Module Extended Parameter]⇨ [Detailed Setting]

2. For "Data Size" (1) under "Input T->O", set the "Data Size" value (1) on the target side.

3. For "Instance ID" (2) under "Input T->O", set the "Instance ID" value (2) on the target side.

4. For "Data Size" (3) under "Output O->T", set the "Data Size" value (3) under "Input O->T" on the target side.

5. For "Instance ID" (4) under "Output O->T", set the "Instance ID" value (4) under "Input O->T" on the target side.

Originator

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Exclusive Owner (Class1 Instance)	-
Application Type	Exclusive Owner	-
Connection No.	001	-
Communication Method	Instance Communications	-
Comment		-
Trigger Type	Cyclic	-
Inhibit Time Mode	Default	-
Inhibit Time	5	ms
Timeout Multiplier	x4	-
Configuration Instance	1	-
Input T->O		
Input Mode	Multicast	-
Real Time Format	Modeless	-
Data Size	200 (1)	bytes
Priority	Scheduled	-
RPI	20000	μs
Instance ID	768 (2)	-
Output O->T		
Output Mode	Point to point	-
Real Time Format	Modeless	-
Data Size	300 (3)	bytes
Priority	Scheduled	-
RPI	20000	μs
Instance ID	1024 (4)	-

Target

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Adapter Instance Communications)	-
Application Type	Exclusive Owner	-
Connection No.	001	-
Communication Method	Instance Communications	-
Data Size	200 (1)	bytes
Comment		-
Instance ID	768 (2)	-
Input O->T		
Data Size	300 (3)	bytes
Instance ID	1024 (4)	-

In the "Setting Value" column, set the same value to the corresponding fields to which the same number is assigned.

Point

When using a product of other company as the originator, refer to the manual for the relevant product.

■Restrictions on the instance ID that can be set in the EtherNet/IP configuration

The upper limit of the instance ID that can be set in the EtherNet/IP configuration as the target of Exclusive Owner must satisfy (1) or (2) below.

• Restrictions based on the number of set instance IDs

No.	Calculation formula
(1)	A+B+C+D≤256

Name of variable	Description
A	Number of set instance IDs when the application type is Input Only in the Class1 instance communications adapter (from target to originator)
B	Number of set tag names when the application type is Input Only in the Class1 tag communications adapter
C	Number of set instance IDs when the application type is Exclusive Owner in the Class1 instance communications adapter (from target to originator)
D	Number of set instance IDs when the application type is Exclusive Owner in the Class1 instance communications adapter (from originator to target)

• Restrictions based on the number of set connections

When the application type is Input Only, each connection setting requires one target-to-originator instance ID or tag name. When the application type is Exclusive Owner, each connection setting requires one target-to-originator ID and one originator-to-target instance ID. Therefore, (1) can be expressed with (2) below using the number of connections that can be set.

No.	Calculation formula
(2)	E+F×2≤256

Name of variable	Description
E	Number of set connections (number of connections to which a connection number is assigned) whose application type is Input Only
F	Number of set connections (number of connections to which a connection number is assigned) whose application type is Exclusive Owner

Point

- (1) expresses the upper limit of instance IDs that can be set. When using (1) for calculating the upper limit of connections that can be set, one connection is required regardless of the application type.
- Even when the value of (2) is 256 which is the maximum value, as long as the number of set connections (E+F) is less than 256, the Class1 instance communications scanner, Class3 message communications client, and UCMM tag communications tag can be set to unassigned connection numbers between No.1 and No.256.

■Precautions for operation of Exclusive Owner (target)

- When setting an instance ID on the originator side, set the correct values to "Instance ID" (1) under "Input T->O" and "Instance ID" (2) under "Output O->T". If the values are set in reverse, a CIP Extended error (General Status: 01H, Extended Status: 012AH) occurs, disabling communications. (☞ Page 465 Error Codes When a Connection Error Occurs)

Originator

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Exclusive Owner (Class1 Instance)	-
Application Type	Exclusive Owner	-
Connection No.	001	-
Communication Method	Instance Communications	-
Comment		-
Trigger Type	Cyclic	-
Inhibit Time Mode	Default	-
Inhibit Time	5	ms
Timeout Multiplier	x4	-
Configuration Instance	1	-
Input T->O		
Input Mode	Multicast	-
Real Time Format	Modeless	-
Data Size	200	bytes
Priority	Scheduled	-
RPI	20000	μs
Instance ID	768 (1)	-
Output O->T		
Output Mode	Point to point	-
Real Time Format	Modeless	-
Data Size	300	bytes
Priority	Scheduled	-
RPI	20000	μs
Instance ID	1024 (2)	-

Target

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Adapter Instance Communications)	-
Application Type	Exclusive Owner	-
Connection No.	001	-
Communication Method	Instance Communications	-
Data Size	200	bytes
Comment		-
Instance ID	768 (1)	-
Input O->T		
Data Size	300	bytes
Instance ID	1024 (2)	-

In the "Setting Value" column, set the same value to the corresponding fields to which the same number is assigned.

- Set the same value to the combination of "Instance ID" (1) under "Input T->O" on the originator side and "Instance ID" (1) on the target side as well as to the combination of "Instance ID" (2) under "Output O->T" on the originator side and "Instance ID" (2) under "Input O->T" on the target side. If (1) does not match during data communication, a CIP Extended error (General Status: 01H, Extended Status: 012BH) occurs. If (2) does not match, a CIP Extended error (General Status: 01H, Extended Status: 012AH) occurs. (☞ Page 465 Error Codes When a Connection Error Occurs)

Originator

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Exclusive Owner (Class1 Instance)	-
Application Type	Exclusive Owner	-
Connection No.	001	-
Communication Method	Instance Communications	-
Comment		-
Trigger Type	Cyclic	-
Inhibit Time Mode	Default	-
Inhibit Time	5	ms
Timeout Multiplier	x4	-
Configuration Instance	1	-
Input T->O		
Input Mode	Multicast	-
Real Time Format	Modeless	-
Data Size	200	bytes
Priority	Scheduled	-
RPI	20000	μs
Instance ID	768 (1)	-
Output O->T		
Output Mode	Point to point	-
Real Time Format	Modeless	-
Data Size	300	bytes
Priority	Scheduled	-
RPI	20000	μs
Instance ID	1025 (2)	-

Target A

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Adapter Instance Communications)	-
Application Type	Exclusive Owner	-
Connection No.	001	-
Communication Method	Instance Communications	-
Data Size	200	bytes
Comment		-
Instance ID	768 (1)	-
Input O->T		
Data Size	300	bytes
Instance ID	1024	-

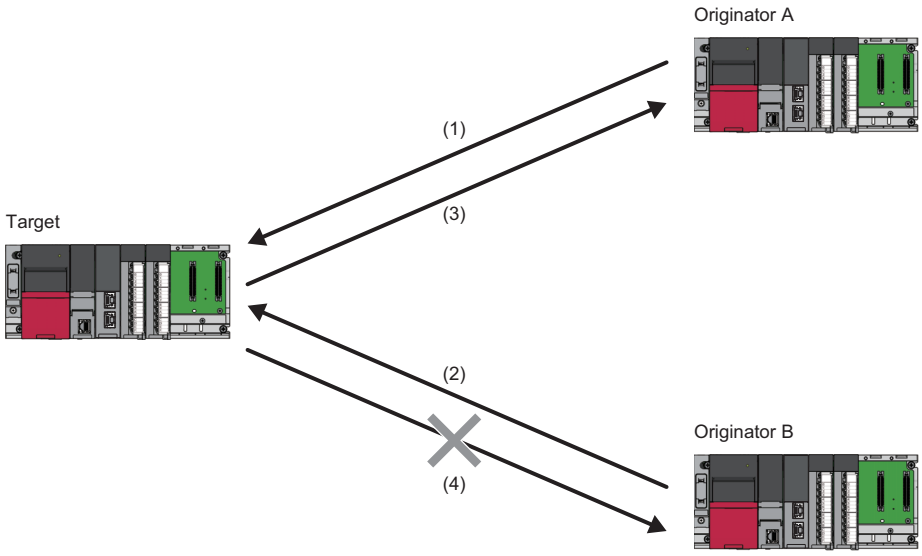
Target B

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Adapter Instance Communications)	-
Application Type	Exclusive Owner	-
Connection No.	002	-
Communication Method	Instance Communications	-
Data Size	200	bytes
Comment		-
Instance ID	769	-
Input O->T		
Data Size	300	bytes
Instance ID	1025 (2)	-

In the "Setting Value" column, set the same value to the corresponding fields to which the same number is assigned.

- Send a single connection establishment request for one originator-to-target instance ID. Exclusive Owner can only receive data from one originator for each connection set to the adapter. When one originator-to-target instance ID receives multiple connection establishment requests, only the connection establishment request received first is achieved and a CIP Extended error (General Status: 01H, Extended Status: 0106H) occurs for other connection establishment requests. (☞ Page 465 Error Codes When a Connection Error Occurs)



(1) Originator A sends a connection establishment request to target connection No.n (n: 1 to 256).
(2) Originator B sends a connection establishment request to target connection No.n (n: 1 to 256).
(3) The connection establishment request from originator A is received and originator A and connection No.n (n: 1 to 256) start communicating.
(4) As connection No.n (n: 1 to 256) has already started communicating with originator A, a CIP Extended error (General Status: 01H, Extended Status: 0106H) occurs upon the connection establishment request from originator B and communication with originator B fails.

Point

- To send data through multicast from the target to multiple originators, use both Exclusive Owner and Input Only. (☞ Page 292 Operation for when both Exclusive Owner and Input Only are used)
- With Exclusive Owner, only the connection establishment request received first is achieved. Therefore, the connected originator may be changed each time the system is started.

■Operation for when both Exclusive Owner and Input Only are used

The following operation can be executed by using both Exclusive Owner and Input Only.

- Target side: Data sending to multiple originators through multicast
- Originator side: Data sending to the target

For this operation, set "Input Mode" under "Input T->O" on the originator side to "Multicast".

1. Open the "Connection Setting" window on the originator side.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Port2 Module Extended Parameter]⇨ [Detailed Setting]

2. Set "Input Mode" under "Input T->O" to "Multicast".

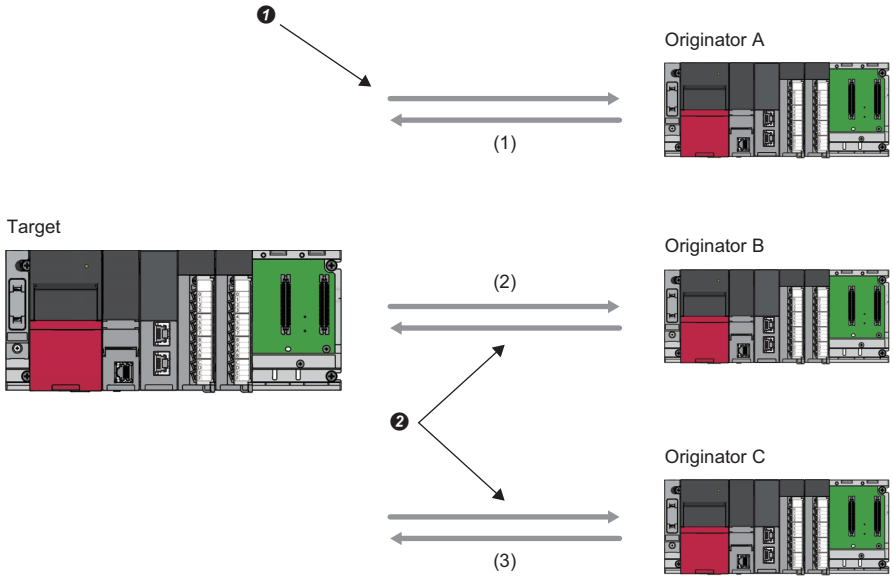
Input T->O		
Input Mode	Multicast	-
Real Time Format	Modeless	-
Data Size	2	bytes
Priority	Scheduled	-
RPI	20000	μs
Instance ID	768	-

Ex.

When performing communications with originator A by using Exclusive Owner while performing communications with originators B and C by using Input Only

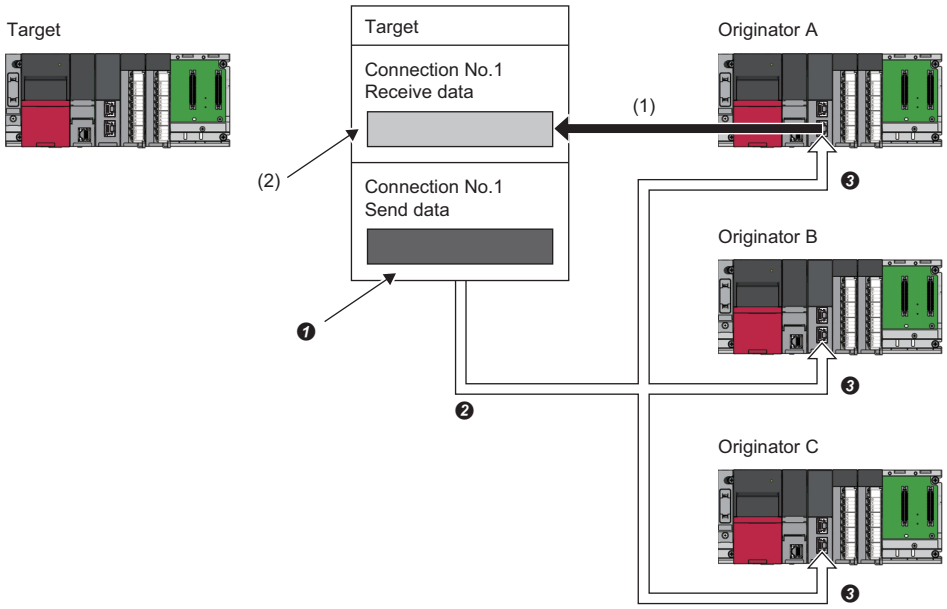
While receiving the data sent from originator A, the target can send the same data to originators A to C through multicast.

- Before communications start



(1) Originator A and the target are connected via connection No.1 (Exclusive Owner (Class1 instance communications)).
(2) Originator B and the target are connected via connection No.1 (Input Only (Class1 instance communications)).
(3) Originator C and the target are connected via connection No.1 (Input Only (Class1 instance communications)).
❶ The target-to-originator instance ID is set to 768 and the originator-to-target instance ID is set to 1024.
❷ The target-to-originator instance ID is set to 768 and the originator-to-target instance ID is set to 198.

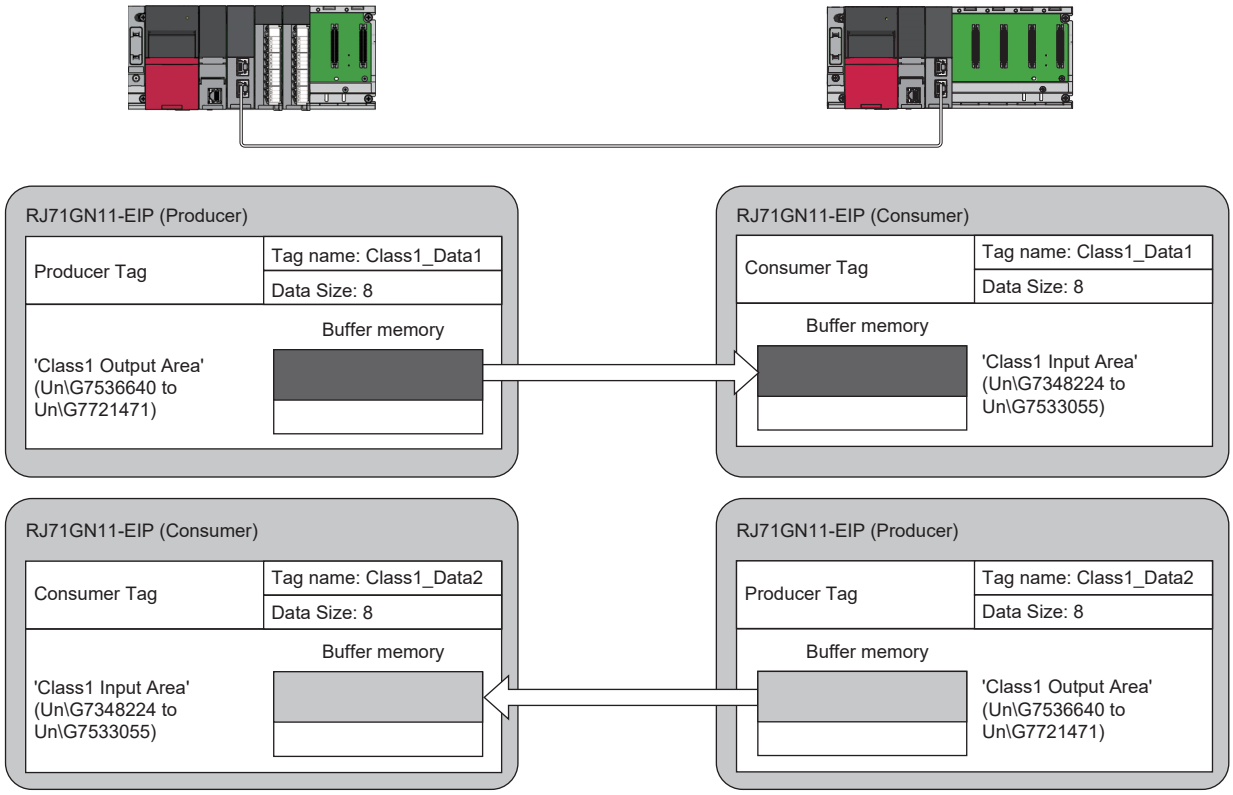
• During communication



(1) Originator A sends data to the target.
(2) Data received from originator A is stored in 'Class1 Input Area' (Un\G7348224 to Un\G7348945) (connection No.1).
❶ Data sent from the target to each originator is stored in 'Class1 Output Area' (Un\G7536640 to Un\G7537361) (connection No.1).
❷ The target sends data to each originator through multicast.
❸ Data sent from the target is received.

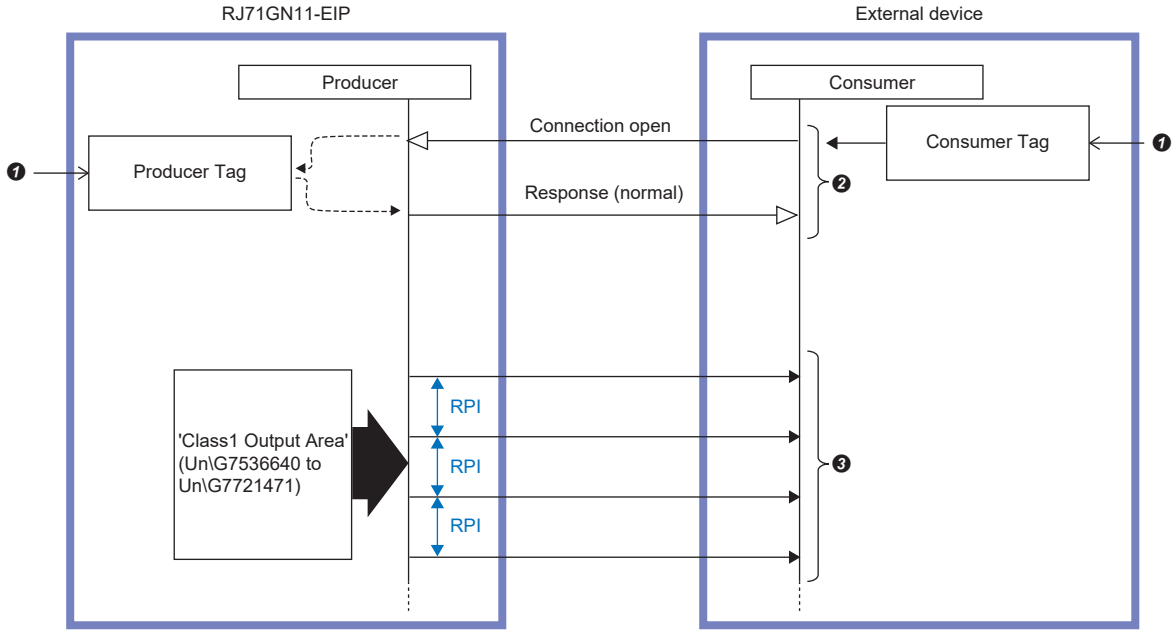
Class1 tag communications

This method is mainly used for communications with the scanner. This method of communications manages a connection to be opened by using the IP address and tag name of the external device.
A connection is opened between tags with the same tag name and same data size to perform data communications periodically.
For tag communications, the connection-opening side is called "Consumer", and the "connection-opened side is called "Producer".
In tag communications, data communications can be performed only in a single direction: from the Producer Tag set by Producer to the Consumer Tag set by Consumer. To perform data communication both ways, both sides need to become Consumers.
In addition, since RPI is managed on a connection basis, even when multiple Producers communicate with the same tag, their data sending timings are not synchronized.



Tag	Description
Producer Tag	Receive a connection open request from the Consumer to be communicated with, and send data to the Consumer Tag with the same name.
Consumer Tag	Send a connection open request to the Producer to be communicated with, and receive data from the Producer Tag with the same name.

Data is sent from Producer to Consumer.



❶ Write the Class1 tag communications connection settings.
❷ When the tag names and data sizes of the Producer Tag and Consumer Tag match, a connection opens.
❸ Send the data stored on the Producer side at the RPI interval.

Data communications procedure

1. Connection settings

Set a connection in "EtherNet/IP Configuration". (☞ Page 121 "EtherNet/IP Configuration" window)

2. Establishing a connection

'EtherNet/IP communication in process' (X10) turns on at the following timing, and a connection starts to open.

- A value other than 0 is set for 'EtherNet/IP communication start request' (Un\G7340096).
- When the EtherNet/IP communication automatic start function is enabled, initialization after power-on is completed.

3. Sending/receiving data

When a connection is opened normally, data is sent/received at the RPI interval as follows.

- The data sent by the target is stored in 'Class1 Input Area' (Un\G7348224 to Un\G7533055).
- The data set in 'Class1 Output Area' (Un\G7536640 to Un\G7721471) of the originator is sent to the target.

Connection settings

The following settings are required when performing tag communications using the CC-Link IE TSN Plus module as the originator.

- Check the tag name set for the target[*1*2].
- Use "EtherNet/IP Configuration" to configure the scanner settings for the CC-Link IE TSN Plus module based on the tag name set for the target[*2].

The following settings are required when performing instance communication using the CC-Link IE TSN Plus module as the target.

- Use "EtherNet/IP Configuration" to configure the adapter settings for the CC-Link IE TSN Plus module[*2].
- Set it so communication is performed for the tag name set in the originator device.[*1*2]

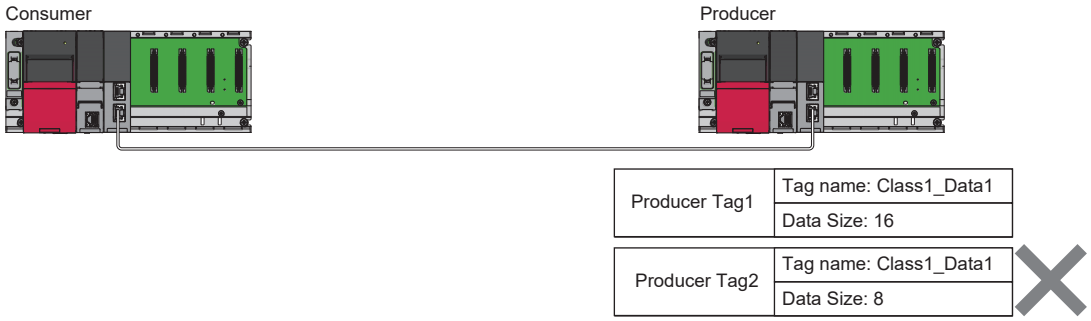
*1 For the setting and checking method, refer to the manual for the external device.
*2 For the CC-Link IE TSN Plus module setting method, refer to the following.
☞ Page 121 "EtherNet/IP Configuration" window

Precautions

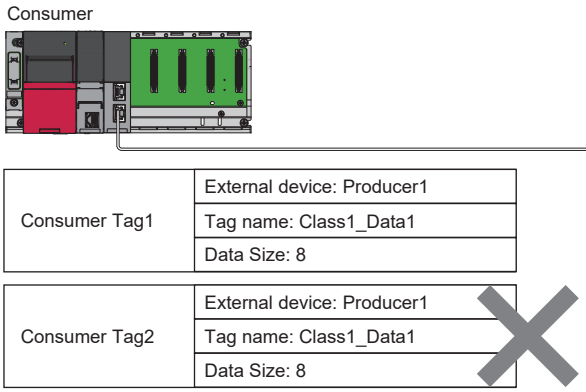
Tag communications cannot be executed depending on the connection setting details.

The following figures show the tag conditions that cannot be set to the CC-Link IE TSN Plus module or under which tag communications cannot be executed.

- A Producer Tag with the same tag name cannot be set to the CC-Link IE TSN Plus module regardless of its data size. (Tag names are not case-sensitive.)

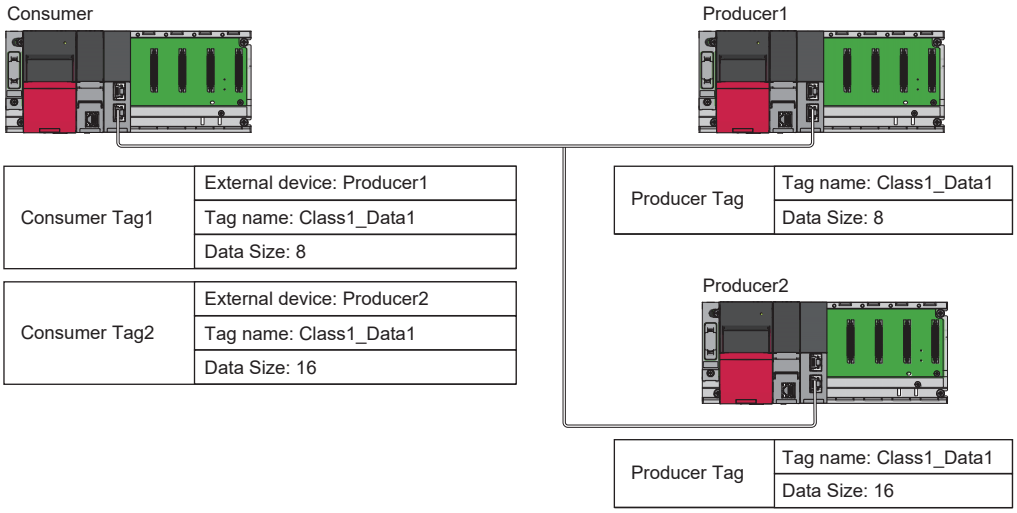


- The setting for opening multiple connections for the Producer Tag held by the external device cannot be made. (Multiple Consumer Tags with the same tag name cannot be set for one external device.) (Tag names are not case-sensitive.)



However, for Producer Tags with the same tag names held by different external devices, a connection can be opened individually.

In this case, since they are independent, the connection settings do not need to be the same. (Including data sizes)



- When the data size of Producer Tag is different from the data size of Consumer Tag, Producer may send an error response to Consumer.

Condition	Result
When the CC-Link IE TSN Plus module is Producer	An error response is sent to Consumer.
When the CC-Link IE TSN Plus module is Consumer	The result depends on the operation of Producer. Refer to the manual for the external device.

Cyclic transmission stop and restart

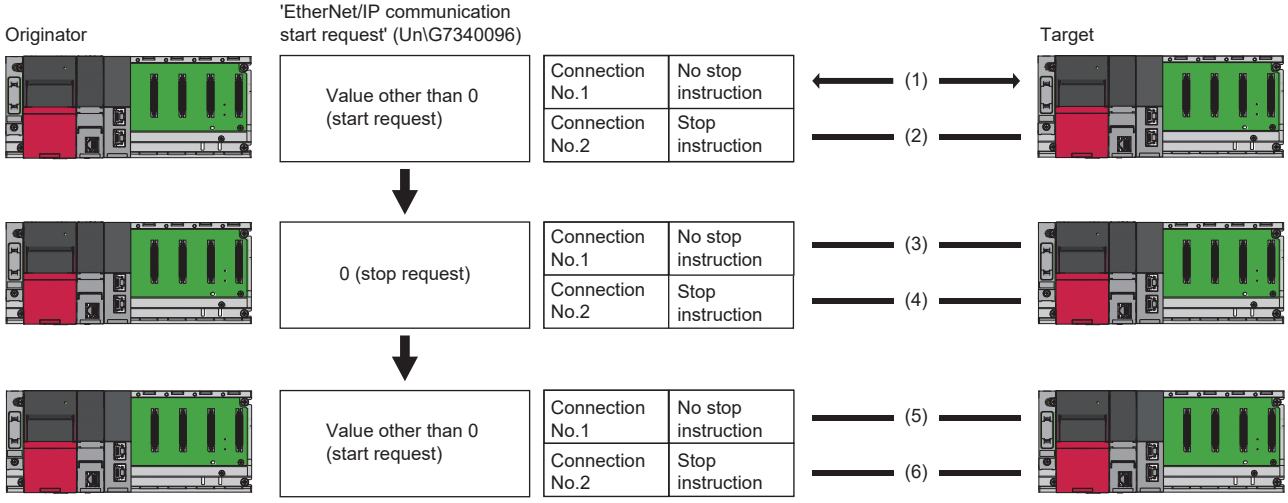
Stop or restart of cyclic transmission is enabled individually for each connection with 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823).

When the bit corresponding to the connection number to be stopped is turned on, cyclic transmission stops, and when that bit is turned off, cyclic transmission restarts.

The following buffer memory areas are used to stop and restart cyclic transmission.

'EtherNet/IP communication start request' (Un\G7340096)	Corresponding bit of 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823)	Cyclic transmission status
0 (stop request)	Off: Pause not specified	All cyclic transmissions are stopped.
Not 0 (start request)	Off: Pause not specified	Cyclic transmission starts.
	On: Pause specified	Cyclic transmission pauses.

Even if the value of 'EtherNet/IP communication start request' (Un\G7340096) is changed from "Other than 0" to "0", 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823) is not cleared. Therefore, even if the value of 'EtherNet/IP communication start request' (Un\G7340096) is changed from "Other than 0" to "0" and back to "Other than 0", EtherNet/IP communications do not start again. To start EtherNet/IP communications, clear 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823) and set Not 0 for 'EtherNet/IP communication start request' (Un\G7340096).



(1) Connection No.1: Communicating
(2) Connection No.2: Stopped
(3) Connection No.1: Stopped (transitioning to Stopped)
(4) Connection No.2: Stopped
(5) No.1: Stopped (remaining stopped) → EtherNet/IP communications do not start.
(6) Connection No.2: Stopped (remaining stopped)

Point

When cyclic transmission is stopped, the operation is performed as follows.

- The originator side performs connection close processing to stop cyclic transmission. A connection timeout does not occur on the target side.
- The target side only stops cyclic transmission. A connection timeout occurs on the originator side.

The conditions for turning on (Cyclic paused) the corresponding bit of 'Class1 cyclic pause status' (Un\G7735824 to Un\G7735839) are as follows.

'EtherNet/IP communication start request' (Un\G7340096)	Specified connection No. parameter	Corresponding bit of 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823)	Corresponding bit of 'Class1 cyclic pause status' (Un\G7735824 to Un\G7735839)
0 (stop request)	—	Off: Pause not specified	Off: Cyclic executing (All bits are off.)
Not 0 (start request)	Does not exist	On: Pause specified	Off: Cyclic executing
	Exists	On: Pause specified	On: Cyclic paused

Setting method

Stop and start cyclic transmission by the following setting methods.

Item	Setting method
To stop cyclic transmission	Turn on the corresponding connection number bit of 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823).
To restart cyclic transmission	Turn off the corresponding connection number bit of 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823).

For details on the buffer memory, refer to the following.

☞ Page 536 Class1 cyclic pause specification (Un\G7735808 to Un\G7735823)

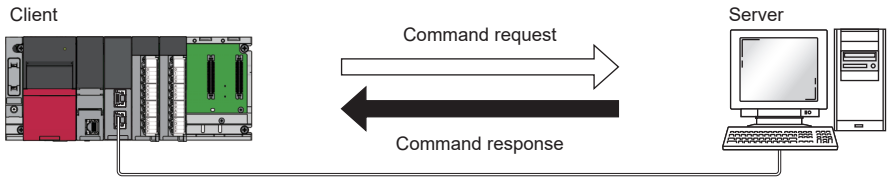
Precautions

- With one of the bits in 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823) turned on, if a request is made to start EtherNet/IP communications, 2 (cannot start) is stored in 'EtherNet/IP communication start status' (Un\G7340097), and EtherNet/IP communications do not start.
- Even after turning on the corresponding bit (specified connection number) in 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823), if a parameter does not exist in the specified connection number, cyclic transmission does not pause.
- If a parameter exists in the connection number specified in 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823), cyclic transmission pauses. However, since a connection open request is not sent to the external device, cyclic transmission does not start.

12.3 Message Communication Function (Client)

Function overview

This function performs Explicit message communications point-to-point between the client (message sending side) and the server (message receiving and processing side).



The available functions include the general message communications client function for sending data at any timing by using message communication support commands and the tag communications client function for periodically reading/writing data for the tag set to the server.

However, if the external device does not support the specified command request or tag communications, an error response is returned.

Point

- Explicit message communications are in accordance with the communications defined in the EtherNet/IP specification.
- To use the message communication function (client), set Not 0 (start request) for 'EtherNet/IP communication start request' (Un\G7340096) so that EtherNet/IP communications can be used.
- For details on the message communication support commands, refer to the following.

☞ Page 375 MESSAGE COMMUNICATION SUPPORT COMMANDS

The message communication function (client) has the following communication methods.

Communication method	Connection	Explicit message setting method	Description	Application
UCMM message communications	No	Buffer memory	A function for performing message communications for the server	Used when sending a message as needed.
Class3 message communications	Yes	"EtherNet/IP Configuration"		Used when sending a message periodically for such purposes as monitoring.
UCMM tag communications	No	Buffer memory	A function for reading from/writing to the server device by using the tag name	Used when the communication method is Unconnected and when reading/writing the value of the device with a priority lower than Class1.
Class3 tag communications	Yes	"EtherNet/IP Configuration"		Used when the communication method is Connected and when reading/writing the value of the device with a priority lower than Class1.

■Message communications

UCMM (Unconnected) and Class3 (Connected) message communications are supported. Messages can be sent to the server.

Data and parameters of the external device can be read/written according to the command request set in the sent message.

■Tag communications

UCMM (Unconnected) and Class3 (Connected) message communications are supported. Read/write requests can be sent to the tag set to the server.

In tag communications, the request-sending side is called "Originator" and the request-receiving side is called "Target".

To use tag communications, the target side must support the tag communications server function.

The following table shows the processing for command requests sent by the originator.

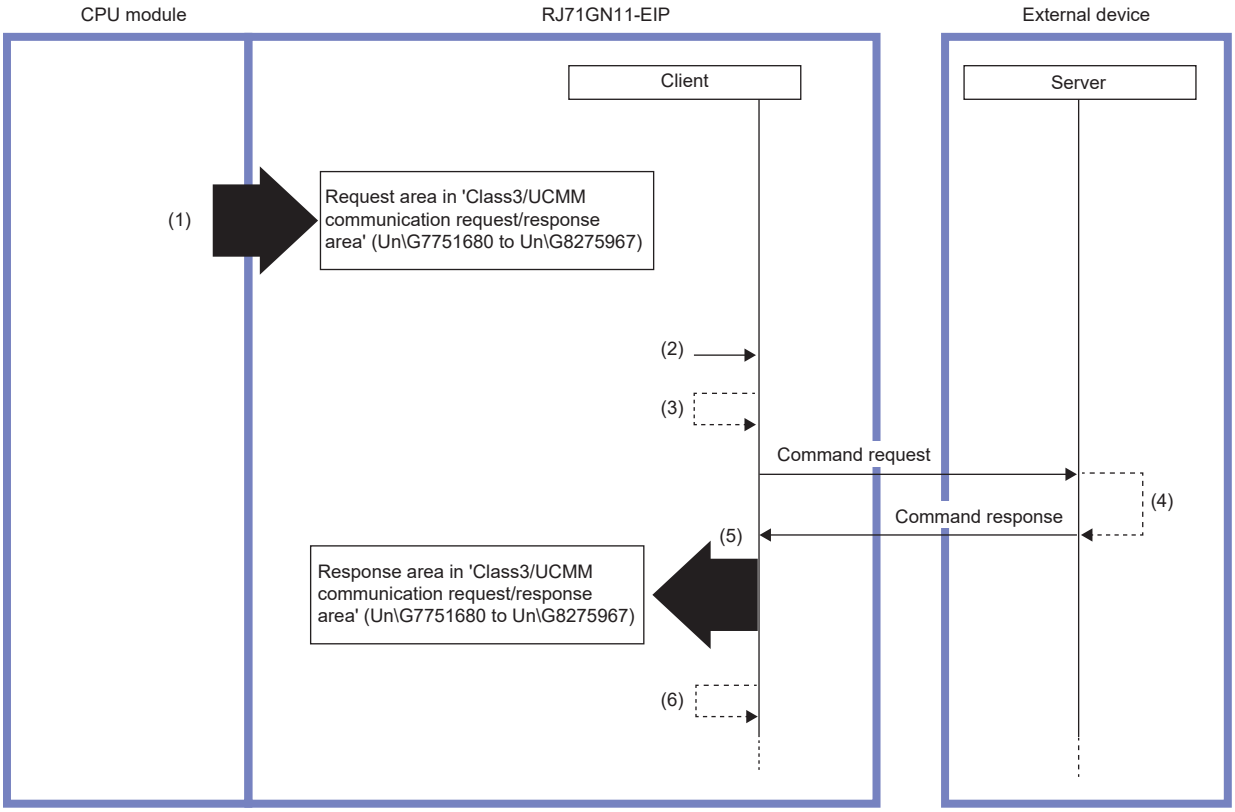
Type		Description
Originator (client)	Read	Send a Read request to the tag of the external device, and read data in the 'Class3/UCMM data area (tag communications)' (Un\G8278016 to Un\G8462847) associated with the tag.
	Write	Send a Write request to the tag of the external device, and write data to the 'Class3/UCMM data area (tag communications)' (Un\G8278016 to Un\G8462847) associated with the tag.

UCMM message communications (client)

Without establishing a connection between the CC-Link IE TSN Plus module and the external device (server), message communications are performed at any timing.

Once per request, communications are performed with the external device without opening a connection.

The set command request is sent to the external device set in the request area of the 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967) in the CC-Link IE TSN Plus module. The command response from the external device is stored in the response area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967).



(1) Set request data by a program

(2) Turn on 'Class3/UCMM communication execution request' (Un\G7749632 to Un\G7749647).

(3) 'Class3/UCMM communication execution request acceptance' (Un\G7749648 to Un\G7749663) turns on.

(4) Command processing execution

(5) Store the response data in the buffer memory.

(6) 'Class3/UCMM communication execution completion' (Un\G7749664 to Un\G7749679) turns on.

Message communications request data preparation

The following describes the setting procedure necessary for sending message communications command requests.
Any value can be set for a command request. However, if a command request not supported by the external device is sent, an error response is returned.

1. Check the manual for the external device operating as the server, and check the following details related to the service to be used.

- The service code of the service to be used
- The class ID of the object to which the service to be used belongs
- The instance ID and attribute ID of the instance attribute to which the service to be used belongs
- The size of the request data and the request data to be sent to the service to be used

2. Based on the check results of step 1, set the following details in the request area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967).

Item	Name	Address*2	Setting details
Required Settings	Communication method	Un\G7751680	0001H: UCMM communications (fixed)
	Communication method	Un\G7751681	0001H: Message communications
	Service	Un\G7751685	Service code*1
	Target IP Address	Un\G7751686	IP address of the external device (lower)
		Un\G7751687	IP address of the external device (upper)
	Class	Un\G7751710	Class ID*1
	Instance	Un\G7751711	Instance ID*1
	Attribute	Un\G7751712	Attribute ID*1
	Data Size	Un\G7751708	Size of request data (bytes)*1 Set 0 if the setting is not required.
	Request data	Un\G7751846 to Un\G7752552	Request data (specified in a little-endian format byte string)*1 The setting is not required if not necessary.
Option settings	Trigger Type	Un\G7751690	0010H: Cyclic When Cyclic is set, data is periodically sent at the interval set for RPI.
	RPI	Un\G7751688	00C8H to EA60H (200ms to 60000ms) Set any sending interval.

*1 For a value to be set, refer to the manual for the external device.
*2 Each address in the column belongs to the first area. To use an area other than the first area, add 2048 × (N-1) to the address value of the first area.

Data sending/receiving

For details on sending and receiving data for UCMM message communications, refer to the following.
☞ Page 309 Sending/receiving data for the message communication function (client)

Precautions

An area available for UCMM message communications is limited to an area where a Class3 communications parameter is not set in "EtherNet/IP Configuration".
If a request is executed by using an area not available for UCMM communications (request area where the value of 'Communication method specification' (Un\G7751680) is 0002H (Class3 communications), the default value), an error (error code: 0005H) is stored in 'Result storage area' (Un\G7752706) in the corresponding response area.

Class3 message communications (client)

By establishing a connection between the CC-Link IE TSN Plus module and the external device (server), message communications are performed periodically.
A command request set for the external device registered in "EtherNet/IP Configuration" is sent as Class3 communications parameters for the CC-Link IE TSN Plus module. The command response from the external device is stored in the response area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967).

Message communications request data preparation

The following describes the setting procedure necessary for sending message communications command requests.

1. In "EtherNet/IP Configuration", set Class3 communications parameters. (☞ Page 121 "EtherNet/IP Configuration" window)
2. If necessary, set the following in the request area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967).

Match the connection number in the Class3/UCMM communication area with the connection number in the Class3 communications parameters set in "EtherNet/IP Configuration".

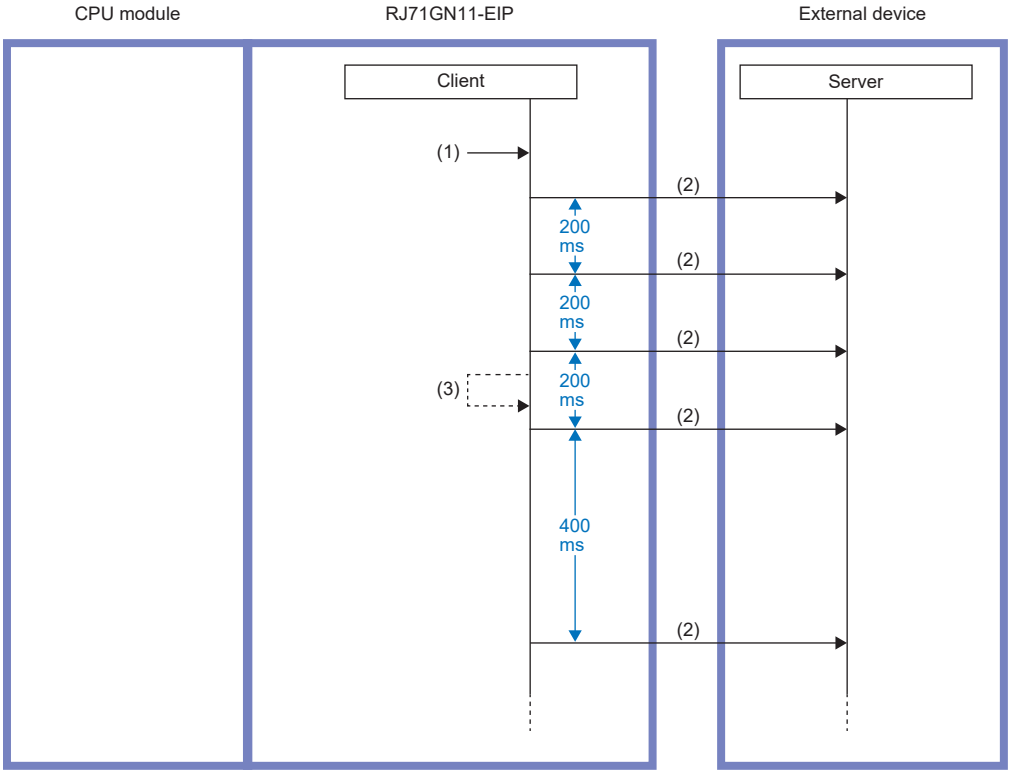
Name	Address (when Connection No. is 1)	Description
Request data	Un\G7751846 to Un\G7752552	Request data to be sent to the external device. (Specified in a little-endian format byte string) A valid area is judged based on the data size set in the Class3 communications parameters. Since the data size is set in byte units, an area with the data size ÷ 2 (rounded up) is valid. This setting is not required when 0 is set for Data Size.

Data sending/receiving

For details on sending and receiving data for Class3 message communications, refer to the following.
☞ Page 309 Sending/receiving data for the message communication function (client)

Option

When Cyclic is selected for the trigger specification, change the value of 'RPI' (Un\G7751688) or of the i_uRPI(RPI) of the module function block to change the sending interval from the value set in the Class3 communications parameters.



(1) Turn on 'Class3/UCMM communication execution request' (Un\G7749632 to Un\G7749647).
(2) Command request
(3) Change RPI from 200ms to 400ms.

Precautions

An area available for Class3 message communications is limited to an area for a connection set in the Class3 communications parameters in "EtherNet/IP Configuration".

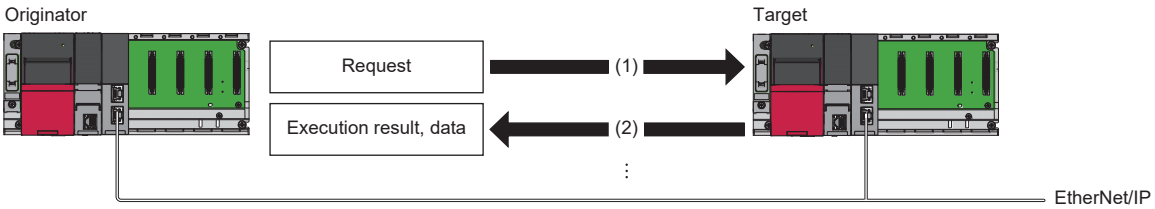
If a request is executed by using an area not available for Class3 communications (request area where the value of 'Communication method specification' (Un\G7751680) is 0001H (UCMM communications)), an error (error code: 0004H) is stored in 'Result storage area' (Un\G7752706) in the corresponding response area.

UCMM tag communications (client)

Without establishing a connection, data is read/written periodically.

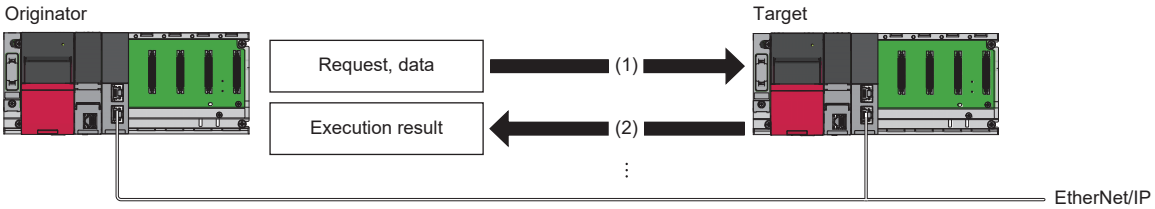
The data set in the request area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967) is sent as a command request, and the response data from the external device is stored in the response area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967).

- Read request



(1) Read request
(2) Read response

- Write request



(1) Write request
(2) Write response

Tag communications request data preparation

The following describes the setting procedure necessary for executing tag communications.

1. Check the content of the tag to be used for tag communications (tag name and size of the tag registered in the external device).
2. Based on the check results of step 1, set the following details in the request area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967).

Item	Name	Address*2	Setting details
Required Settings	Communication method specification	Un\G7751680	0001H: UCMM communications (fixed)
	Communication method specification	Un\G7751681	0002H: Tag communications
	Service	Un\G7751685	• 124CH: UCMM/Class3 Read Originator (for Read request) • 124DH: UCMM/Class3 Write Originator (for Write request)
	Target IP address	Un\G7751686	IP address of the external device (lower)
		Un\G7751687	IP address of the external device (upper)
	Data Type	Un\G7751707	• 00C3H: INT (signed 16-bit data) • 00C4H: DINT (signed 32-bit data)
	Data Size	Un\G7751708	Specify the size as the number of tag elements for Read or Write.
	Request data	Un\G7751846 to Un\G7752552	Write data for Write request An area of the size (Data Size) × (Data Type type) becomes valid. (1 (word) when Data Type is [INT], and 2 (word) when Data Type is [DINT]) When UCMM/Class3 Read Originator is set for Service, the setting is not required.
Option settings	Trigger Type	Un\G7751690	0010H: Cyclic When Cyclic is set, data is periodically sent at the interval set for RPI.
	RPI	Un\G7751688	00C8H to EA60H (200ms to 60000ms) Set any sending interval.
	Path Segment specification (Segment Size)*1	Un\G7751691	1 (with added Path Segment)
	Path Segment specification (Path Segment)*1	Un\G7751692	Lower 8 bytes: Port number, Upper 8 bytes: Slot number

*1 For details on Path Segment, refer to the following.
☞ Page 539 Class3/UCMM communication area

*2 Each address in the column belongs to the first area. To use an area other than the first area, add 2048 × (N-1) to the address value of the first area.

Data sending/receiving

For details on sending and receiving data for UCMM tag communications, refer to the following.

☞ Page 309 Sending/receiving data for the message communication function (client)

Precautions

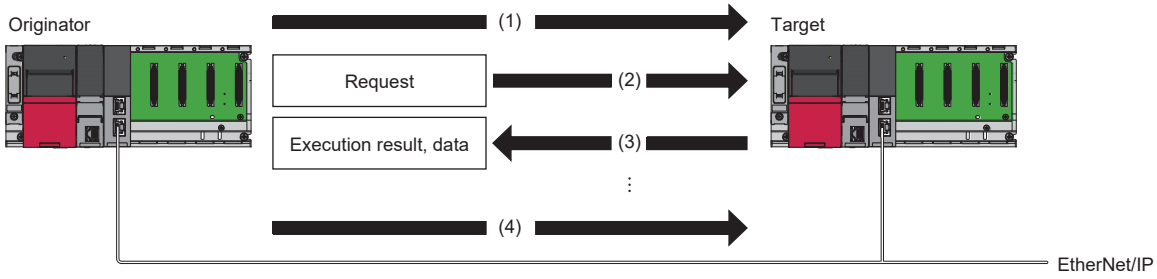
An area available for UCMM tag communications is limited to an area where a Class3 communications parameter is not set in "EtherNet/IP Configuration".

If a request is executed by using an area not available for UCMM communications (request area where the value of 'Communication method specification' (Un\G7751680) is 0002H (Class3 communications)), an error (error code: 0005H) is stored in 'Result storage area' (Un\G7752706) in the corresponding response area.

Class3 tag communications (client)

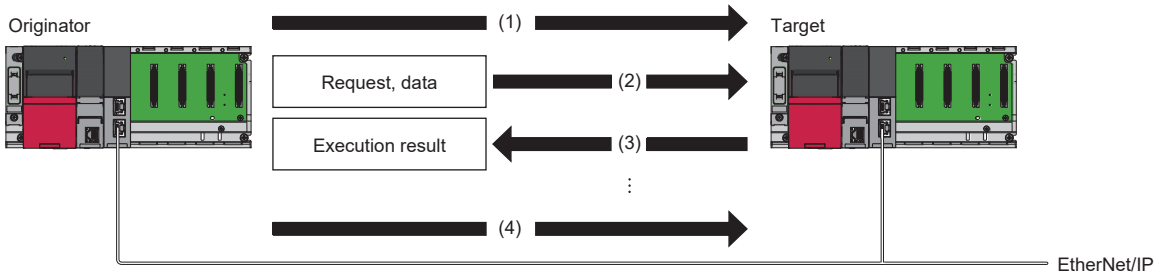
By establishing a connection, data is read/written periodically.

- Read request



(1) Connection open
(2) Read request
(3) Read response
(4) Connection close

- Write request



(1) Connection open
(2) Write request
(3) Write response
(4) Connection close

Tag communications request data preparation

The following describes the setting procedure necessary for executing tag communications.

1. In "EtherNet/IP Configuration", set Class3 communications parameters. (☞ Page 121 "EtherNet/IP Configuration" window)
2. If necessary, set the following in the request area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967).

Match the connection number in the Class3/UCMM communication area with the connection number in the Class3 communications parameters set in "EtherNet/IP Configuration".

Name	Address (when Connection No. is 1)	Description
Request data	Un\G7751846 to Un\G7752552	Request data to be sent to the external device. (Specified in a little-endian format byte string) A valid area is judged based on the data size set in the Class3 communications parameters. For the data size, an area of the size (Data Size) × (Data Type type) becomes valid. (1 (word) when Data Type is [INT], and 2 (word) when Data Type is [DINT]) When UCMM/Class3 Read Originator is set for Service, the setting is not required.

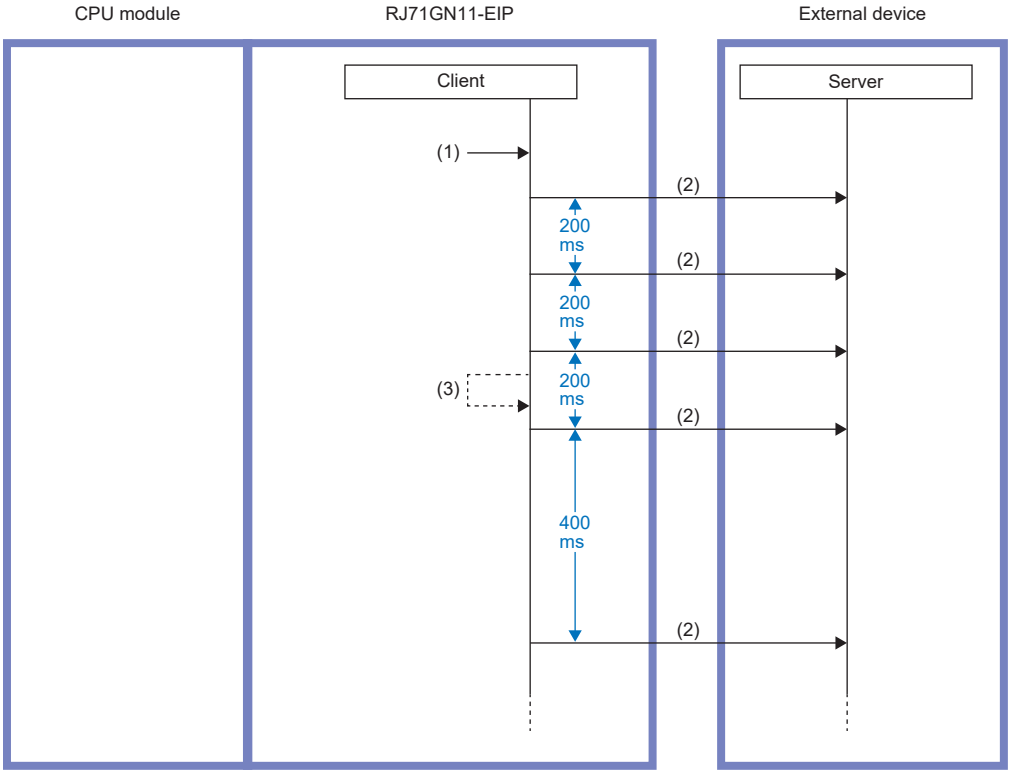
Data sending/receiving

For details on sending and receiving data for Class3 tag communications, refer to the following.

☞ Page 309 Sending/receiving data for the message communication function (client)

Option

When Cyclic is selected for the trigger specification, change the value of 'RPI' (Un\G7751688) or of the i_uRPI(RPI) of the module function block to change the sending interval from the value set in the Class3 communications parameters.



(1) Turn on 'Class3/UCMM communication execution request' (Un\G7749632 to Un\G7749647).
(2) Command request
(3) Change RPI from 200ms to 400ms.

Precautions

An area available for Class3: Tag communications is limited to an area for a connection set in the Class3 communications parameters in "EtherNet/IP Configuration".

If a request is executed by using an area not available for Class3 communications (request area where the value of 'Communication method specification' (Un\G7751680) is 0001H (UCMM communications)), an error (error code: 0004H) is stored in 'Result storage area' (Un\G7752706) in the corresponding response area.

Sending/receiving data for the message communication function (client)

The message communication function (client) has the following two methods.

- Sending/receiving data for message communications using the buffer memory (☞ Page 309 Sending/receiving data for message communications using the buffer memory)
- Sending/receiving data for message communications using module function blocks (☞ Page 312 Sending/receiving data for message communications using module function blocks)

Sending/receiving data for message communications using the buffer memory

Message communication is sent/received using one area from 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). (☞ Page 539 Class3/UCMM communication area)

There are 256 areas (from 1 to 256), and the area to be used differs depending on the communication type to be executed. Determine the area to be used in 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967) in the following way.

Communication type	Method
Class3	After the required parameters such as the tag name, class, instance, and attribute ID for Class3 communications to be used are set in "EtherNet/IP Configuration", 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967) with the same number as a connection number for which the Class3 communications parameters were set is secured.
UCMM	An area in 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967) with the same number as a connection number for which the Class3 communications parameters are not set in "EtherNet/IP Configuration" can be used. However, not using a number that was used as a module function block request number for an area in 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967) is recommended.

■Procedure

Message communications for the external device are executed according to the following procedure. (For areas described hereafter, the first area is used as an example. To use an area other than the first area, add 2048 × (N-1) to the address value of the first area.)

1. Check 'Communication method specification' (Un\G7751680) in the request area of the Class3/UCMM communication area (1st).
2. When the value of 'Communication method specification' (Un\G7751680) is 0001H (UCMM communications), set items from 'Communication method specification' (Un\G7751681) to 'Tag Name' (Un\G7751716 to Un\G7751843). When the value of 'Communication method specification' (Un\G7751680) is 0002H (Class3 communications), the setting is not required.
3. If necessary, set 'Request data' (Un\G7751846 to Un\G7752552).

Set this mainly when sending a write request to the external device, such as when writing to the tag and rewriting parameters by using Set_Attribute_Single.

4. Turn on bit 0 of 'Class3/UCMM communication execution request' (Un\G7749632 to Un\G7749647).
5. The result is stored in the response area of the Class3/UCMM communication area (1st), and bit 0 of 'Class3/UCMM communication execution completion' (Un\G7749664 to Un\G7749679) turns on.
6. Turn off bit 0 of 'Class3/UCMM communication execution request' (Un\G7749632 to Un\G7749647), and bit 0 of 'Class3/UCMM communication execution completion' (Un\G7749664 to Un\G7749679) turns off.

If the execution request is turned on again before 'Class3/UCMM communication execution completion' (Un\G7749664 to Un\G7749679) is turned on and off, the turning off of the execution request may not be recognized.

■Precautions

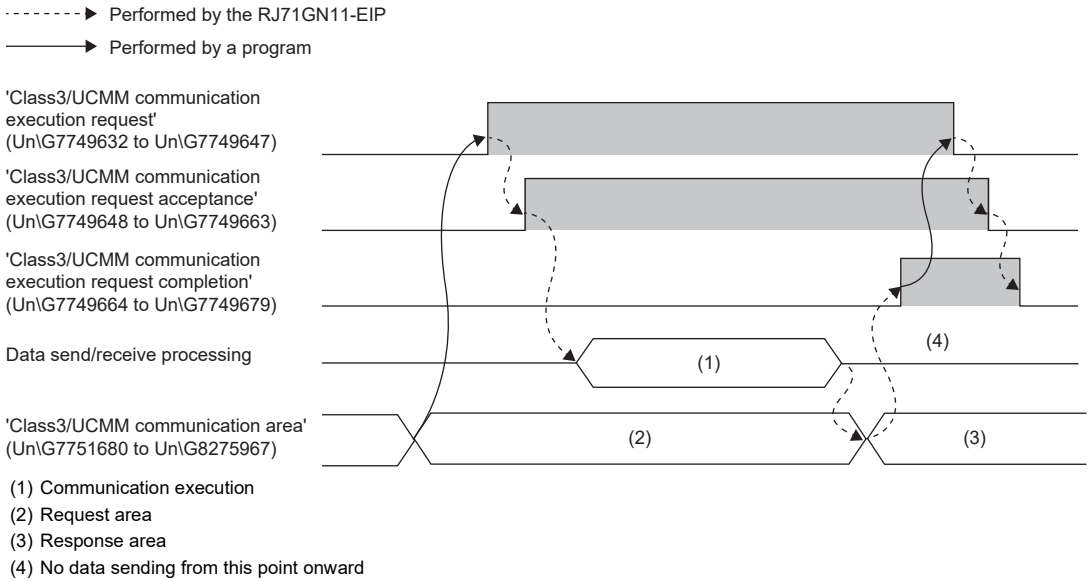
- Areas where Class3 communications parameters are set in "EtherNet/IP Configuration" become dedicated to Class3 communications. For the value of 'Communication method specification' (Un\G7751680), 0001H (UCMM communications) is set by default. Therefore, for areas where Class3 communications parameters are not set, check again the determined areas to be used for any problem in advance.
- If the value of 'Communication method specification' (Un\G7751680) is rewritten by a program, a data link request may fail and an error may occur. Care must be taken so as not to rewrite it.
- If data sending/receiving fails, or if an error response is sent from the external device at the time of reception, an error code is stored in 'Result storage area' (Un\G7752706). (☞ Page 539 Class3/UCMM communication area)

■Timing chart

The following figures show operations from the time 'Class3/UCMM communication execution request' (Un\G7749632 to Un\G7749647) turns on until it turns off depending on the setting details of 'Trigger specification' (Un\G7751690).

• When the trigger specification is Application Trigger

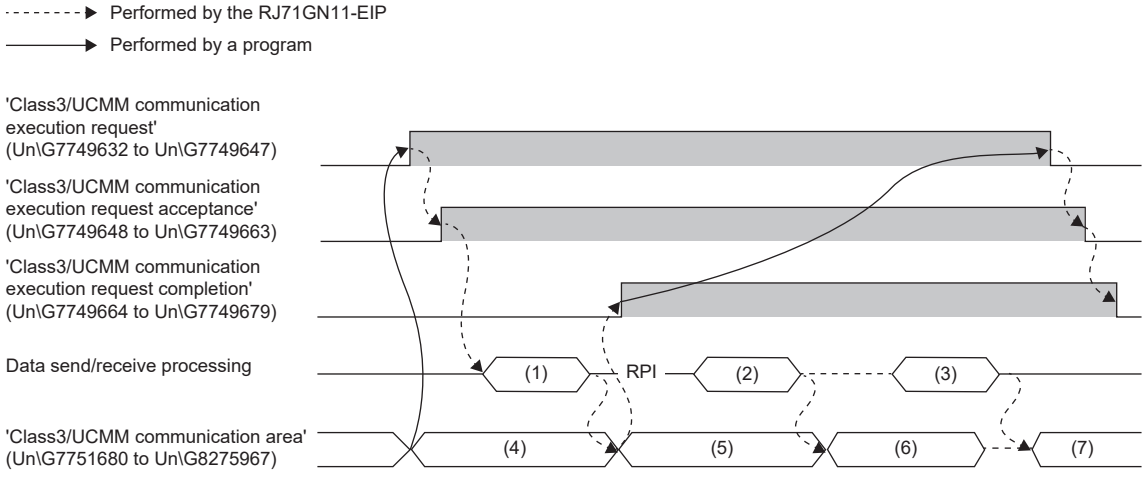
A message is sent only once for one request.



(1) Communication execution
(2) Request area
(3) Response area
(4) No data sending from this point onward

• When the trigger specification is Cyclic

A message is sent periodically at the interval set for 'RPI' (Un\G7751688), and every time a message is received, the result is stored in the response area. (Every time the result is stored, the value of 'Execution completion count' (Un\G7752868 to Un\G7752869) is increased.)



(1) Communication execution (Cyclic 1st time)
(2) Communication execution (Cyclic 2nd time)
(3) Communication execution (Cyclic Nth time)
(4) Request area
(5) Response area (Cyclic 1st time)
(6) Response area (Cyclic 2nd time)
(7) Response area (Cyclic Nth time)

Point

The following describes the operations when the trigger specification is changed during the time between the bit of 'Class3/UCMM communication execution request acceptance' (Un\G7749648 to Un\G7749663) turning on and the bit of 'Class3/UCMM communication execution request' (Un\G7749632 to Un\G7749647) turning off. (Including during the time of periodic transmission by Cyclic)

- When the trigger specification is changed from Application Trigger to Cyclic, periodic transmission is not performed. To enable periodic transmission, turn off the bit of 'Class3/UCMM communication execution request' (Un\G7749632 to Un\G7749647) once, check that the bit of 'Class3/UCMM communication execution request acceptance' (Un\G7749648 to Un\G7749663) and the bit of 'Class3/UCMM communication execution completion' (Un\G7749664 to Un\G7749679) are turned off, and turn on the bit of 'Class3/UCMM communication execution request' (Un\G7749632 to Un\G7749647).
- When the trigger specification is changed from Cyclic to Application Trigger, periodical transmission is performed the RPI time after transmission immediately before the change of the trigger specification, and then periodic transmission stops. To execute periodic transmission again, refer to the case where the trigger specification is changed from Application Trigger to Cyclic.

Sending/receiving data for message communications using module function blocks

Execute data sending/receiving for message communications using module function blocks.
Determine the module function blocks to be used based on the communication type for executing message communications, communications method, and service to be used (when the communication method is tag communications).
For details on module function blocks, refer to the following.
MELSEC iQ-R EtherNet/IP Function Block Reference

Communication type	Communication method	Service	Module FB
UCMM	Message communications	—	M+RJ71GN11_SE_EIP_UCMMOriginator_MessageSend
	Tag communications	Read	M+RJ71GN11_SE_EIP_UCMMOriginator_ReadTagData
		Write	M+RJ71GN11_SE_EIP_UCMMOriginator_WriteTagData
Class3	Message communications	—	M+RJ71GN11_SE_EIP_Class3Originator_MessageSend
	Tag communications	Read	M+RJ71GN11_SE_EIP_Class3Originator_ReadTagData
		Write	M+RJ71GN11_SE_EIP_Class3Originator_WriteTagData

■Request number

Determine the request number as follows according to the communication type to be executed.

Communication type	Method
Class3	After the required parameters such as the tag name, class, instance, and attribute ID for Class3 communications to be used are set in "EtherNet/IP Configuration", the number of the connection number for which these Class3 communications parameters were set becomes a request number.
UCMM	The same number as a connection number for which the Class3 communications parameters are not set in "EtherNet/IP Configuration" can be used as a request number. However, a request number used by another module function block or the number of an area used in 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967) cannot be used. Be careful about duplication. (Identical numbers can be used as long as they are not requested at the same time. In that case, however, mutual exclusion is required. Managing request numbers based on different numbers is therefore recommended.)

■Send procedure

1. Set all the input arguments for the module function block to be used.
2. For message communications or tag communications (write) for which request data must be set, set required data to the request data storage device or write data storage device.

- When the communication type is UCMM: Set data of the size specified by the input argument.
- When the communication type is Class3: Set data as big as the size of data set as Class3 communications parameters.

3. Turn on i_bEN (execution command) of the module function block.

Point

If an error occurs because an incorrect module function block is used or the module function block is set incorrectly, o_bErr (Error completion) of the module function block turns on and an error code is stored in o_uErrId (Error code). (☞ Page 433 Error Codes When a Module Error Occurs)

■Receive procedure

1. When o_bENO (Execution status) of the module function block turns on, the result is stored in the output argument and public variable.
2. When o_bOK (Normal completion) of the module function block turns on, data of the size equal to the data size is stored in the response data storage device for message communications and in the read data storage device for tag communications.

Point

If reception fails or an error response is sent from the external device at the time of reception, o_bErr (Error completion) of the module function block turns on and an error code is stored in o_uErrId (Error code). (☞ Page 433 Error Codes When a Module Error Occurs)

■Operation

The following table shows the operations from i_bEN (Execution command) of the module function block turning on to turning off according to the setting details of i_uTrigger (Trigger specification).

Trigger Type	Operation
Application Trigger	Every time the module function block is executed, the received data is stored in the output argument and public variable. For Application Trigger, a request is executed only once. Therefore, when the module function block is executed after o_bOK (Normal completion) turns on, the same data is stored continuously.
Cyclic	A request is sent periodically at the set RPI interval. Every time pbo_udRequestCompleteCount (Execution completion count) of the module function block is updated, the result to be stored in the output argument and public variable is updated.

Point

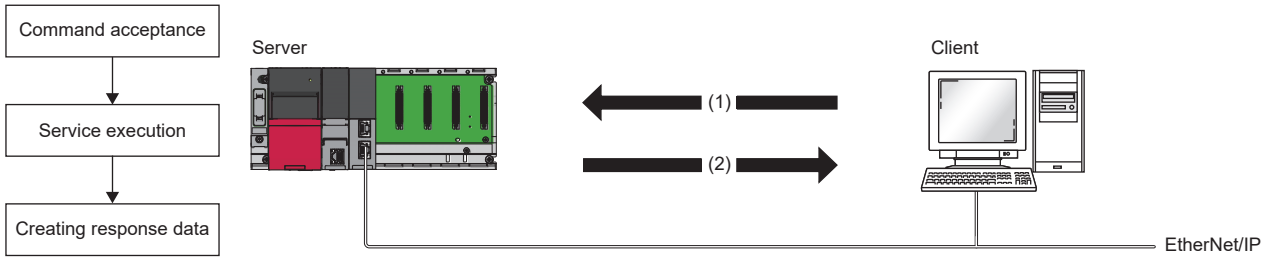
The following describes the operations when the trigger specification is changed during the time between i_bEN (Execution command) of the module function block turning on and turning off.

- When the trigger specification is changed from Application Trigger to Cyclic, periodic transmission is not performed. To enable periodic transmission, turn off i_bEN (Execution command) of the module function block once, check that o_bENO (Execution status) is turned off, and turn on i_bEN (Execution command) again.
- When the trigger specification is changed from Cyclic to Application Trigger, periodical transmission is performed the RPI time after transmission immediately before the change of the trigger specification, and then periodic transmission stops. To execute periodic transmission again, refer to the case where the trigger specification is changed from Application Trigger to Cyclic.

12.4 Message Communication Function (Server)

Function overview

This function executes the service specified by a command request sent by the client and returns a response.



(1) Command
(2) Response data

The available functions include the general message communications server function for accepting a command request sent from a client and the tag communications server function for accepting a Read/Write request for data for the tag set to the server.

Point

To use the message communication function (server), set Not 0 (start request) for 'EtherNet/IP communication start request' (Un\G7340096) so that EtherNet/IP communications can be used.

The message communication function (server) has the following communication methods.

Communication method	Connection	Description
UCMM message communications	No	Without establishing a connection between the CC-Link IE TSN Plus module and the external device (client), the command request accepted from the client is processed and response data is sent.
Class3 message communications	Yes	By establishing a connection between the CC-Link IE TSN Plus module and the external device (client), the command request accepted from the client is processed and response data is sent.
UCMM tag communications	No	Without establishing a connection between the CC-Link IE TSN Plus module and the external device (client), data is read and written for the set tag.
Class3 tag communications	Yes	By establishing a connection between the CC-Link IE TSN Plus module and the external device (client), data is read and written for the set tag.

■Message communications

UCMM (Unconnected) and Class3 (Connected) message communications are supported. Messages are processed according to the request from the client.

The services the CC-Link IE TSN Plus module can process differs depending on the class ID specified by a command request for the message communication support command. For details on the services available for each class ID, refer to the following.

☞ Page 375 MESSAGE COMMUNICATION SUPPORT COMMANDS

When the CC-Link IE TSN Plus module operates as a server, it automatically processes the command when receiving a command request from the external device and returns a command response to the external device. No special setting and operation are required.

■Tag communications

The available functions include the message communications server function by which the CC-Link IE TSN Plus module processes a request for the service, and the tag communications server function for processing a Read/Write request for data for the tag set to the CC-Link IE TSN Plus module.

In tag communications, the request-sending side is called "Originator" and the request-receiving side is called "Target".

To use tag communications, a tag must be registered in "EtherNet/IP Configuration".

When registering a tag in the CC-Link IE TSN Plus module, existing tag names cannot be used.[*1*2]

*1 Tag names are not case-sensitive.

*2 Tag names used for Class1 tag communications are treated separately. Therefore, it is possible to use the same name as a tag used in Class1 tag communications. However, in such a case, it is not possible to read/write message communications for that tag.

A command request is received for the target tag from the originator, the following operations are performed.

Type		Description
Target (server)	Read	Receive a Read request from the external device and send data in the 'Class3/UCMM data area (tag communications)' (Un\G8278016 to Un\G8462847) associated with the specified tag to the client.
	Write	Receive a Write request from the external device and write data to the 'Class3/UCMM data area (tag communications)' (Un\G8278016 to Un\G8462847) associated with the specified tag.

Operation when a command is accepted

When a Read/Write request is received from the client for the tag of the own station, and a tag with the same name as the tag name set to the own station exists, read or write is performed on the buffer memory area assigned to that tag in 'Class3/UCMM data area (tag communications)' (Un\G8278016 to Un\G8462847).

Point

- To set a tag to the own station, set it in "EtherNet/IP Configuration". (☞ Page 121 Parameter settings for EtherNet/IP devices)
- The target tag must be a Class3/UCMM tag. A Class1 tag cannot used for the target.

■Buffer memory area assigned to a tag

For a tag registered as a Class3/UCMM tag in "EtherNet/IP Configuration", the buffer memory area to be assigned changes according to the set connection number (1 to 256).

The following table shows the buffer memory areas corresponding to the connection numbers set for the tag name.

Connection	Buffer memory area*1	Module label*2
No.1	Un\G8278016	GN11_SE_1.EIP.stnArea_Cls3UCMMTagDataArea[1].unArea_Cls3UCMMTagData_D
No.2	Un\G8278738	GN11_SE_1.EIP.stnArea_Cls3UCMMTagDataArea[2].unArea_Cls3UCMMTagData_D
⋮	⋮	⋮
No.256	Un\G8462126	GN11_SE_1.EIP.stnArea_Cls3UCMMTagDataArea[256].unArea_Cls3UCMMTagData_D

*1 The buffer memory address for connection number n can be calculated by 8278016+(n-1) × 722.

*2 The module number (_1) changes depending on the system configuration.

■Read/Write request size

A Read/Write request size can be calculated by (Data Type) × (Data Size) of a tag.

Item	Description
Data Type	• INT: 1 word • DINT: 2 words
Data Size	Size of request data from the client

Point

If the Read/Write request size exceeds the data size of the tag registered as a Class3/UCMM tag, without executing Read/Write, an abnormal response is returned to the client.

■Read/Write execution

The following table shows the operations when a Read/Write request is received.

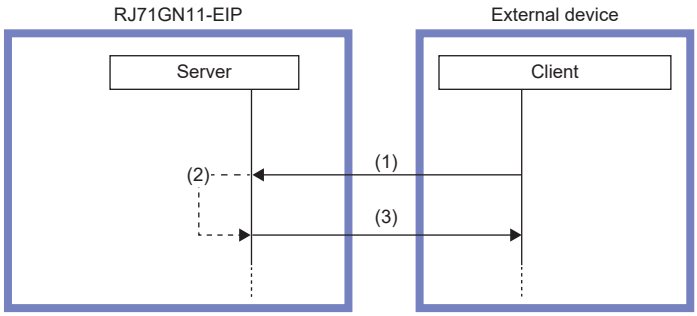
Type	Description
Read	When a Read request is received from the external device (client), sends data of the requested size, starting from the start address corresponding to each connection number in 'Class3/UCMM data area (tag communications)' (Un\G8278016 to Un\G8462847), to the client.
Write	When a Write request is received from the external device (client), writes data of the requested size, starting from the start address corresponding to each connection number in 'Class3/UCMM data area (tag communications)' (Un\G8278016 to Un\G8462847).

Point

If the Write request size is smaller than the data size of the tag registered as the Class3/UCMM tag, the data contained in the area where Write was not performed upon receiving a response will not be altered.

UCMM message communications (server)

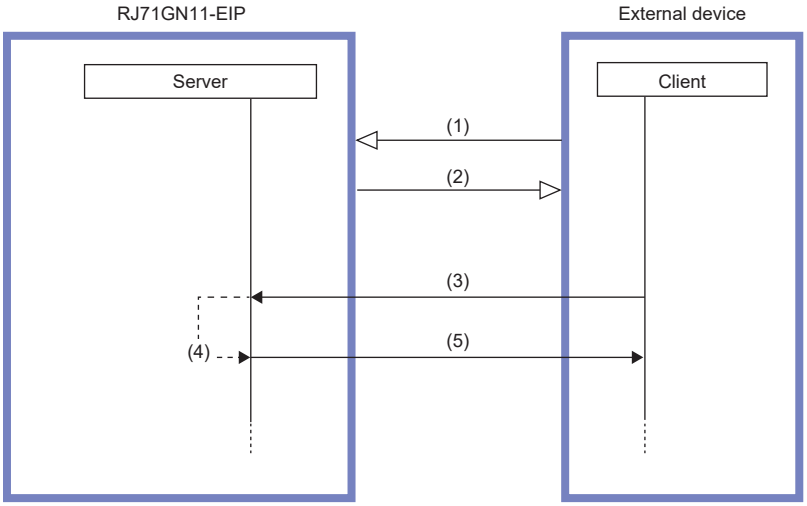
Without establishing a connection between the CC-Link IE TSN Plus module and the external device, the command request accepted from the client is processed and response data is sent.



(1) Command request
(2) Command processing execution
(3) Command response

Class3 message communications (server)

After a connection open request from the client is accepted, a command request accepted from the client is processed and response data is sent.

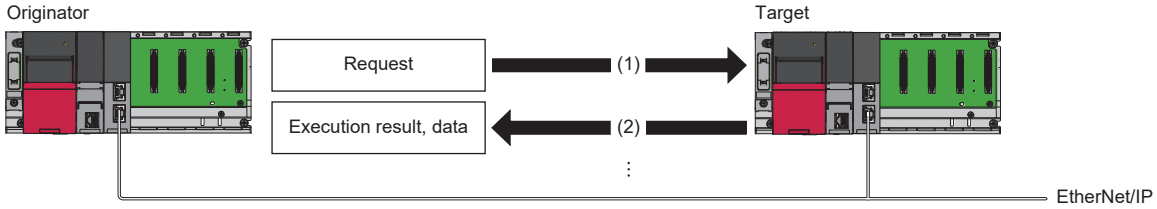


(1) Connection open request
(2) Connection open request (normal)
(3) Command request
(4) Command processing execution
(5) Command response

UCMM tag communications (server)

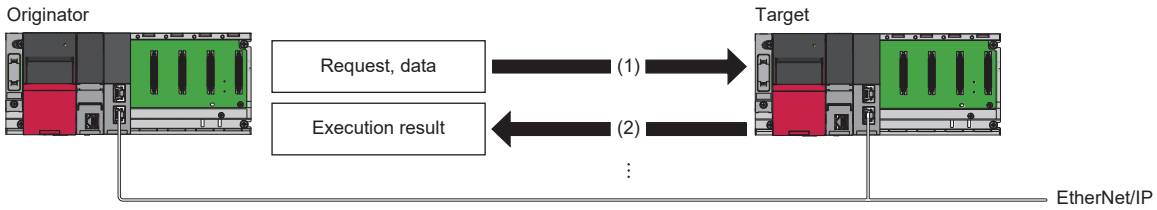
Without establishing a connection, a Read/Write request from the originator is accepted, and data processing is performed for the tag set to the CC-Link IE TSN Plus module.

Read request



(1) Read request
(2) Read response

Write request

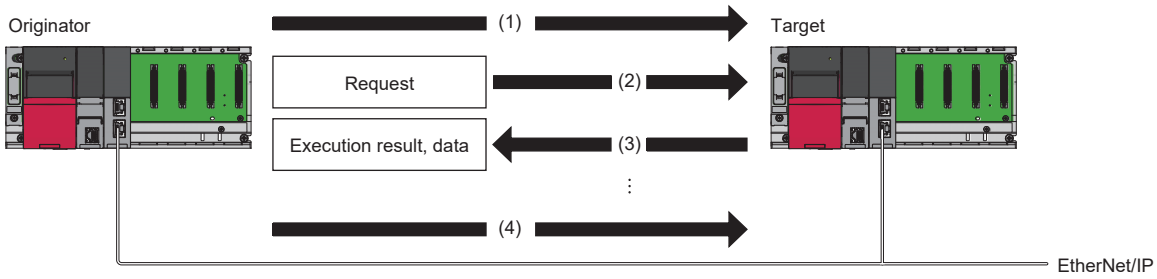


(1) Write request
(2) Write response

Class3 tag communications (server)

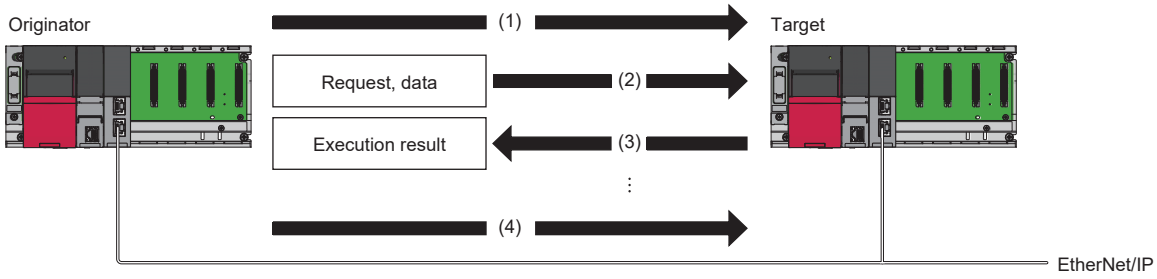
After a connection is established, a connection open request and Read/Write request from the originator are accepted, and data processing is performed for the tag set to the CC-Link IE TSN Plus module.

Read request



(1) Connection open
(2) Read request
(3) Read response
(4) Connection close

Write request



(1) Connection open
(2) Write request
(3) Write response
(4) Connection close

12.5 Communication Status Setting Function at the Occurrence of a CPU Stop Error

When an error occurs in the CPU module with CC-Link IE TSN Plus modules mounted, whether to stop or continue EtherNet/IP communications can be set individually for each CC-Link IE TSN Plus module.
Therefore, EtherNet/IP communications can be continued even when the CPU module on which the stop error occurred goes into the STOP state.

Setting method

Use the buffer memory of the CC-Link IE TSN Plus module for the setting.

Address	Buffer memory	Reference
Un\G7340104	EtherNet/IP communication continuation specification request	Page 531 EtherNet/IP communication continuation specification request (Un\G7340104)

To stop EtherNet/IP communications when the CPU module changes from RUN to STOP, set 'EtherNet/IP communication continuation specification request' (Un\G7340104) to a value other than 16 (stop).
To continue EtherNet/IP communications when the CPU module changes from RUN to STOP, set 'EtherNet/IP communication continuation specification request' (Un\G7340104) to 16 (continue).

Point

When a value other than 16 (stop) is set for 'EtherNet/IP communication continuation specification request' (Un\G7340104) and the CPU module goes into the STOP state, 'EtherNet/IP communication start request' (Un\G7340096) becomes 0 (stop request).

12.6 EtherNet/IP Communication Automatic Start Function

Function overview

With this function, EtherNet/IP communications can be started without using a program when the programmable controller is powered off and on or the CPU module changes from STOP to RUN.

When not using this function, a program that sets a value other than 0 (start request) for "EtherNet/IP communication start request' (Un\G7340096) is required to start EtherNet/IP communications.

Setting method

In the application setting of the engineering tool, set "Start" for "EtherNet/IP Auto-start setting".

For details, refer to the following.

☞ Page 119 EtherNet/IP Auto-start setting

Operation

When this function is enabled, when the CPU module changes from STOP to RUN, 16 (start request) is set as the 'EtherNet/IP communication start request' (Un\G7340096) and communications start automatically.

However, buffer memory operation changes depending on the value set as the 'EtherNet/IP communication continuation specification request' (Un\G7340104).

The following table shows the relationship related to EtherNet/IP communication automatic start with respect to each buffer memory area.

• When the CPU module is in the RUN state and the system is powered off and on

Before			After	
CPU module status	**Status of "EtherNet/IP Auto-start setting"**	**Status of 'EtherNet/IP communication continuation specification request' (Un\G7340104)**	**Status of 'EtherNet/IP communication start request' (Un\G7340096)**	**Status of 'EtherNet/IP communication continuation specification status' (Un\G7340105)**
RUN state	Start	16 (continue)	16 (start request) is set.	1 (operating with 16 (continue)) is set.
		Value other than 16 (stop)	16 (start request) is set.	2 (operating with Value other than 16 (stop)) is set.
	Not to Start	—	The status does not change.	Remains set to "0" (settings not reflected).

• If the CPU module changes from STOP to RUN or RUN to STOP

Before				After	
CPU module status	**Status of "EtherNet/IP Auto-start setting"**	**Status of 'EtherNet/IP communication continuation specification status' (Un\G7340105)**	**Status of 'EtherNet/IP communication continuation specification request' (Un\G7340104)**	**Status of 'EtherNet/IP communication start request' (Un\G7340096)**	**Status of 'EtherNet/IP communication continuation specification status' (Un\G7340105)**
STOP → RUN	Start	0 (settings not reflected), or 2 (operating with Value other than 16 (stop))	16 (continue)	16 (start request) is set.	1 (operating with 16 (continue)) is set.
			Value other than 16 (stop)	16 (start request) is set.	2 (operating with Value other than 16 (stop)) is set.
		1 (operating with 16 (continue))	—	The status does not change.*2	The status does not change.
	Not to Start	—	—	The status does not change.	—

Before				After	
CPU module status	**Status of "EtherNet/IP Auto-start setting"**	**Status of 'EtherNet/IP communication continuation specification status' (Un\G7340105)**	**Status of 'EtherNet/IP communication continuation specification request' (Un\G7340104)**	**Status of 'EtherNet/IP communication start request' (Un\G7340096)**	**Status of 'EtherNet/IP communication continuation specification status' (Un\G7340105)**
RUN→STOP*1	—	2 (operating with Value other than 16 (stop))	—	0 (stop request) is set.	2 (operating with Value other than 16 (stop)) is set.
		1 (operating with 16 (continue))	—	The status does not change. (Remains set to "16" (start request).)	The status does not change.

*1 This operation is performed when the status of 'EtherNet/IP communication start request' (Un\G7340096) is set to "16" (start request) and the status of 'EtherNet/IP communication start status' (Un\G7340097) is set to "1" (operating). If 'EtherNet/IP communication start status' (Un\G7340097) is set to any value other than 1 (operating), communication will not start and the operation will not stop.

*2 Since it does not stop when the CPU module changes from RUN to STOP, communication will not stop unless 'EtherNet/IP communication start request' (Un\G7340096) is manually set to "0" (stop request).
In addition, if communication is stopped manually, it is necessary to manually set 'EtherNet/IP communication start request' (Un\G7340096) to 16 (start request) to restart communication.

13 PROGRAMMING

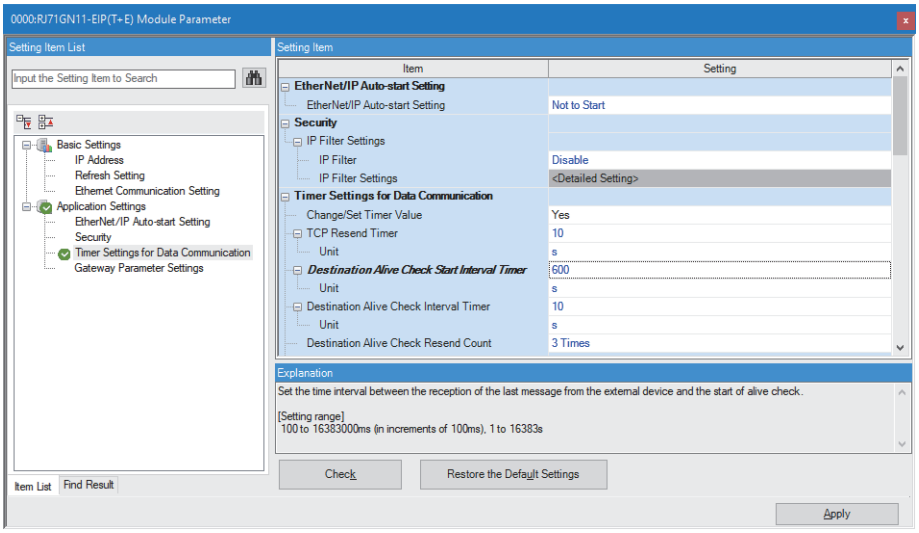
13.1 Precautions for Programming

This section describes precautions when creating EtherNet/IP communications programs.

Timer Settings for Data Communication

When using the engineering tool to set parameters, be sure to pay attention to the value of the data communications timer. If communication is interrupted due to a cable disconnection or an external device stoppage, disconnection may occur earlier than the connection timeout time.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Application Settings] ⇨ [Timer Settings for Data Communication]



■When "Change/Set Timer Value" is set to "Yes"

Set the "Destination Alive Check Resend Count" time to a value longer than the connection timeout time.

■When "Change/Set Timer Value" is set to "No"

Set the connection timeout time so that it is not shorter than 600s (default value).

Point

- The connection timeout time is calculated to be RPI (communication cycle) × Timeout Multiplier. (☞ Page 273 Connection settings)
- For "Timer Settings for Data Communication" parameters, refer to the following.

☞ Page 91 Timer Settings for Data Communication

Refresh Settings

Do not use "M+RJ71GN11_SE_EIP_Class1SetOutputData" in the program for connections in which Class1 communications is specified in the refresh settings under parameters in the engineering tool.

The refresh may lead to send data inconsistencies between the output data to be sent and the output data set in the module function block.

For an example program that does not use "M+RJ71GN11_SE_EIP_Class1SetOutputData", refer to the following.

☞ Page 338 Target 2-side program

13.2 Class1 Communications Communication Example

This section describes examples of executing Class1 instance communications and Class1 tag communications between the CC-Link IE TSN Plus module and an EtherNet/IP device.

Point

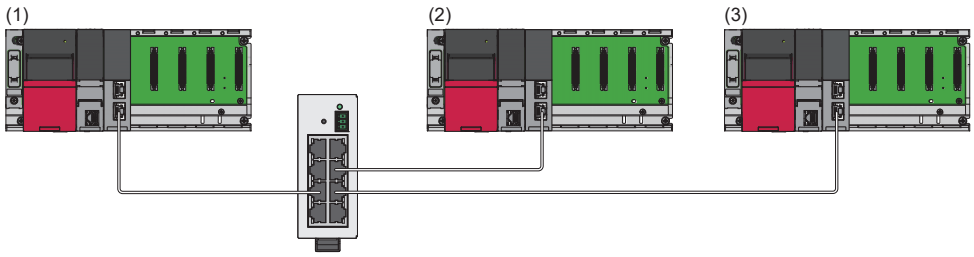
Data communications between the send/receive data assigned to the buffer memory area and the CPU device can be used the following methods: using by the MOV instruction or the FROM/TO instruction and using with a module FB.

For details on the communication method with a module FB, refer to the following.

MELSEC iQ-R EtherNet/IP Function Block Reference

System configuration

The following system configuration is used to explain communication examples of Class1 instance communications and Class1 tag communications.



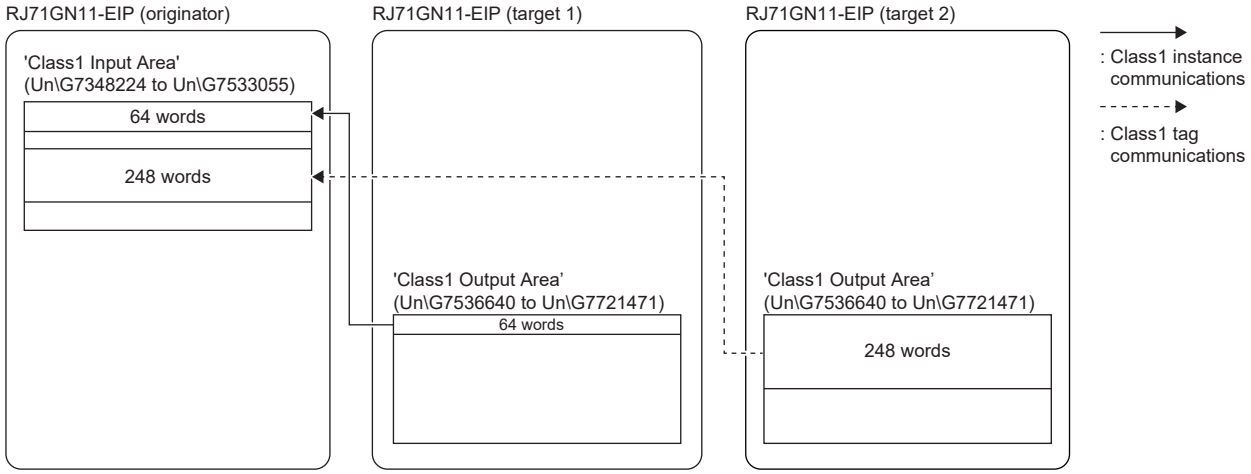
(1) Programmable controller system (originator)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.4.51)

(2) Programmable controller system (target 1)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.4.1)

(3) Programmable controller system (target 2)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.4.2)

Communication description

The following figure shows the relationships of buffer memory areas of the CC-Link IE TSN Plus module with each target.



Setting parameters

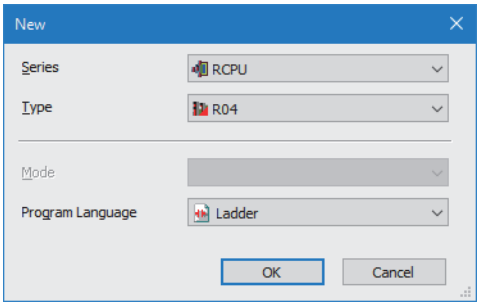
Use the engineering tool to set the parameters.

Setting the CC-Link IE TSN Plus module (originator)

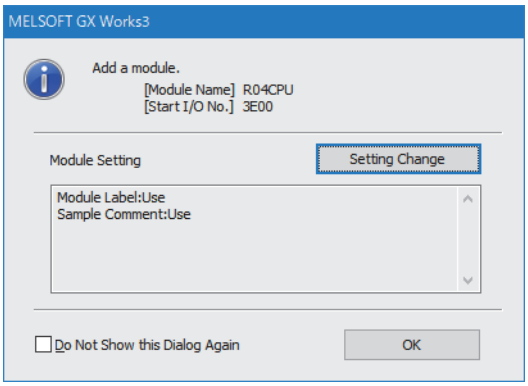
Connect the engineering tool to the originator-side CPU module and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]

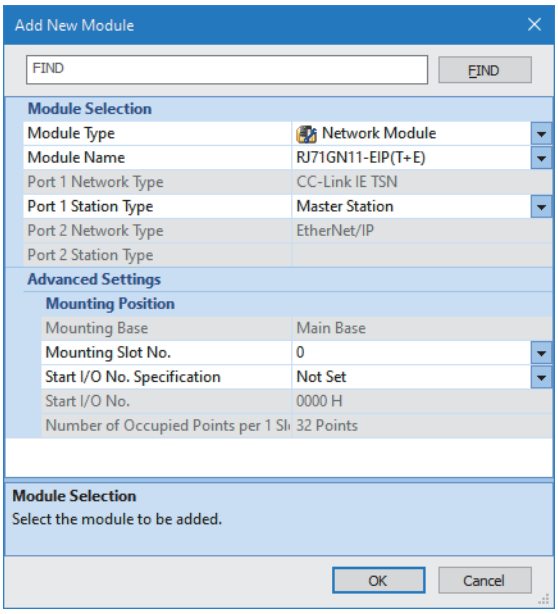


2. Click the [Setting Change] button to use the module label.

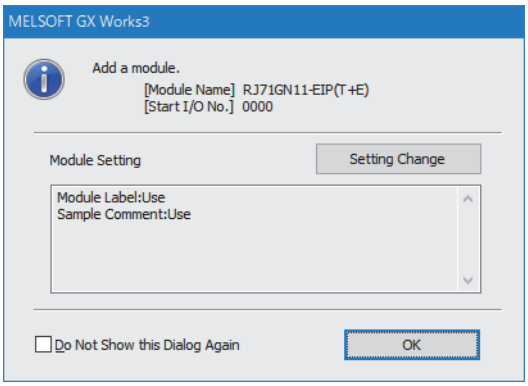


3. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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

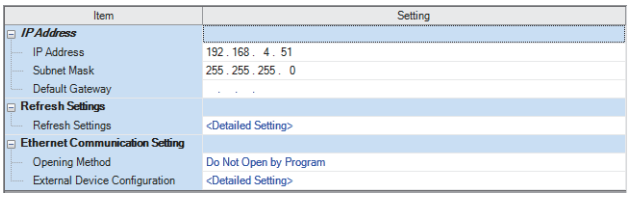


4. Click the [OK] button to add a module label of the CC-Link IE TSN Plus module.



5. Set the items in "Basic Settings" as follows.

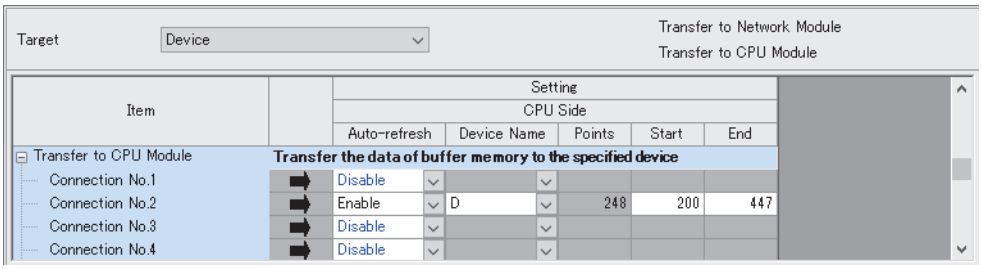
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]



Item	Setting
IP Address	
IP Address	192 . 168 . 4 . 51
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

6. Set the "Refresh Setting" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings] ⇨ [Refresh Settings]



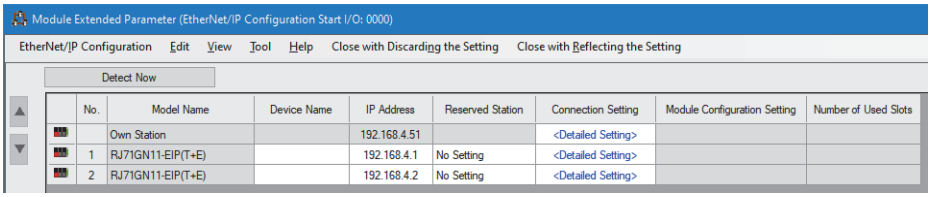
Item		Setting				
		CPU Side				
		Auto-refresh	Device Name	Points	Start	End
Transfer to CPU Module	Transfer the data of buffer memory to the specified device					
Connection No.1		Disable				
Connection No.2		Enable	D	248	200	447
Connection No.3		Disable				
Connection No.4		Disable				

7. Click the [Apply] button.

8. Set the EtherNet/IP communication parameters in "EtherNet/IP Configuration".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Extended Parameter]

9. From "Module List", add "RJ71GN11-EIP(T+E)" to the list of EtherNet/IP devices and then configure the settings as follows.

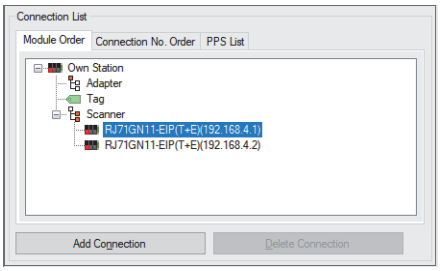


Point

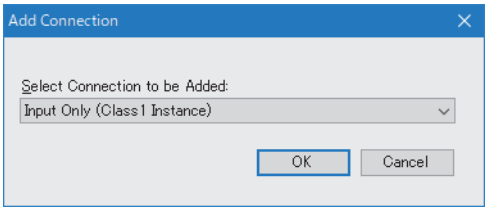
If "RJ71GN11-EIP(T+E)" is not shown in the "Module List", it is necessary to add the EDS file.
For adding the EDS file, refer to the following.
☞ Page 141 Adding/deleting the EDS file

10. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connections for Target 1 and Target 2.

11. Select the target 1 under "Scanner" in "Connection List" and click the [Add Connection] button.



12. Select "Input Only (Class1 Instance)" in "Select Connection to be Added:" and click the [OK] button.

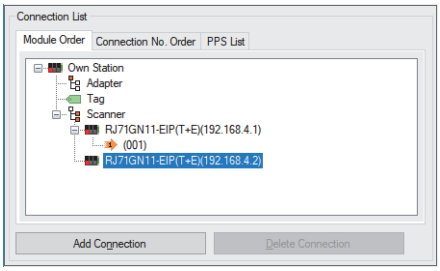


13. Set the parameter for the Class1 instance communications in "Detailed Connection Settings".

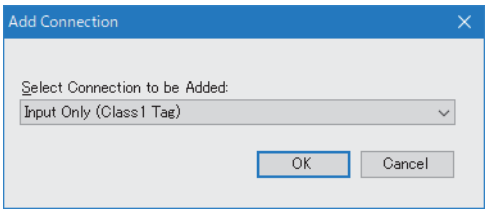
Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Input Only (Class1 Instance)	-
Application Type	Input Only	-
Connection No.	001	-
Communication Method	Instance Communications	-
Comment		-
Trigger Type	Cyclic	-
Inhibit Time Mode	Default	-
Inhibit Time	5	ms
Timeout Multiplier	x4	-
Configuration Instance	1	-
Input T->O		
Input Mode	Multicast	-
Real Time Format	Modeless	-
Data Size	128	bytes
Priority	Scheduled	-
RPI	10000	μs
Instance ID	768	-
Output O->T		
Output Mode	Point to point	-
Real Time Format	Heartbeat	-
Data Size	0	bytes
Priority	Scheduled	-
RPI	20000	μs
Instance ID	198	-
Check Identity		
Compatible Mode	Disabled	-
Vendor Code Check	Disabled	-
Product Type Check	Disabled	-
Product Code Check	Disabled	-
Major Revision Check	Disabled	-
Minor Revision Check	Disabled	-

14. Select the target 2 under "Scanner" in "Connection List" and click the [Add Connection] button.



15. Select "Input Only (Class1 Tag)" in "Select Connection to be Added:" and click the [OK] button.



16. Set the parameter for the Class1 tag communications in "Connection Detailed Setting".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Input Only (Class1 Tag)	-
Application Type	Input Only	-
Connection No.	002	-
Communication Method	Tag Communications	-
Tag Name	Tag001	-
Tag Name Size	6	Characters
Comment		-
Trigger Type	Cyclic	-
Inhibit Time Mode	Default	-
Inhibit Time	5	ms
Timeout Multiplier	x4	-
Input T->O		
Input Mode	Multicast	-
Real Time Format	Modeless	-
Data Size	496	bytes
Priority	Scheduled	-
RPI	5000	µs
Output O->T		
Output Mode	Point to point	-
Real Time Format	Heartbeat	-
Priority	Scheduled	-
RPI	20000	µs
Check Identity		
Compatible Mode	Disabled	-
Vendor Code Check	Disabled	-
Product Type Check	Disabled	-
Product Code Check	Disabled	-
Major Revision Check	Disabled	-
Minor Revision Check	Disabled	-

17. Click the [Apply] button.

18. Click the [OK] button to close the connection settings.

19. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

20. Write the set parameters to the originator-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

Setting the CC-Link IE TSN Plus module (target 1)

Connect the engineering tool to the target 1-side CPU module and set the parameters.

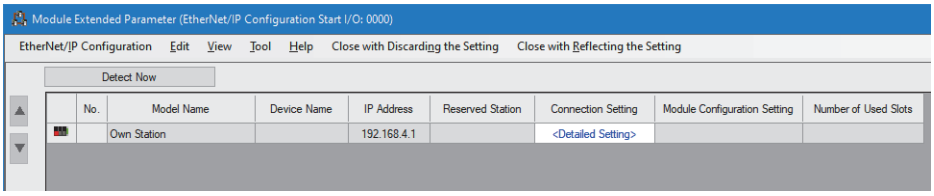
1. Set the CPU module and add the CC-Link IE TSN Plus module. The setting method of the CPU module and addition method of the CC-Link IE TSN Plus module are the same as those of the CC-Link IE TSN Plus module (originator). (☞ Page 325 Setting the CC-Link IE TSN Plus module (originator))
2. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

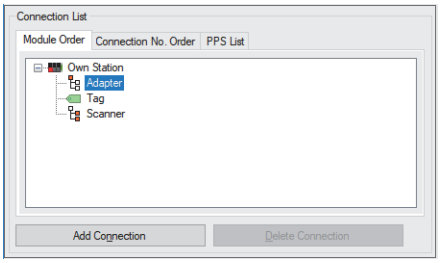
Item	Setting
IP Address	
IP Address	192 . 168 . 4 . 1
Subnet Mask	. . .
Default Gateway	. . .
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

3. Click the [Apply] button.
4. Set the EtherNet/IP communication parameters in "EtherNet/IP Configuration".

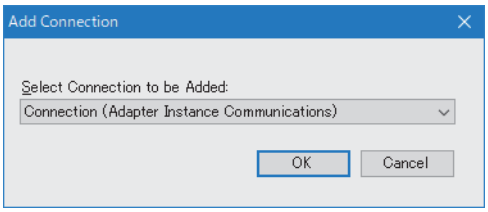
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Extended Parameter]



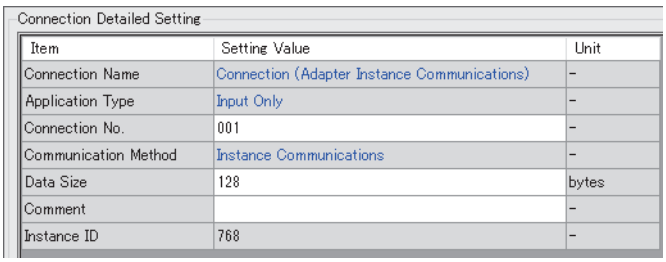
5. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection of the originator.
6. Select "Adapter" in "Connection List" and click the [Add Connection] button.



7. Select "Connection (Adapter Instance Communications)" in "Select Connection to be Added:" and click the [OK] button.



8. Set the parameter for the Class1 instance communications in "Detailed Connection Settings".



9. Click the [Apply] button.

10. Click the [OK] button to close the connection settings.

11. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

12. Write the set parameters to the target 1-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

Setting the CC-Link IE TSN Plus module (target 2)

Connect the engineering tool to the target 2-side CPU module and set the parameters.

1. Set the CPU module and add the CC-Link IE TSN Plus module. The setting method of the CPU module and addition method of the CC-Link IE TSN Plus module are the same as those of the CC-Link IE TSN Plus module (originator). (☞ Page 325 Setting the CC-Link IE TSN Plus module (originator))

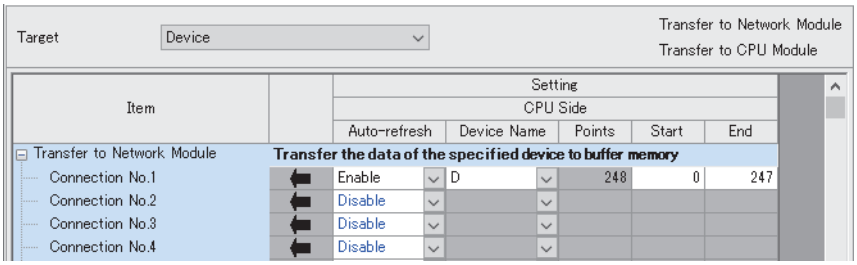
2. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

Item	Setting
IP Address	
IP Address	192 . 168 . 4 . 2
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	. . .
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

3. Set the "Refresh Setting" as follows.

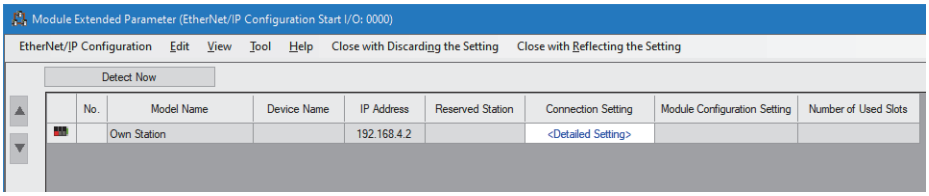
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings] ⇨ [Refresh Settings]



4. Click the [Apply] button.

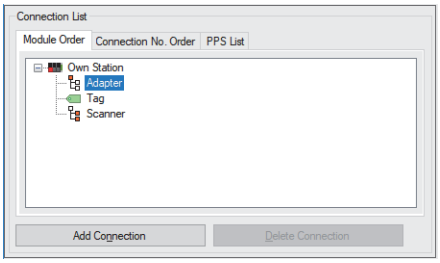
5. Set the EtherNet/IP communication parameters in "EtherNet/IP Configuration".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Extended Parameter]

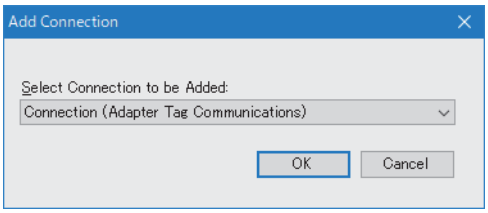


6. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection of the originator.

7. Select "Adapter" in "Connection List" and click the [Add Connection] button.



8. Select "Connection (Adapter Tag Communications)" in "Select Connection to be Added:" and click the [OK] button.



9. Set the parameter for the Class1 tag communications in "Connection Detailed Setting".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Adapter Tag Communications)	-
Application Type	Input Only	-
Connection No.	001	-
Communication Method	Tag Communications	-
Tag Name	Tag001	-
Tag Name Size	6	Characters
Data Size	496	bytes
Comment		-

10. Click the [Apply] button.

11. Click the [OK] button to close the connection settings.

12. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

13. Write the set parameters to the target 2-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

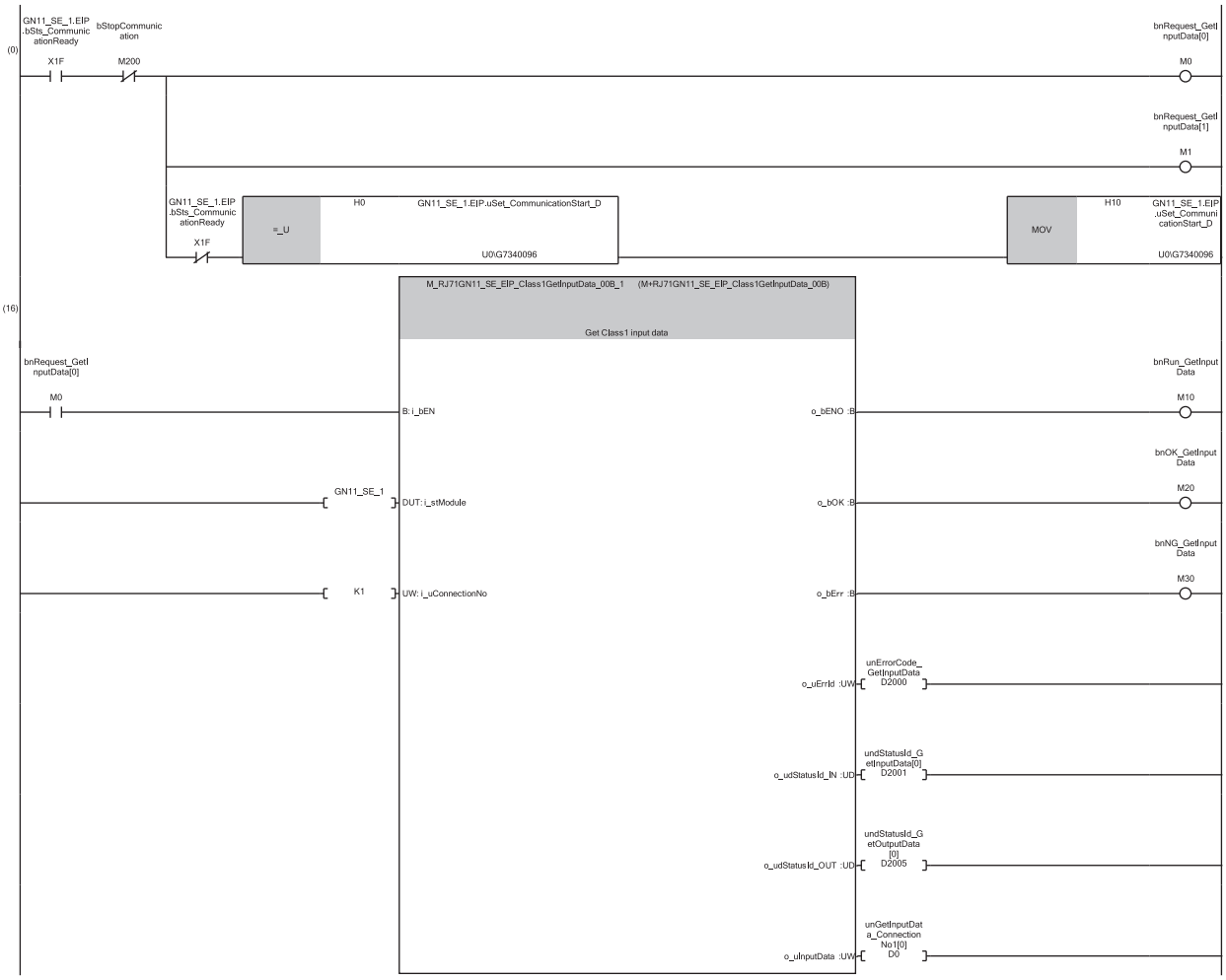
Program example

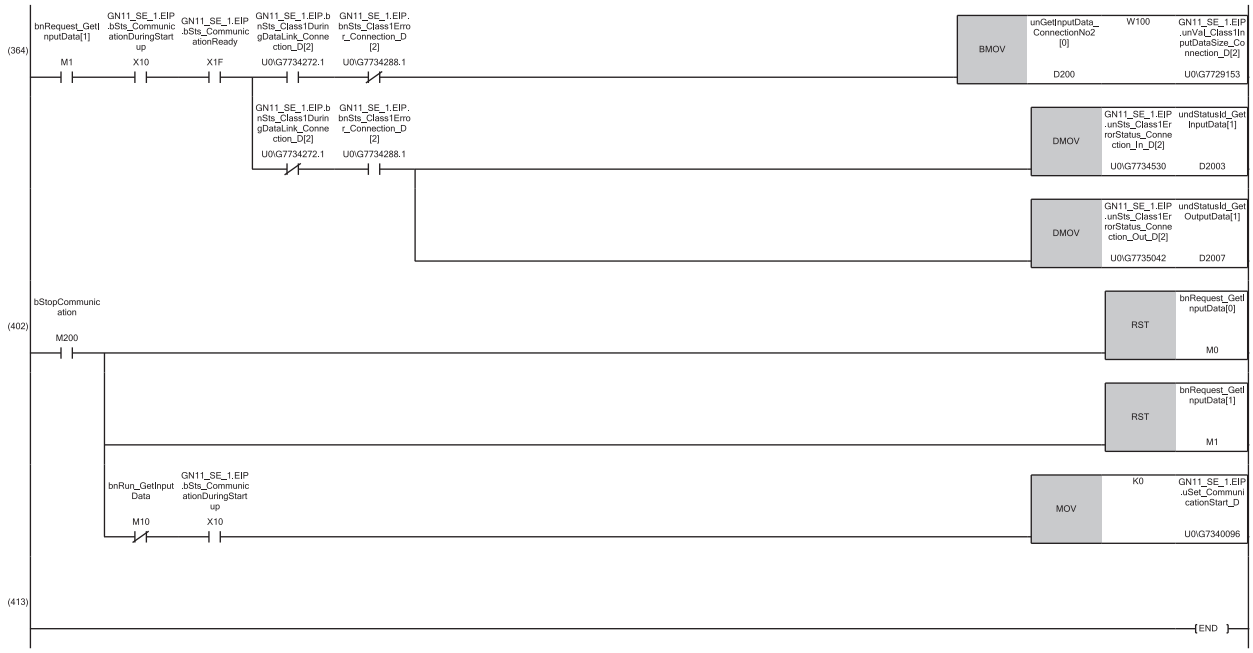
The following program executes the Class1 instance communications and the Class1 tag communications by executing STOP to RUN on the CPU module.

Originator-side program

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
	GN11_SE_1.EIP.unVal_Class1InputDataSize_Connection_D[2]	Class1 input data size (connection No.2)	U0\G7729153
	GN11_SE_1.EIP.bnSts_Class1DuringDataLink_Connection_D[2]	Class1 data link status (connection No.2)	U0\G7734272.1
	GN11_SE_1.EIP.bnSts_Class1Error_Connection_D[2]	Class1 error status (connection No.2)	U0\G7734288.1
	GN11_SE_1.EIP.unSts_Class1ErrorStatus_Connection_In_D[2]	Class1 connection error status (error code for connection No.2 input side (when receiving))	U0\G7734530
	GN11_SE_1.EIP.unSts_Class1ErrorStatus_Connection_Out_D[2]	Class1 connection error status (error code for connection No.2 output side (when sending))	U0\G7735042
Labels to be defined	Define global labels as shown below.		
FBs to be used	• M+RJ71GN11_SE_EIP_Class1GetInputData		

Label Name	Data Type		Class	Assign (Device/Label)
bnRequest_GetInputData	Bit(0.1)	...	VAR_GLOBAL	M0
bnRun_GetInputData	Bit	...	VAR_GLOBAL	M10
bnOK_GetInputData	Bit	...	VAR_GLOBAL	M20
bnNG_GetInputData	Bit	...	VAR_GLOBAL	M30
unErrorCode_GetInputData	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D2000
undStatusId_GetInputData	Double Word [Unsigned]/Bit String [32-bit](0.1)	...	VAR_GLOBAL	D2001
undStatusId_GetOutputData	Double Word [Unsigned]/Bit String [32-bit](0.1)	...	VAR_GLOBAL	D2005
unGetInputData_ConnectionNo1	Word [Unsigned]/Bit String [16-bit](0.63)	...	VAR_GLOBAL	D0
unGetInputData_ConnectionNo2	Word [Unsigned]/Bit String [16-bit](0.127)	...	VAR_GLOBAL	D200
bStopCommunication	Bit	...	VAR_GLOBAL	M200


GN11_SE_1.EIP.bSts_CommunicationReady
bStopCommunication
(0)
X1F
M200
bnRequest_GetInputData[0]
M0
bnRequest_GetInputData[1]
M1
GN11_SE_1.EIP.bSts_CommunicationReady
X1F
=_U
H0
GN11_SE_1.EIP.uSet_CommunicationStart_D
U0\G7340096
MOV
H10
GN11_SE_1.EIP.uSet_CommunicationStart_D
U0\G7340096
M_RJ71GN11_SE_EIP_Class1GetInputData_00B_1
(M+RJ71GN11_SE_EIP_Class1GetInputData_00B)
Get Class1 input data
(16)
bnRequest_GetInputData[0]
M0
B: i_bEN
o_bENO :B
bnRun_GetInputData
M10
bnOK_GetInputData
M20
GN11_SE_1
DUT: i_stModule
o_bOK :B
bnNG_GetInputData
M30
K1
UW: i_uConnectionNo
o_bErr :B
unErrorCode_GetInputData
D2000
o_uErrId :UW
undStatusId_GetInputData[0]
D2001
o_udStatusId_IN :UD
undStatusId_GetOutputData[0]
D2005
o_udStatusId_OUT :UD
unGetInputData_Connection No1[0]
D0
o_uInputData :UW



(0) Set the acquisition processing for input data from connection No.1 and connection No.2, and start EtherNet/IP communication.

(16) When M0 is on, "M+RJ71GN11_SE_EIP_Class1GetInputData" is executed to acquire the connection No.1 input data.
When M20 is on, the input data received from target 1 continues to be stored from D0 for the data size set in connection No.1.

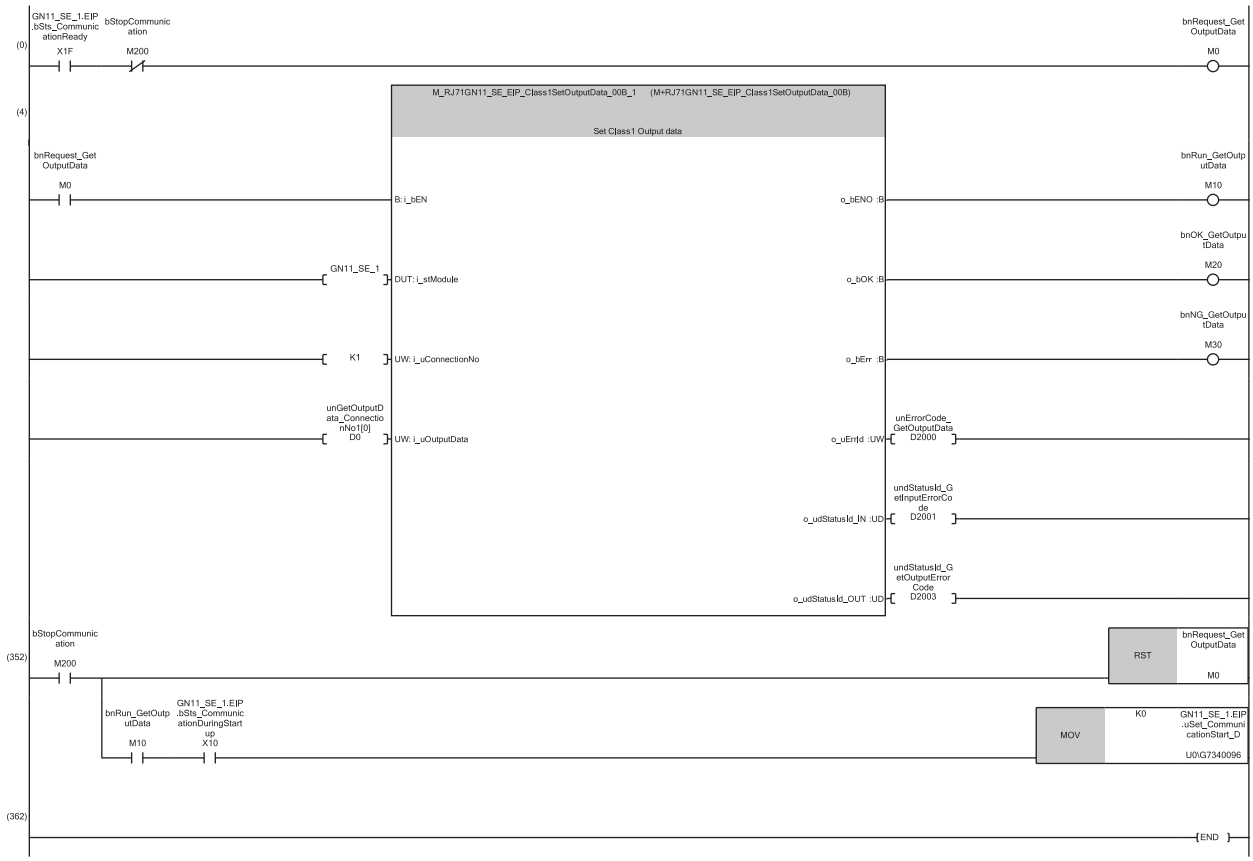
(364) When M1 is on, while the 'Class1 data link status' (U0\G7734272.1) of connection No.2 is normal, the input data received from target 2 is refreshed from D200 by the data size set in connection No.2 and then copied to W100 or later.

(402) By turning on M200, input data acquisition and EtherNet/IP communication are stopped.

Target 1-side program

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
Labels to be defined	Define global labels as shown below.		
FBs to be used	• M+RJ71GN11_SE_EIP_Class1SetOutputData		

Label Name	Data Type		Class	Assign (Device/Label)
bStopCommunication	Bit	...	VAR_GLOBAL	M200
bnRequest_GetOutputData	Bit	...	VAR_GLOBAL	M0
bnRun_GetOutputData	Bit	...	VAR_GLOBAL	M10
bnOK_GetOutputData	Bit	...	VAR_GLOBAL	M20
bnNG_GetOutputData	Bit	...	VAR_GLOBAL	M30
unGetOutputData_ConnectionNo1	Word [Unsigned]/Bit String [16-bit](0..63)	...	VAR_GLOBAL	D0
unErrorCode_GetOutputData	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D2000
undStatusId_GetInputErrorCode	Double Word [Unsigned]/Bit String [32-bit]	...	VAR_GLOBAL	D2001
undStatusId_GetOutputErrorCode	Double Word [Unsigned]/Bit String [32-bit]	...	VAR_GLOBAL	D2003



(0) Set the processing for output data to connection No.1 and start EtherNet/IP communication.

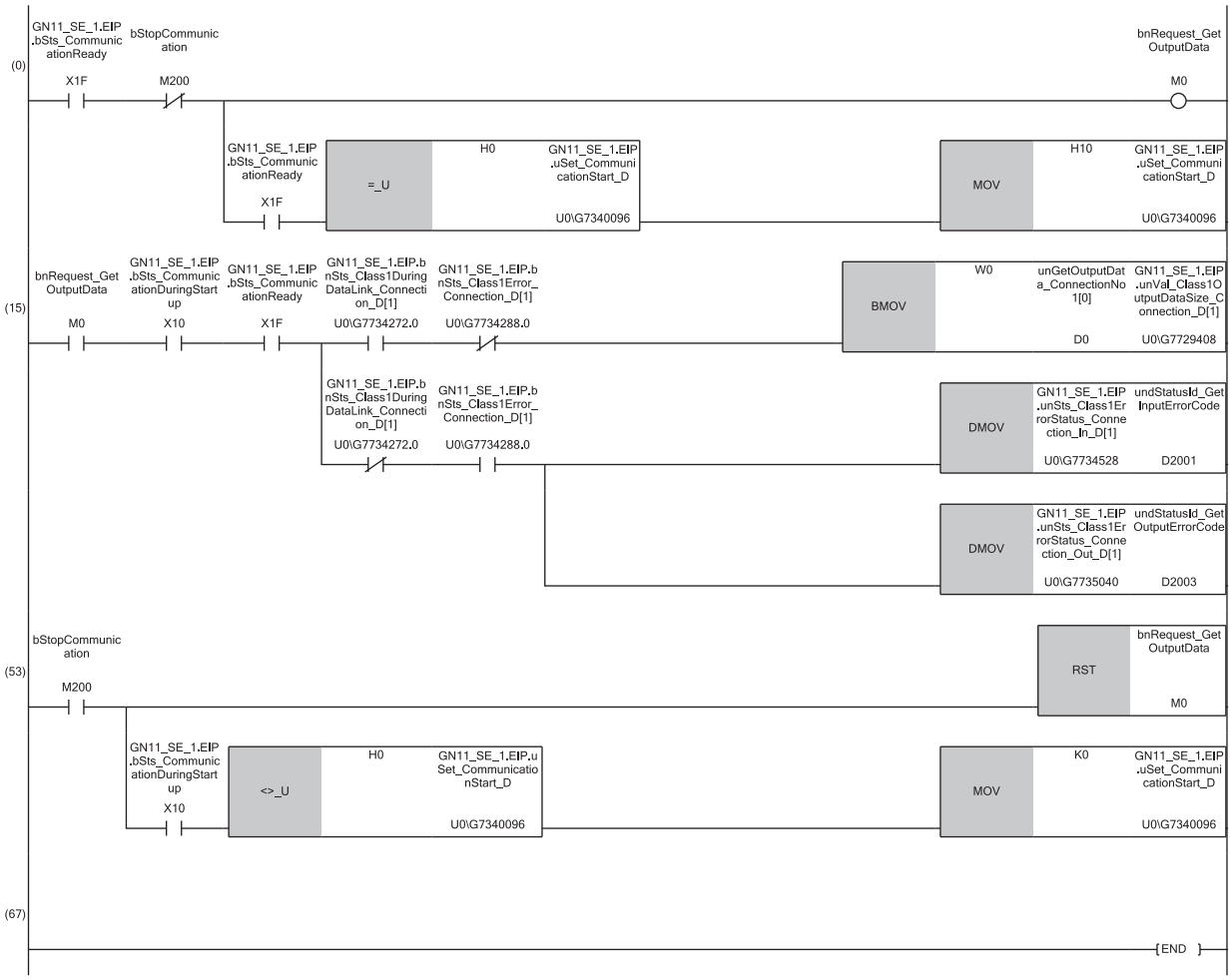
(4) When M0 is on, "M+RJ71GN11_SE_EIP_Class1SetOutputData" is executed to set the connection No.2 output data.
When M20 is on, the output data set in D0 or later is sent to the originator according to the data size set for connection No.1.

(352) By turning on M200, output data setting and EtherNet/IP communication are stopped.

Target 2-side program

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
	GN11_SE_1.EIP.unVal_Class1OutputDataSize_Connection_D[1]	Class1 output data size (connection No.1)	U0\G7729408
	GN11_SE_1.EIP.bnSts_Class1DuringDataLink_Connection_D[1]	Class1 data link status (connection No.1)	U0\G7734272.0
	GN11_SE_1.EIP.bnSts_Class1Error_Connection_D[1]	Class1 error status (connection No.1)	U0\G7734288.0
	GN11_SE_1.EIP.unSts_Class1ErrorStatus_Connection_In_D[1]	Class1 connection error status (error code for connection No.1 input side (when receiving))	U0\G7734528
	GN11_SE_1.EIP.unSts_Class1ErrorStatus_Connection_Out_D[1]	Class1 connection error status (error code for connection No.1 output side (when sending))	U0\G7735040
Labels to be defined	Define global labels as shown below.		

Label Name	Data Type		Class	Assign (Device/Label)
bStopCommunication	Bit	...	VAR_GLOBAL	M200
bnRequest_GetOutputData	Bit	...	VAR_GLOBAL	M0
unGetOutputData_ConnectionNo1	Word [Unsigned]/Bit String [16-bit](0..63)	...	VAR_GLOBAL	D0
undStatusId_GetInputErrorCode	Double Word [Unsigned]/Bit String [32-bit]	...	VAR_GLOBAL	D2001
undStatusId_GetOutputErrorCode	Double Word [Unsigned]/Bit String [32-bit]	...	VAR_GLOBAL	D2003



(0) Set the processing for output data to connection No.1 and start EtherNet/IP communication.

(15) When M0 is on, while the 'Class1 data link status' (U0\G7734272.0) of connection No.1 is normal, the data stored after W0 is copied to D0 and later as output data.
The data stored in D0 or later is refreshed as transmission data for the number of refresh points and then sent to the originator.

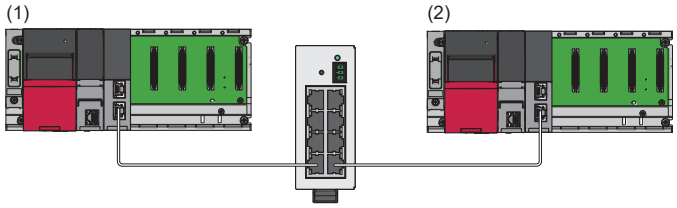
(53) By turning on M200, output data setting and EtherNet/IP communication are stopped.

13.3 UCMM Message Communications Communication Example

This section describes an example of executing UCMM message communications between CC-Link IE TSN Plus modules.

System configuration

The following system configuration is used to explain the communication example of UCMM message communications.



(1) Programmable controller system (client)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.0.5)

(2) Programmable controller system (server)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.0.6)

Setting parameters

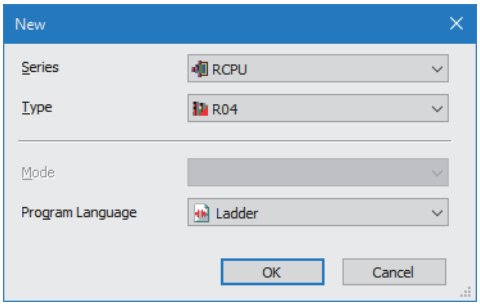
Use the engineering tool to set the parameters.

Setting the CC-Link IE TSN Plus module (client)

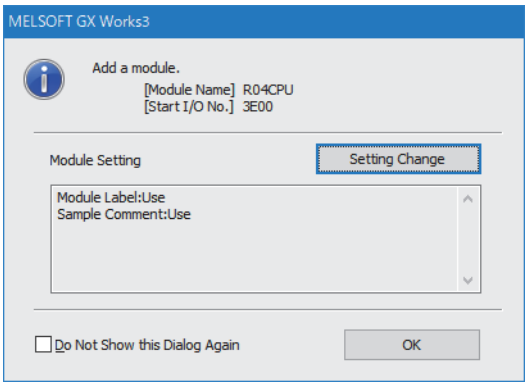
Connect the engineering tool to the client-side CPU module and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]

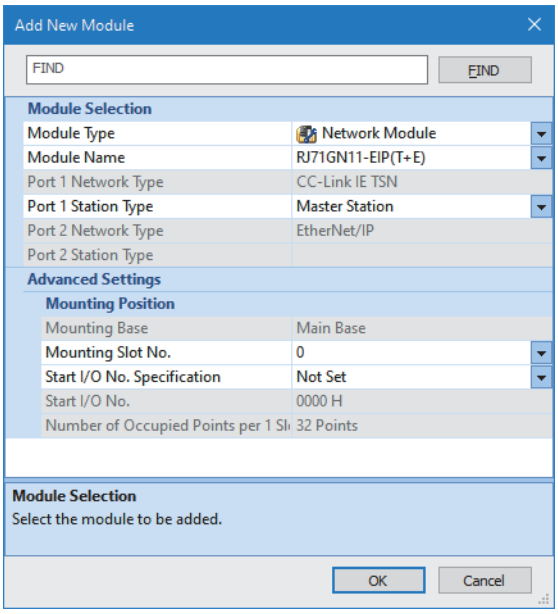


2. Click the [Setting Change] button to use the module label.

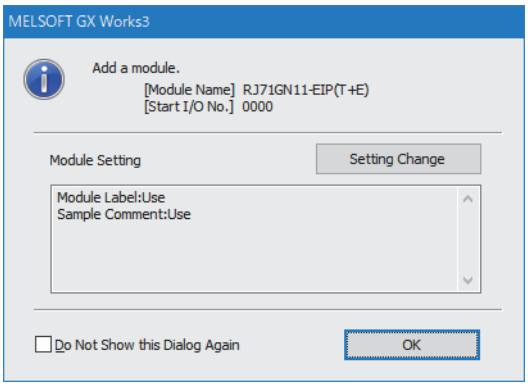


3. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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



4. Click the [OK] button to add a module label of the CC-Link IE TSN Plus module.



5. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

Item	Setting
IP Address	
IP Address	192 . 168 . 0 . 5
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	. . .
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

6. Click the [Apply] button.

7. Write the set parameters to the client-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

Setting the CC-Link IE TSN Plus module (server)

Connect the engineering tool to the server-side CPU module and set the parameters.

1. Set the CPU module and add the CC-Link IE TSN Plus module. The setting method of the CPU module and addition method of the CC-Link IE TSN Plus module are the same as those of the CC-Link IE TSN Plus module (client). (☞ Page 340 Setting the CC-Link IE TSN Plus module (client))

2. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

Item	Setting
⊟ *IP Address*	
IP Address	192 . 168 . 0 . 6
Subnet Mask	. . .
Default Gateway	. . .
⊟ **Refresh Settings**	
Refresh Settings	<Detailed Setting>
⊟ **Ethernet Communication Setting**	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

3. Set the items in "Application Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Application Settings]

Item	Setting
⊟ *EtherNet/IP Auto-start Setting*	
EtherNet/IP Auto-start Setting	Start
⊟ **Security**	
⊟ IP Filter Settings	
IP Filter	Disable
IP Filter Settings	<Detailed Setting>
⊟ **Timer Settings for Data Communication**	
Change/Set Timer Value	No
⊞ TCP Resend Timer	10
⊞ Destination Alive Check Start Interval Timer	600
⊞ Destination Alive Check Interval Timer	10
Destination Alive Check Resend Count	3 Times
⊞ Advanced Settings	
⊟ **Gateway Parameter Settings**	
Gateway Other Than Default Gateway	Not Use
⊞ Gateway Information	

4. Click the [Apply] button.

5. Write the set parameters to the server-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

Program example

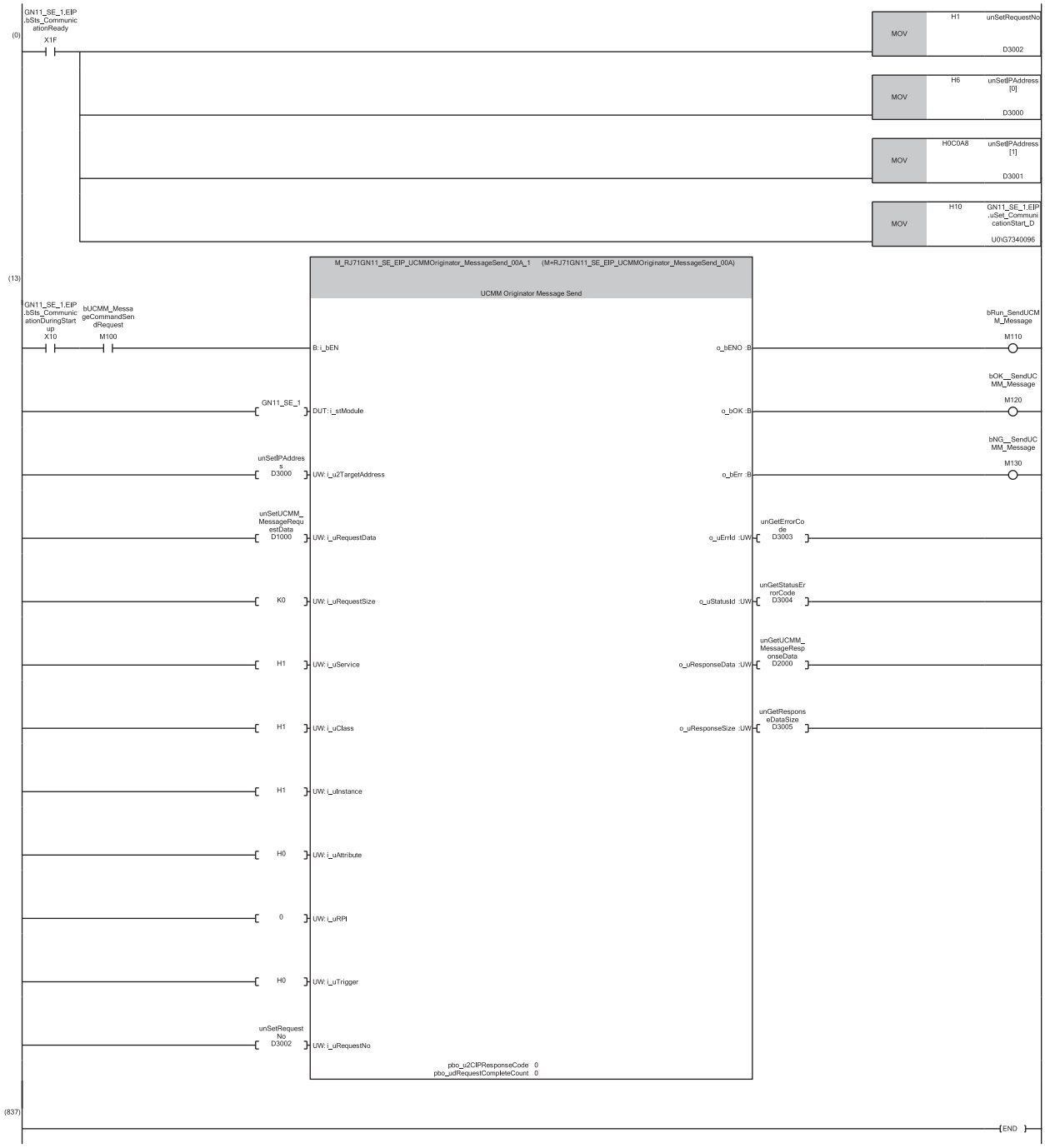
The UCMM message communications program is executed by changing the CPU module from STOP to RUN.
The following example shows a program to execute UCMM message communications by turning on the UCMM message command sent request in the program. (A server-side program is not required.)
When the program is executed, the following request commands are sent to the server side.

Item	Data to be specified	Description
Class ID	01H	Specifies the identity object.
Instance ID	01H	—
Service code	01H	Get_Attributes_All (Acquires all attributes of the instances specified by Class ID and Instance ID.)
Attribute ID	00H	Due to the "Get_Attributes_All" command, no specific Attribute ID is specified.
Request data	None	Specifies the request data size as 0.

Client-side program

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
Labels to be defined	Define global labels as shown below.		
FBs to be used	• M+RJ71GN11_SE_EIP_UCMMOriginator_MessageSend		

Label Name	Data Type	Class	Assign (Device/Label)
bUCMM_MessageCommandSendRequest	Bit	VAR_GLOBAL	M100
bRun_SendUCMM_Message	Bit	VAR_GLOBAL	M110
bOK_SendUCMM_Message	Bit	VAR_GLOBAL	M120
bNG_SendUCMM_Message	Bit	VAR_GLOBAL	M130
unSetUCMM_MessageRequestData	Word [Unsigned]/Bit String [16-bit](0..706)	VAR_GLOBAL	D1000
unGetUCMM_MessageResponseData	Word [Unsigned]/Bit String [16-bit](0..706)	VAR_GLOBAL	D2000
unSetIPAddress	Word [Unsigned]/Bit String [16-bit](0..1)	VAR_GLOBAL	D3000
unSetRequestNo	Word [Unsigned]/Bit String [16-bit]	VAR_GLOBAL	D3002
unGetErrorCode	Word [Unsigned]/Bit String [16-bit]	VAR_GLOBAL	D3003
unGetStatusErrorCode	Word [Unsigned]/Bit String [16-bit]	VAR_GLOBAL	D3004
unGetResponseDataSize	Word [Unsigned]/Bit String [16-bit]	VAR_GLOBAL	D3005



(0) Set the request number and destination IP address for UCMM message communications, and start EtherNet/IP communications.

(13) By turning on M100, "M+RJ71GN11_SE_EIP_UCMMOriginator_MessageSend" is executed and the request data is sent to the server side.
When M120 is on, the response result from the server side is stored in D2000 or later. (Half of the response data size stored in D3005 (bytes) are stored (rounded up).)
If the response data size is an odd number, only the lower 1 byte of the end device is stored.

Point

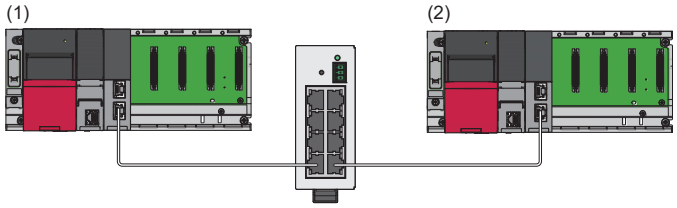
Ensure that the request number to be set is not the same as the connection number used for Class3 communications or the request number used for other UCMM communications.

13.4 UCMM Tag Communications Communication Example

This section describes examples of executing UCMM tag communications between CC-Link IE TSN Plus modules.

System configuration

The following system configuration is used to explain communication examples of UCMM tag communications.



(1) Programmable controller system (originator)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.1.5)

(2) Programmable controller system (target)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.1.6)

Communication description

When the communication example for UCMM tag communications is executed, the following operation is performed.

Originator-side operation

■Write request to tags

By executing a UCMM tag communication write request, the device area data stored in D1000 or later is written to the Tag001 tag on the target side according to the requested size.*1

*1 If the requested data type is INT, request data consisting of the request data size × 1 word (10 words in the program example) is sent.
If the requested data type is DINT, request data consisting of the request data size × 2 words is sent.

■Tag read request

By executing a UCMM tag communication read request, the data set to the Tag002 tag on the target side is read according to the requested size. From the read data, the amount according to the read data size (size stored in D3204) is stored in D2000 or later.

(Regardless of the tag data type of the external device, the received read data size is stored in units of words.)

In addition, the size of the data read from the tag of the external device depends on the read request data size set in the output argument (i_uDataSize) of the module function block, as well as the external device tag data type (value stored in D3203).*1*2

*1 If the external device tag data type is INT, the read request data size × 1 word is read.
If the external device tag data type is DINT, the read request data size × 2 words is read.

*2 The read request tag data type set in the module function block input argument (i_uDataType) is used to perform a parameter check when sending a request.
If the data type of the external device tag that was read is different, check whether the requested tag name and data size are correct.

Target-side operation

The current values of the tag data set in Tag001 and Tag002 are read and the current values are updated.

During target-side operation, both read and write requests from the originator side for the tag can be accepted.

However, if the data is updated due to a write request while the current value is being read, or if the data having its current value updated is read due to a read request, it may result in a data inconsistency.

Setting parameters

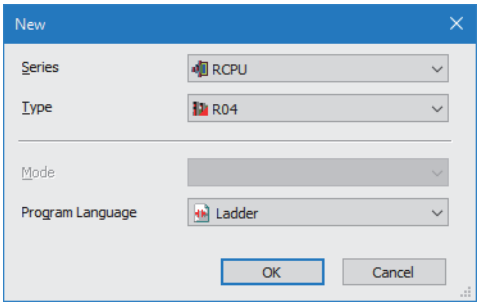
Use the engineering tool to set the parameters.

Setting the CC-Link IE TSN Plus module (originator)

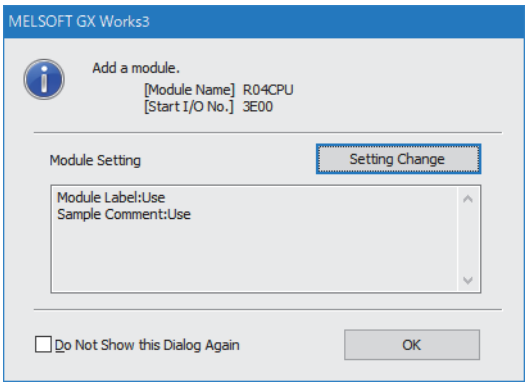
Connect the engineering tool to the originator-side CPU module and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]

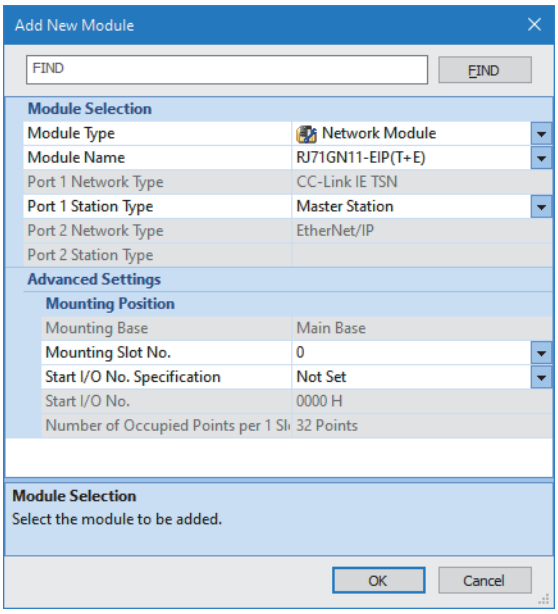


2. Click the [Setting Change] button to use the module label.

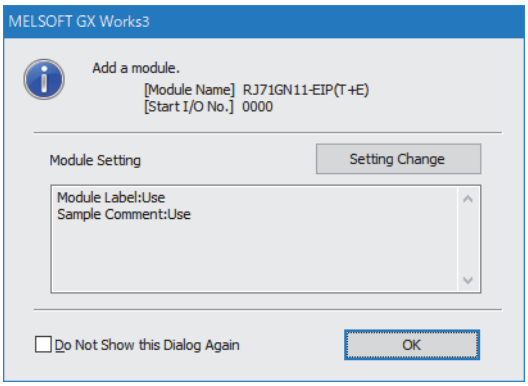


3. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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



4. Click the [OK] button to add a module label of the CC-Link IE TSN Plus module.



5. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

Item	Setting
IP Address	
IP Address	192 . 168 . 1 . 5
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	. . .
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

6. Click the [Apply] button.

7. Write the set parameters to the originator-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

Setting the CC-Link IE TSN Plus module (target)

Connect the engineering tool to the target-side CPU module and set the parameters.

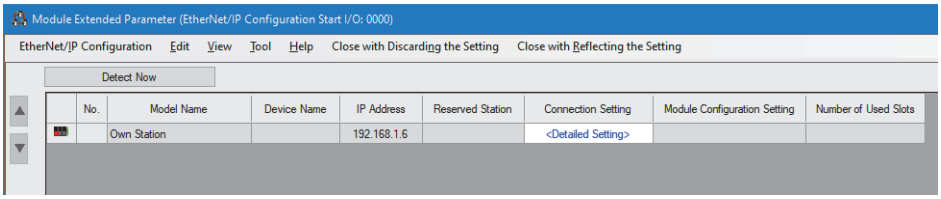
1. Set the CPU module and add the CC-Link IE TSN Plus module. The setting method of the CPU module and addition method of the CC-Link IE TSN Plus module are the same as those of the CC-Link IE TSN Plus module (originator). (☞ Page 346 Setting the CC-Link IE TSN Plus module (originator))
2. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

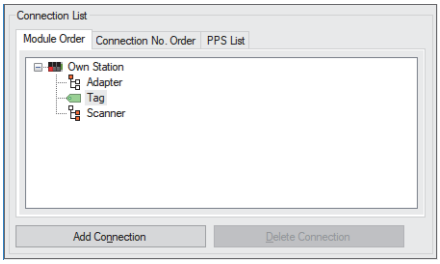
Item	Setting
IP Address	
IP Address	192 . 168 . 1 . 6
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	. . .
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

3. Click the [Apply] button.
4. Set the EtherNet/IP communication parameters in "EtherNet/IP Configuration".

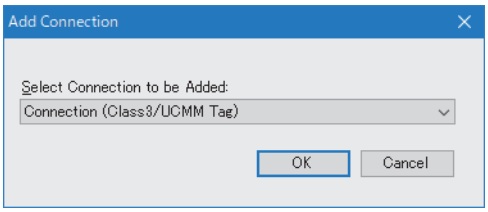
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Extended Parameter]



5. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection of the originator.
6. Select "Tag" in "Connection List" and click the [Add Connection] button.



7. Select "Connection (Class3/UCMM Tag)" in "Select Connection to be Added:" and click the [OK] button.



8. Set the parameters for UCMM tag communications (Tag001) in "Connection Detailed Setting".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Class3/UCMM Tag)	-
Connection No.	001	-
Data Type	INT	-
Tag Name	Tag001	-
Tag Name Size	6	Characters
Size	10	-
Comment		-

9. Repeat steps 6 to 7 and set the parameters for UCMM tag communications (Tag002) in "Connection Detailed Setting".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Class3/UCMM Tag)	-
Connection No.	002	-
Data Type	DINT	-
Tag Name	Tag002	-
Tag Name Size	6	Characters
Size	10	-
Comment		-

10. Click the [Apply] button.

11. Click the [OK] button to close the connection settings.

12. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

13. Write the set parameters to the target-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

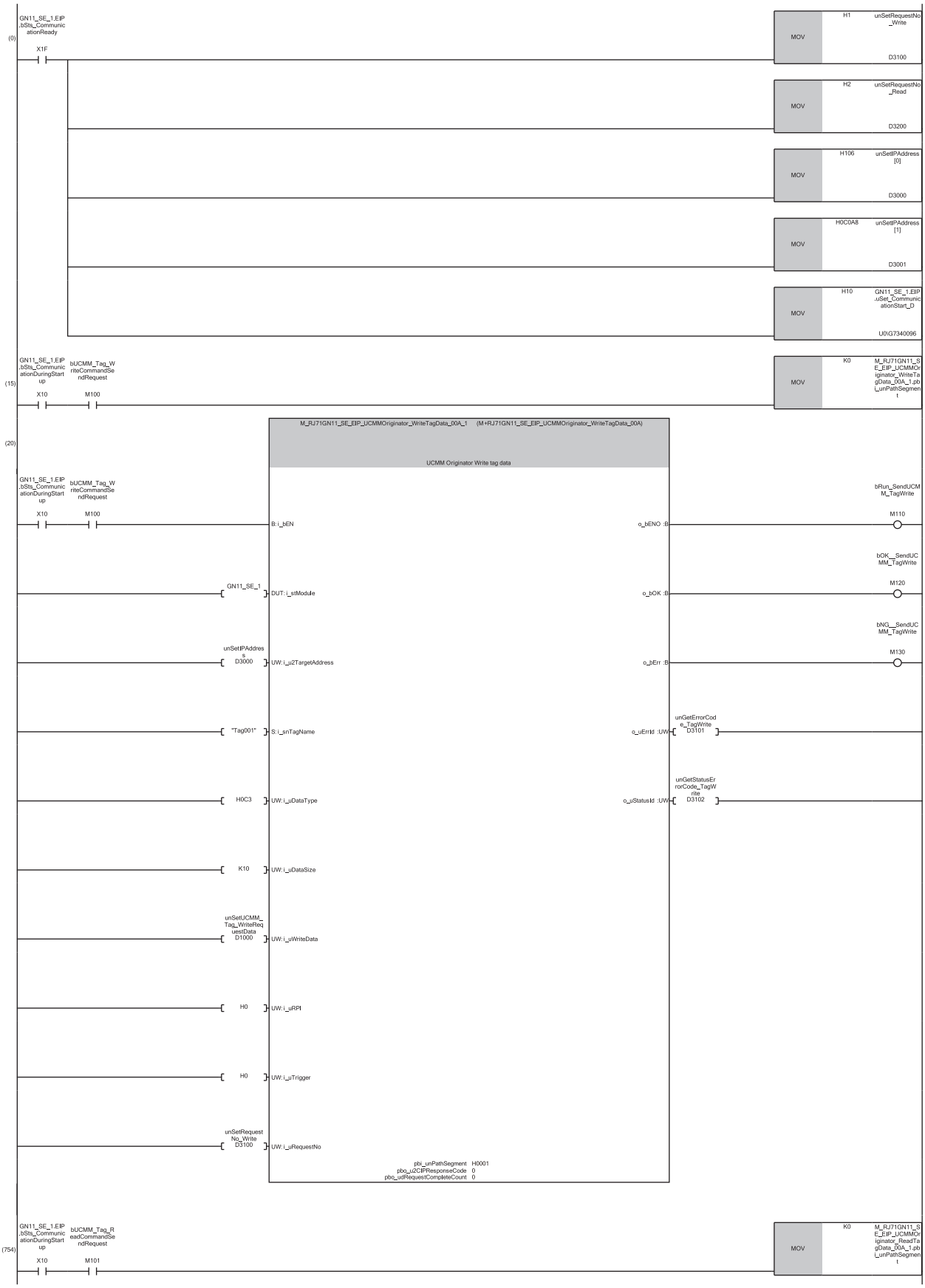
Program example

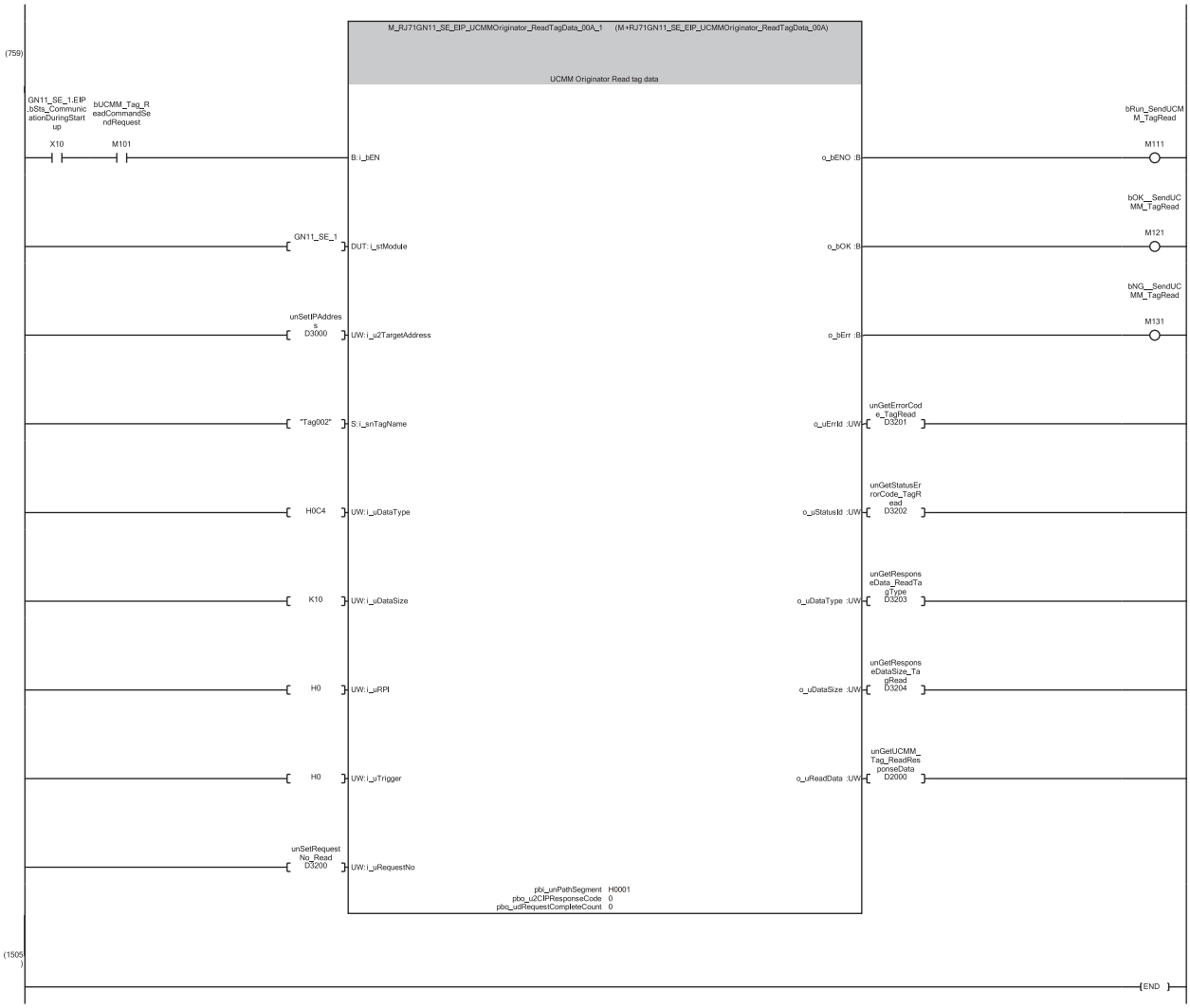
The UCMM tag communication program is executed by changing the CPU module from STOP to RUN.

Originator-side program

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
Labels to be defined	Define global labels as shown below.		
FBs to be used	• M+RJ71GN11_SE_EIP_UCMMOriginator_WriteTagData • M+RJ71GN11_SE_EIP_UCMMOriginator_ReadTagData		

Label Name	Data Type		Class	Assign (Device/Label)
bUCMM_Tag_WriteCommandSendRequest	Bit	...	VAR_GLOBAL	M100
bUCMM_Tag_ReadCommandSendRequest	Bit	...	VAR_GLOBAL	M101
bRun_SendUCMM_TagWrite	Bit	...	VAR_GLOBAL	M110
bOK_SendUCMM_TagWrite	Bit	...	VAR_GLOBAL	M120
bNG_SendUCMM_TagWrite	Bit	...	VAR_GLOBAL	M130
bRun_SendUCMM_TagRead	Bit	...	VAR_GLOBAL	M111
bOK_SendUCMM_TagRead	Bit	...	VAR_GLOBAL	M121
bNG_SendUCMM_TagRead	Bit	...	VAR_GLOBAL	M131
unSetUCMM_Tag_WriteRequestData	Word [Unsigned]/Bit String [16-bit](0..706)	...	VAR_GLOBAL	D1000
unGetUCMM_Tag_ReadResponseData	Word [Unsigned]/Bit String [16-bit](0..706)	...	VAR_GLOBAL	D2000
unSetIPAddress	Word [Unsigned]/Bit String [16-bit](0..1)	...	VAR_GLOBAL	D3000
unSetRequestNo_Write	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3100
unGetErrorCode_TagWrite	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3101
unGetStatusErrorCode_TagWrite	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3102
unSetRequestNo_Read	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3200
unGetErrorCode_TagRead	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3201
unGetStatusErrorCode_TagRead	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3202
unGetResponseData_ReadTagType	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3203
unGetResponseDataSize_TagRead	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3204


GN11_SE_1.EIP.bSts_CommunicationReady
X1F
MOV
H1
unSetRequestNo_Write
D3100
H2
unSetRequestNo_Read
D3200
H106
unSetIPAddress[0]
D3000
H0C0A8
unSetIPAddress[1]
D3001
H10
GN11_SE_1.EIP.uSet_CommunicationStart_D
U0\G7340096
GN11_SE_1.EIP.bSts_CommunicationDuringStartup
bUCMM_Tag_WriteCommandSendRequest
X10
M100
K0
M_RJ71GN11_SE_EIP_UCMMOriginator_WriteTagData_00A_1.pbi_unPathSegment
M_RJ71GN11_SE_EIP_UCMMOriginator_WriteTagData_00A_1 (M+RJ71GN11_SE_EIP_UCMMOriginator_WriteTagData_00A)
UCMM Originator Write tag data
B:i_bEN
o_bENO :B
bRun_SendUCMM_TagWrite
M110
bOK__SendUCMM_TagWrite
M120
bNG__SendUCMM_TagWrite
M130
GN11_SE_1
DUT:i_stModule
o_bOK :B
unSetIPAddress
D3000
UW:i_u2TargetAddress
o_bErr :B
"Tag001"
S:i_snTagName
o_uErrId :UW
unGetErrorCode_TagWrite
D3101
H0C3
UW:i_uiDataType
o_uiStatusId :UW
unGetStatusErrorCode_TagWrite
D3102
K10
UW:i_uiDataSize
unSetUCMM_Tag_WriteRequestData
D1000
UW:i_uWriteData
H0
UW:i_uRPI
UW:i_uTrigger
unSetRequestNo_Write
D3100
UW:i_uRequestNo
pbi_unPathSegment H0001
pbo_u2CIPResponseCode 0
pbo_udRequestCompleteCount 0
GN11_SE_1.EIP.bSts_CommunicationDuringStartup
bUCMM_Tag_ReadCommandSendRequest
X10
M101
K0
M_RJ71GN11_SE_EIP_UCMMOriginator_ReadTagData_00A_1.pbi_unPathSegment
MOV



(0) Set the request number and destination IP address for UCMM tag communications, and start EtherNet/IP communications.
(15) Specify "0" (Disabled) for the Path Segment data used in the module function block.
(20) By turning on M100, "M+RJ71GN11_SE_EIP_UCMMOriginator_WriteTagData" is executed and a write request is sent to the server side.
When M120 is on, 10 worlds of data stored in D1000 or later is written to Tag001 on the server side.
(754) Specify "0" (Disabled) for the Path Segment data used in the module function block.
(759) By turning on M101, "M+RJ71GN11_SE_EIP_UCMMOriginator_ReadTagData" is executed and a read request is sent to the server side.
When M121 is on, the server-side response result is stored in D2000 or later according to the response data size stored in D3204.

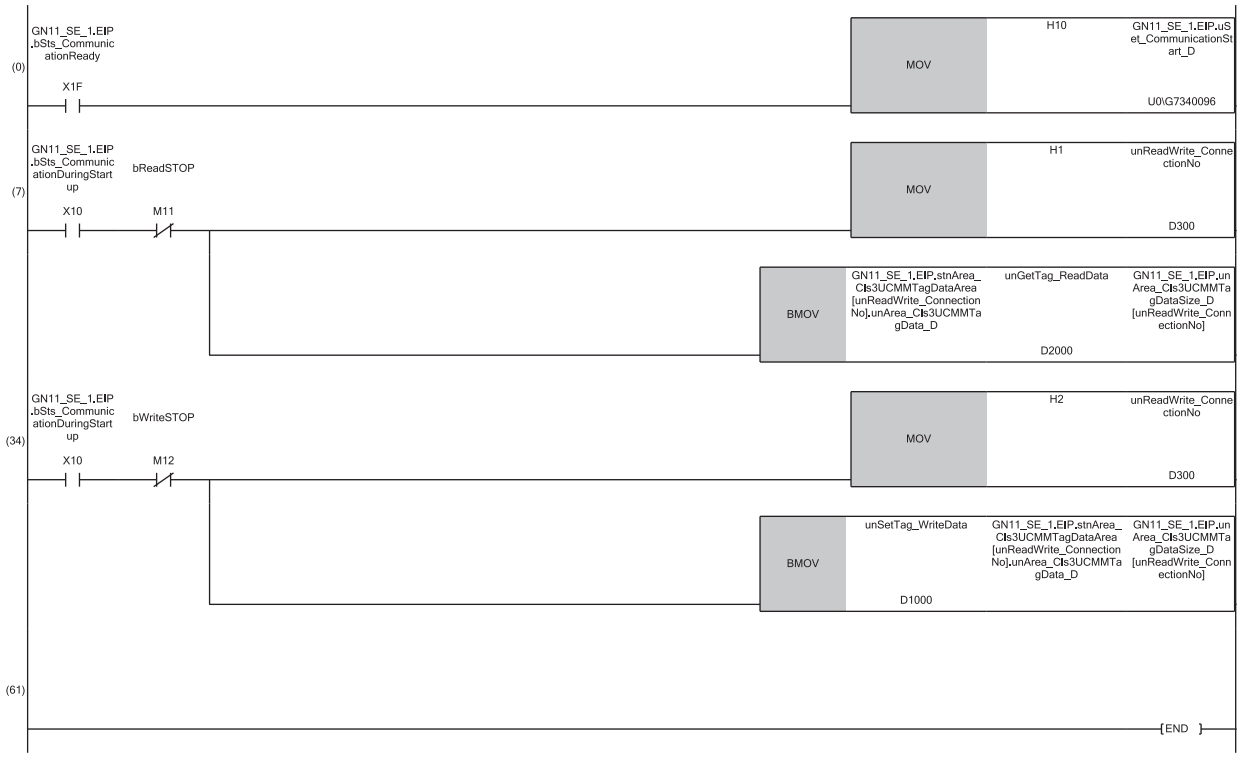
Point

- Ensure that the request number to be set is not the same as the connection number used for Class3 communications or the request number used for other UCMM communications.
- When sending a request to a device that does not require the Path Segment setting, such as a CC-Link IE TSN Plus module, settings must be made as shown in line 754 of the program example. (☞ Page 539 Class3/UCMM communication area)

Target-side program

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
	GN11_SE_1.EIP.stnArea_Cls3UCMMTagDataArea[unReadWrite_ConnectionNo].unArea_Cls3UCMMTagData_D	Class3/UCMM data area (for tag communications)	U0\G8278016 to U0\G8462847
	GN11_SE_1.EIP.unArea_Cls3UCMMTagDataSize_D[unReadWrite_ConnectionNo]	Class3/UCMM data size (for tag communications)	U0\G8463104 to U0\G8463359
Labels to be defined	Define global labels as shown below.		

Label Name	Data Type		Class	Assign (Device/Label)
bReadSTOP	Bit	...	VAR_GLOBAL	M11
bWriteSTOP	Bit	...	VAR_GLOBAL	M12
unReadWrite_ConnectionNo	Word [Signed]	...	VAR_GLOBAL	D300
unSetTag_WriteData	Word [Unsigned]/Bit String [16-bit](0..721)	...	VAR_GLOBAL	D1000
unGetTag_ReadData	Word [Unsigned]/Bit String [16-bit](0..721)	...	VAR_GLOBAL	D2000



(0) Start EtherNet/IP communications.

(7) Specify the connection number set for the tag that you wish to read the current value, and copy the data set for the specified tag to D2000.

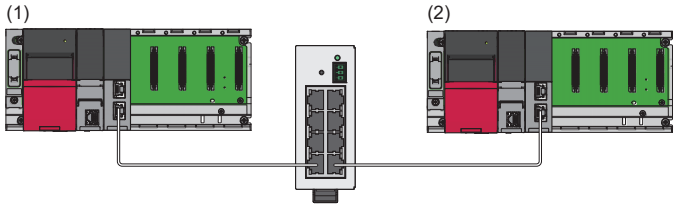
(34) Specify the connection number set for the tag that you wish to update the current value, and update the data set for the specified tag to the data set in D1000.

13.5 Class3 Message Communications Communication Example

This section describes an example of executing Class3 message communications between CC-Link IE TSN Plus modules.

System configuration

The following system configuration is used to explain the communication example of Class3 message communications.



(1) Programmable controller system (client)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.4.10)

(2) Programmable controller system (server)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.4.11)

Setting parameters

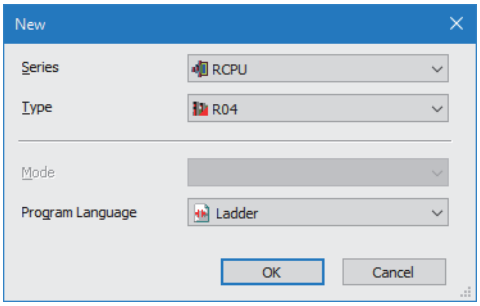
Use the engineering tool to set the parameters.

Setting the CC-Link IE TSN Plus module (client)

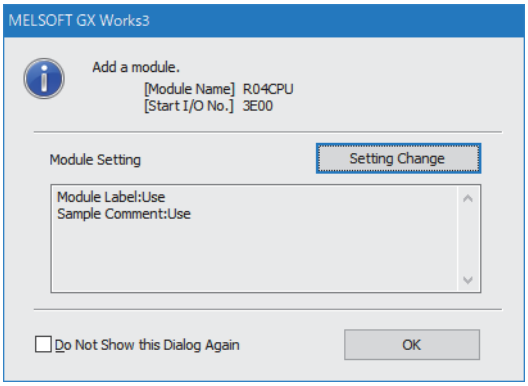
Connect the engineering tool to the client-side CPU module and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]

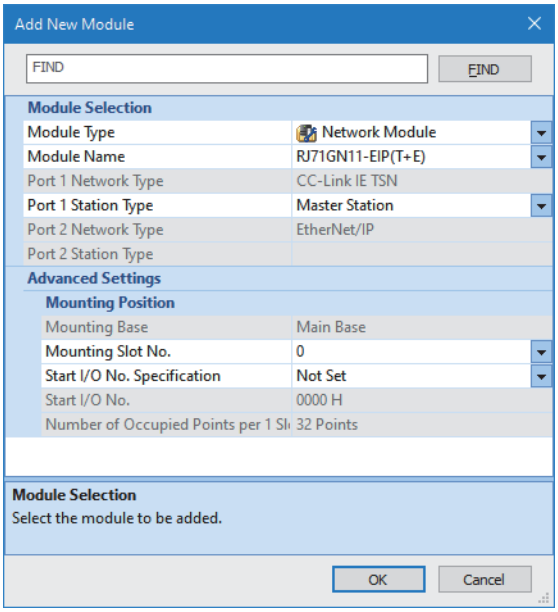


2. Click the [Setting Change] button to use the module label.

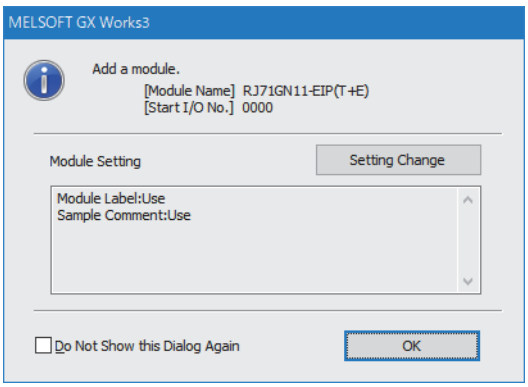


3. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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



4. Click the [OK] button to add a module label of the CC-Link IE TSN Plus module.



5. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

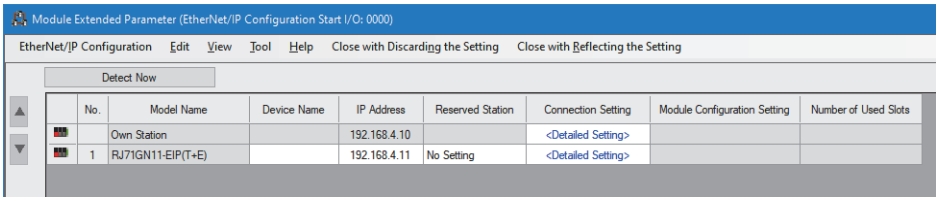
Item	Setting
IP Address	
IP Address	192 . 168 . 4 . 10
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	. . .
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

6. Click the [Apply] button.

7. Set the EtherNet/IP communication parameters in "EtherNet/IP Configuration".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Extended Parameter]

8. From "Module List", add "RJ71GN11-EIP(T+E)" to the list of EtherNet/IP devices and then configure the settings as follows.

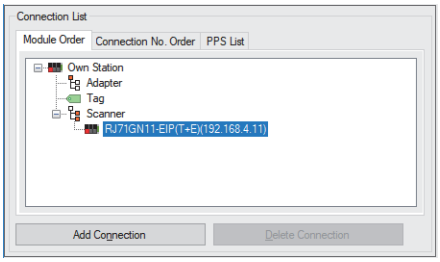


Point

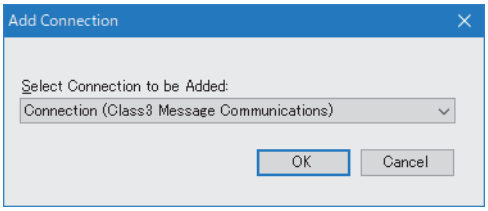
If "RJ71GN11-EIP(T+E)" is not shown in the "Module List", it is necessary to add the EDS file.
For adding the EDS file, refer to the following.
☞ Page 141 Adding/deleting the EDS file

9. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection of the server.

10. Select the server under "Scanner" in "Connection List" and click the [Add Connection] button.



11. Select "Connection (Class3 Message Communications)" in "Select Connection to be Added:" and click the [OK] button.



12. Set the parameter for the Class3 message communications in "Connection Detailed Setting".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Class3 Message Communications)	-
Connection No.	001	-
Communication Method	Message Communications	-
Service	1	-
Data Size	0	bytes
Large_Forward_Open	Use Automatically	-
Comment		-
Trigger Type	Cyclic	-
RPI	200000	μs
Timeout Multiplier	x4	-
Class ID	1	-
Instance ID	1	-
Attribute ID	0	-

13. Click the [Apply] button.

14. Click the [OK] button to close the connection settings.

15. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

16. Write the set parameters to the client-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

Setting the CC-Link IE TSN Plus module (server)

Connect the engineering tool to the server-side CPU module and set the parameters.

1. Set the CPU module and add the CC-Link IE TSN Plus module. The setting method of the CPU module and addition method of the CC-Link IE TSN Plus module are the same as those of the CC-Link IE TSN Plus module (client). (☞ Page 354 Setting the CC-Link IE TSN Plus module (client))

2. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

Item	Setting
IP Address	
IP Address	192 . 168 . 4 . 11
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	. . .
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

3. Set the items in "Application Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Application Settings]

Item	Setting
EtherNet/IP Auto-start Setting	
EtherNet/IP Auto-start Setting	Start
Security	
IP Filter Settings	
IP Filter	Disable
IP Filter Settings	<Detailed Setting>
Timer Settings for Data Communication	
Change/Set Timer Value	No
TCP Resend Timer	10
Destination Alive Check Start Interval Timer	600
Destination Alive Check Interval Timer	10
Destination Alive Check Resend Count	3 Times
Advanced Settings	
Gateway Parameter Settings	
Gateway Other Than Default Gateway	Not Use
Gateway Information	

4. Click the [Apply] button.

5. Write the set parameters to the server-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

Program example

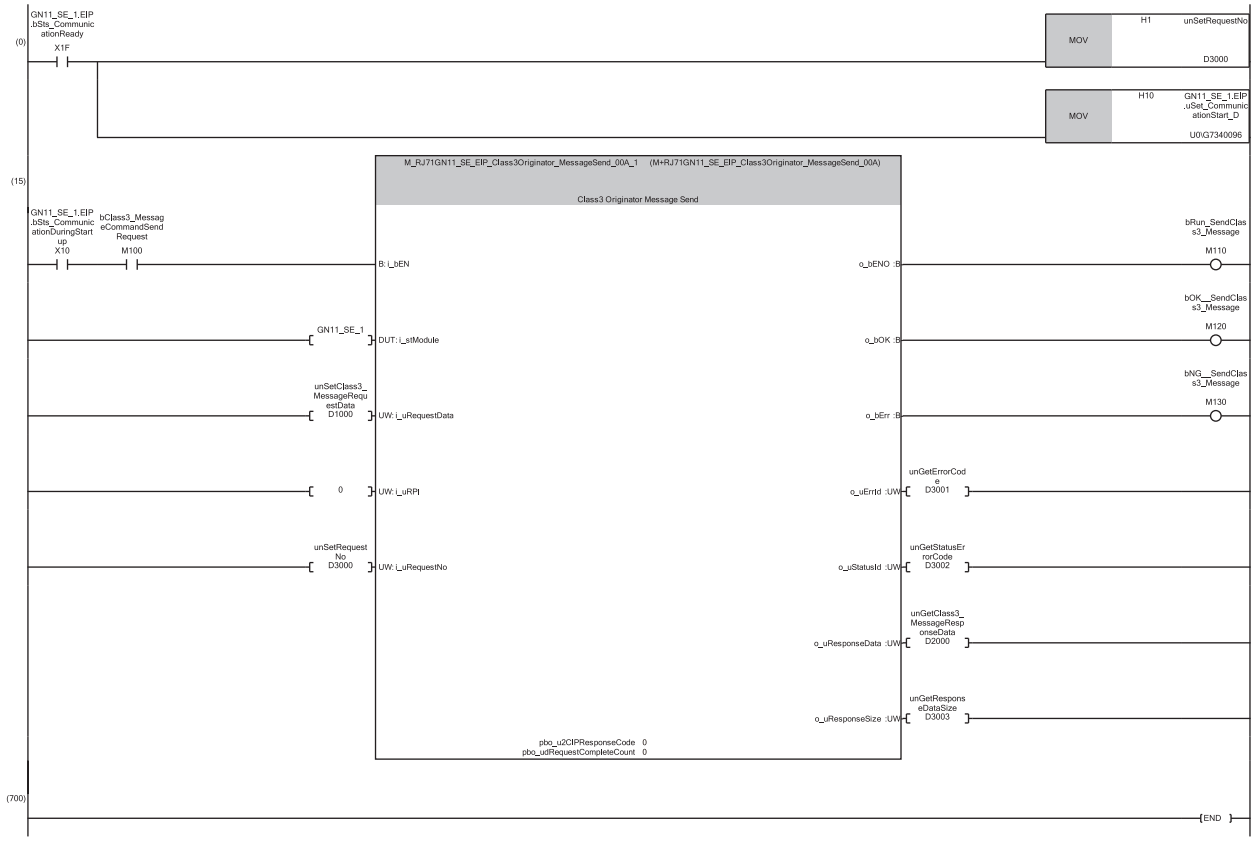
The Class3 message communications program is executed by changing the CPU module from STOP to RUN.
The following example shows a program to execute Class3 message communications by turning on the Class3 message command sent request in the program. (A server-side program is not required.)
When the program is executed, the following request commands are sent to the server side.

Item	Data to be specified	Description
Class ID	01H	Specifies the identity object.
Instance ID	01H	—
Service code	01H	Get_Attributes_All (Acquires all attributes of the instances specified by Class ID and Instance ID.)
Attribute ID	00H	Due to the "Get_Attributes_All" command, no specific Attribute ID is specified.
Request data	0	Specifies the request data size as 0.

Client-side program

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
Labels to be defined	Define global labels as shown below.		
FBs to be used	• M+RJ71GN11_SE_EIP_Class3Originator_MessageSend		

Label Name	Data Type		Class	Assign (Device/Label)
bClass3_MessageCommandSendRequest	Bit	...	VAR_GLOBAL	M100
bRun_SendClass3_Message	Bit	...	VAR_GLOBAL	M110
bOK_SendClass3_Message	Bit	...	VAR_GLOBAL	M120
bNG_SendClass3_Message	Bit	...	VAR_GLOBAL	M130
unSetClass3_MessageRequestData	Word [Unsigned]/Bit String [16-bit](0..706)	...	VAR_GLOBAL	D1000
unGetClass3_MessageResponseData	Word [Unsigned]/Bit String [16-bit](0..706)	...	VAR_GLOBAL	D2000
unSetRequestNo	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3000
unGetErrorCode	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3001
unGetStatusErrorCode	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3002
unGetResponseDataSize	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3003



(0) Set the request number for Class3 message communications, and start EtherNet/IP communications.

(15) By turning on M100, "M+RJ71GN11_SE_EIP_Class3Originator_MessageSend" is executed and the request data is sent to the server side.
When M120 is on, the response result from the server side is stored in D2000 or later. (Half of the response data size stored in D3003 (bytes) are stored (rounded up).)
If the response data size is an odd number, only the lower 1 byte of the end device is stored.

Point

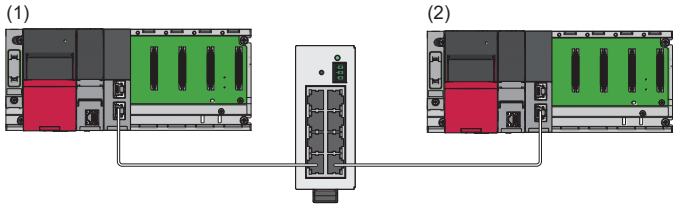
Ensure that the request number to be set is not the same as the request number used for other UCMM communications.

13.6 Class3 Tag Communications Communication Example

This section describes examples of executing Class3 tag communications between CC-Link IE TSN Plus modules.

System configuration

The following system configuration is used to explain communication examples of Class3 tag communications.



(1) Programmable controller system (originator)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.5.10)

(2) Programmable controller system (target)
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.168.5.11)

Communication description

When the communication example for Class3 tag communications is executed, the following operation is performed.

Originator-side operation

■Write request to tags

By executing a Class3 tag communication write request, the device area data stored in D1000 or later is written to the Tag001 tag on the target side according to the requested size.*1

*1 If the requested data type is INT, request data consisting of the request data size × 1 word (10 words in the program example) is sent.
If the requested data type is DINT, request data consisting of the request data size × 2 words is sent.

■Tag read request

By executing a Class3 tag communication read request, the data set to the Tag002 tag on the target side is read according to the requested size. From the read data, the amount according to the read data size (size stored in D3204) is stored in D2000 or later.
(Regardless of the tag data type of the external device, the received read data size is stored in units of words.)
In addition, the size of the data read from the tag of the external device depends on the external device tag data type.*1

*1 If the external device tag data type is INT, the read request data size × 1 word is read.
If the external device tag data type is DINT, the read request data size × 2 words is read.

Target-side operation

The current values of the tag data set in Tag001 and Tag002 are read and the current values are updated.
During target-side operation, both read and write requests from the originator side for the tag can be accepted.
However, if the data is updated due to a write request while the current value is being read, or if the data having its current value updated is read due to a read request, it may result in a data inconsistency.

Setting parameters

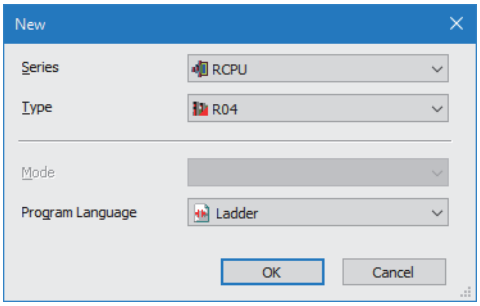
Use the engineering tool to set the parameters.

Setting the CC-Link IE TSN Plus module (originator)

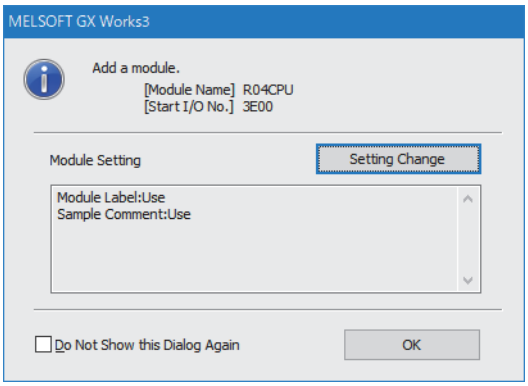
Connect the engineering tool to the originator-side CPU module and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]

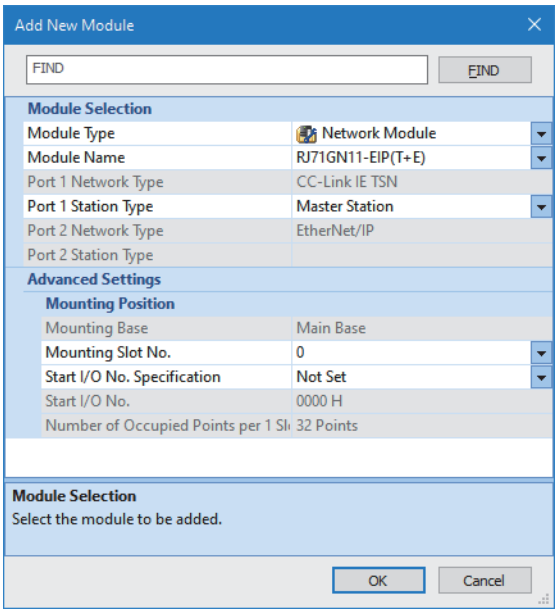


2. Click the [Setting Change] button to use the module label.

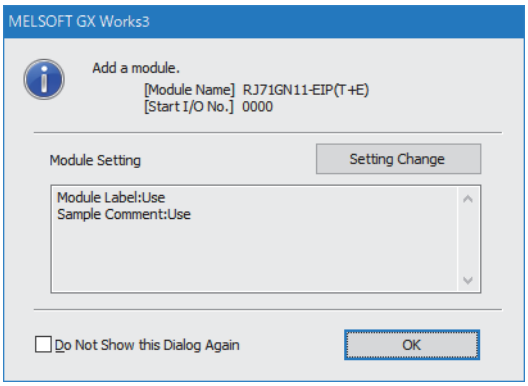


3. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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



4. Click the [OK] button to add a module label of the CC-Link IE TSN Plus module.



5. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

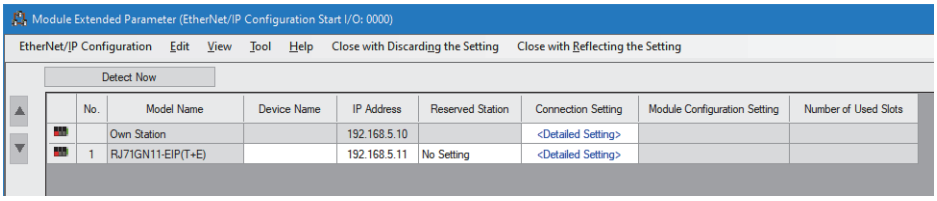
Item	Setting
IP Address	
IP Address	192 . 168 . 5 . 10
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

6. Click the [Apply] button.

7. Set the EtherNet/IP communication parameters in "EtherNet/IP Configuration".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Extended Parameter]

8. From "Module List", add "RJ71GN11-EIP(T+E)" to the list of EtherNet/IP devices and then configure the settings as follows.

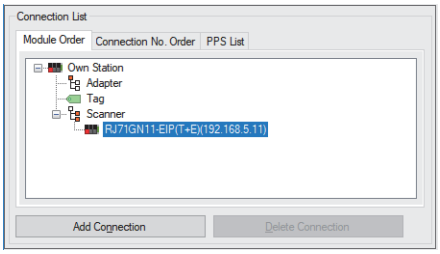


Point

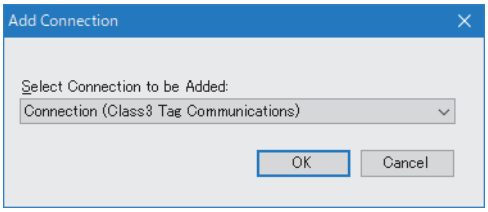
If "RJ71GN11-EIP(T+E)" is not shown in the "Module List", it is necessary to add the EDS file.
For adding the EDS file, refer to the following.
☞ Page 141 Adding/deleting the EDS file

9. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection the target.

10. Select the target under "Scanner" in "Connection List" and click the [Add Connection] button.



11. Select "Connections (Class3 Tag Communications)" in "Select Connection to be Added:" and click the [OK] button.



12. Set the parameters for Class3 tag communications (Tag001) in "Connection Detailed Setting".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Class3 Tag Communications)	-
Connection No.	001	-
Port	Not Used	-
Link Address	0	-
Communication Method	Tag Communications	-
Service	Write	-
Data Type	INT	-
Tag Name	Tag001	-
Tag Name Size	6	Characters
Size	10	-
Comment		-
Trigger Type	Application Trigger	-
RPI	200000	μs
Timeout Multiplier	x4	-

13. Repeat steps 9 to 10 and set the parameters for Class3 tag communications (Tag002) in "Connection Detailed Setting".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Class3 Tag Communications)	-
Connection No.	002	-
Port	Not Used	-
Link Address	0	-
Communication Method	Tag Communications	-
Service	Read	-
Data Type	DINT	-
Tag Name	Tag002	-
Tag Name Size	6	Characters
Size	10	-
Comment		-
Trigger Type	Application Trigger	-
RPI	200000	μs
Timeout Multiplier	x4	-

14. Click the [Apply] button.

15. Click the [OK] button to close the connection settings.

16. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

17. Write the set parameters to the originator-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

Setting the CC-Link IE TSN Plus module (target)

Connect the engineering tool to the target-side CPU module and set the parameters.

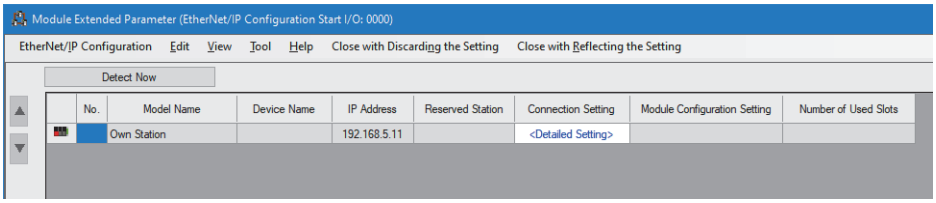
1. Set the CPU module and add the CC-Link IE TSN Plus module. The setting method of the CPU module and addition method of the CC-Link IE TSN Plus module are the same as those of the CC-Link IE TSN Plus module (originator). (☞ Page 361 Setting the CC-Link IE TSN Plus module (originator))
2. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

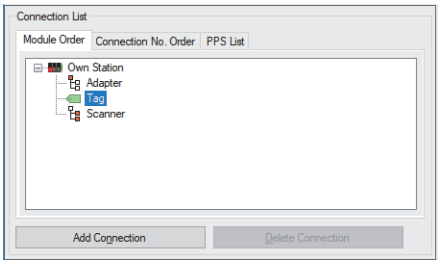
Item	Setting
IP Address	
IP Address	192 . 168 . 5 . 11
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	. . .
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

3. Click the [Apply] button.
4. Set the EtherNet/IP communication parameters in "EtherNet/IP Configuration".

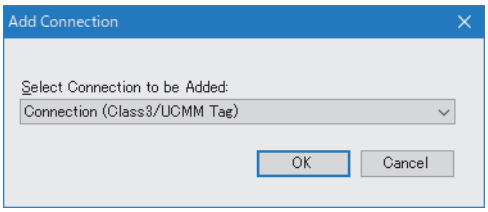
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Extended Parameter]



5. Double-click "<Detailed Setting>" in the "Connection Setting" column and set the connection of the originator.
6. Select "Tag" in "Connection List" and click the [Add Connection] button.



7. Select "Connection (Class3/UCMM Tag)" in "Select Connection to be Added:" and click the [OK] button.



8. Set the parameters for Class3 tag communications (Tag001) in "Connection Detailed Setting".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Class3/UCMM Tag)	-
Connection No.	001	-
Data Type	INT	-
Tag Name	Tag001	-
Tag Name Size	6	Characters
Size	10	-
Comment		-

9. Repeat steps 6 to 7 and set the parameters for Class3 tag communications (Tag002) in "Connection Detailed Setting".

Connection Detailed Setting

Item	Setting Value	Unit
Connection Name	Connection (Class3/UCMM Tag)	-
Connection No.	002	-
Data Type	DINT	-
Tag Name	Tag002	-
Tag Name Size	6	Characters
Size	10	-
Comment		-

10. Click the [Apply] button.

11. Click the [OK] button to close the connection settings.

12. Select [Close with Reflecting the Setting] and close the "EtherNet/IP Configuration" window.

13. Write the set parameters to the target-side CPU module. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

☞ Page 114 EtherNet/IP Parameter Settings

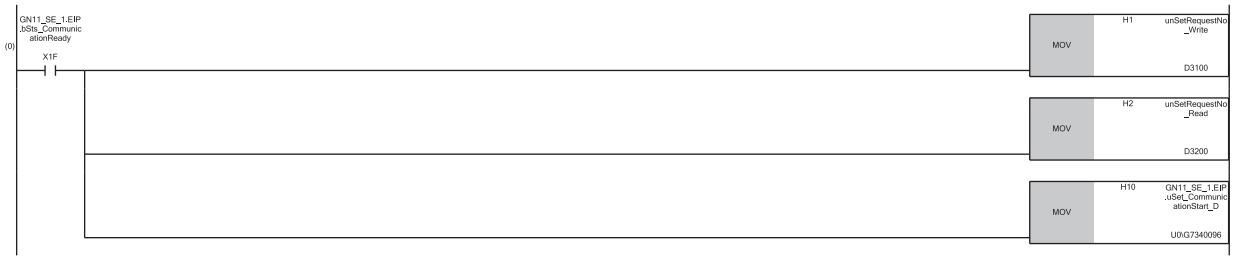
Program example

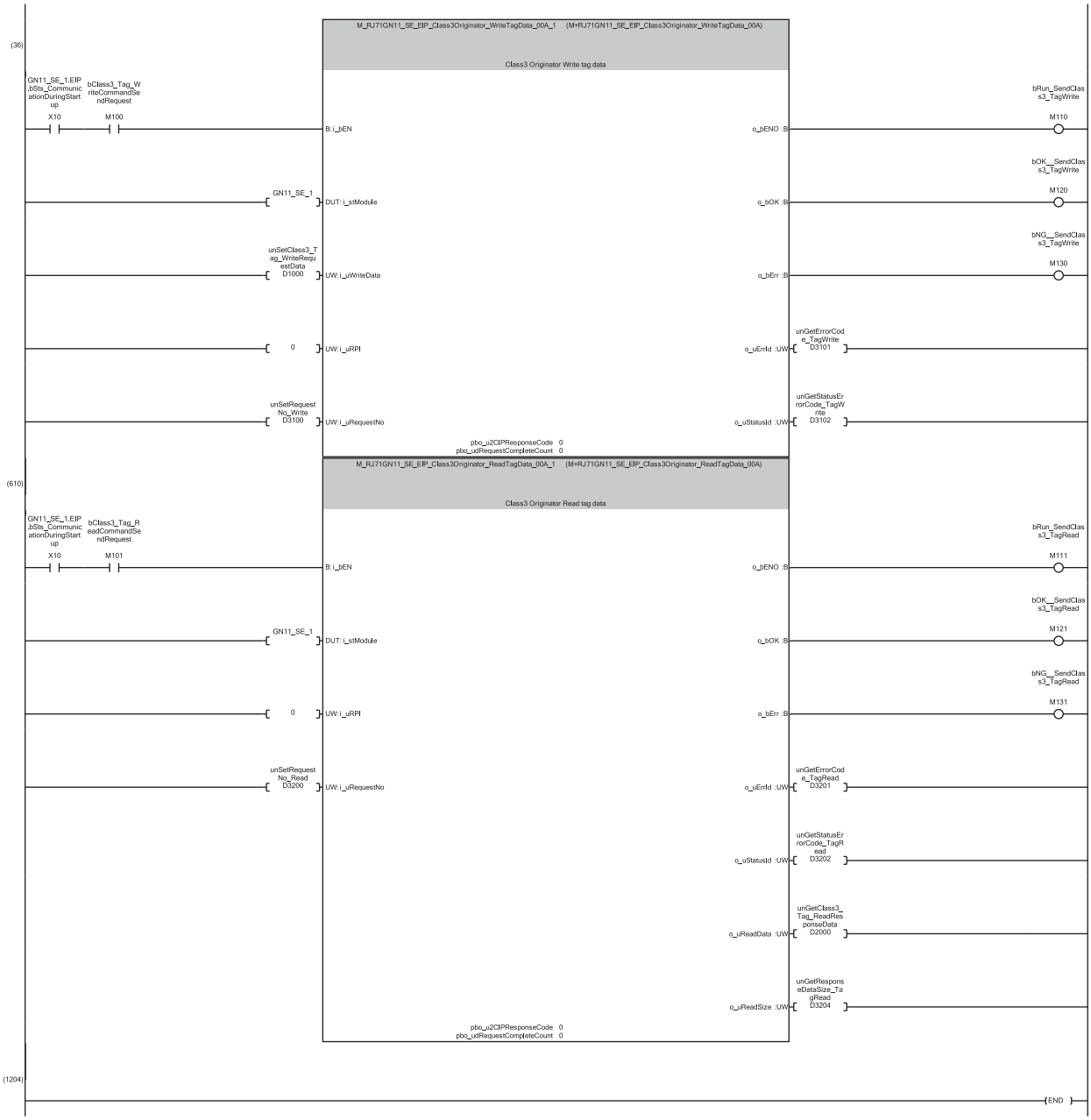
The Class3 tag communications program is executed by changing the CPU module from STOP to RUN.

Originator-side program

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
Labels to be defined	Define global labels as shown below.		
FBs to be used	• M+RJ71GN11_SE_EIP_Class3Originator_WriteTagData • M+RJ71GN11_SE_EIP_Class3Originator_ReadTagData		

Label Name	Data Type		Class	Assign (Device/Label)
bClass3_Tag_WriteCommandSendRequest	Bit	...	VAR_GLOBAL	M100
bClass3_Tag_ReadCommandSendRequest	Bit	...	VAR_GLOBAL	M101
bRun_SendClass3_TagWrite	Bit	...	VAR_GLOBAL	M110
bOK_SendClass3_TagWrite	Bit	...	VAR_GLOBAL	M120
bNG_SendClass3_TagWrite	Bit	...	VAR_GLOBAL	M130
bRun_SendClass3_TagRead	Bit	...	VAR_GLOBAL	M111
bOK_SendClass3_TagRead	Bit	...	VAR_GLOBAL	M121
bNG_SendClass3_TagRead	Bit	...	VAR_GLOBAL	M131
unSetClass3_Tag_WriteRequestData	Word [Unsigned]/Bit String [16-bit](0..706)	...	VAR_GLOBAL	D1000
unGetClass3_Tag_ReadResponseData	Word [Unsigned]/Bit String [16-bit](0..706)	...	VAR_GLOBAL	D2000
unSetRequestNo_Write	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3100
unGetErrorCode_TagWrite	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3101
unGetStatusErrorCode_TagWrite	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3102
unSetRequestNo_Read	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3200
unGetErrorCode_TagRead	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3201
unGetStatusErrorCode_TagRead	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3202
unGetResponseDataSize_TagRead	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3204





(0) Set the request number for Class3 tag communications, and start EtherNet/IP communications.

(36) By turning on M100, "M+RJ71GN11_SE_EIP_Class3Originator_WriteTagData" is executed and a write request is sent to the server side.
When M120 is on, the set size of data stored in D1000 or later is written to Tag001 on the server side as the parameters for Class3 communications.

(610) By turning on M101, "M+RJ71GN11_SE_EIP_Class3Originator_ReadTagData" is executed and a read request is sent to the server side.
When M121 is on, the server-side response result is stored in D2000 or later according to the response data size stored in D3204.

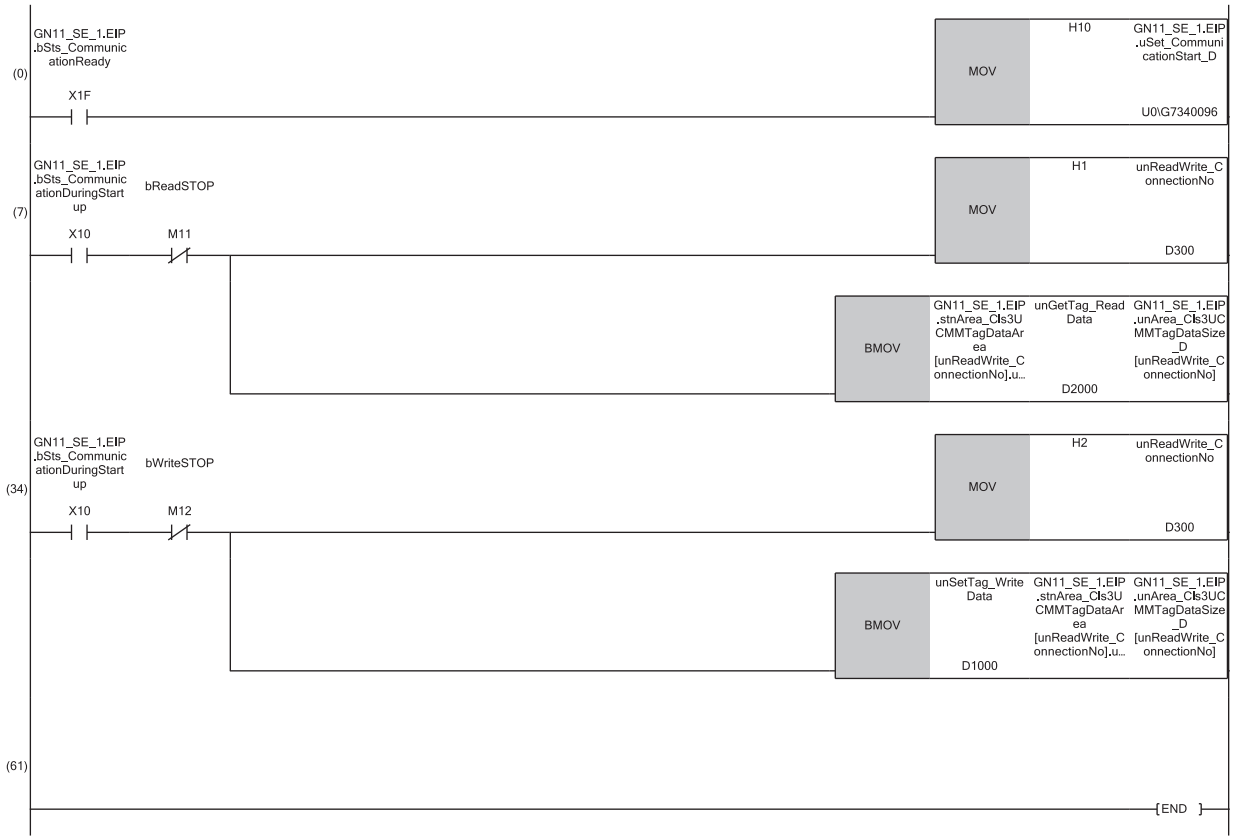
Point

Ensure that the request number to be set is not the same as the request number used for other UCMM communications.

Target-side program

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
	GN11_SE_1.EIP.stnArea_Cls3UCMMTagDataArea[unReadWrite_ConnectionNo].unArea_Cls3UCMMTagData_D	Class3/UCMM data area (for tag communications)	U0\G8278016 to U0\G8462847
	GN11_SE_1.EIP.unArea_Cls3UCMMTagDataSize_D[unReadWrite_ConnectionNo]	Class3/UCMM data size (for tag communications)	U0\G8463104 to U0\G8463359
Labels to be defined	Define global labels as shown below.		

Label Name	Data Type		Class	Assign (Device/Label)
unReadWrite_ConnectionNo	Word [Signed]	...	VAR_GLOBAL	D300
bReadSTOP	Bit	...	VAR_GLOBAL	M11
bWriteSTOP	Bit	...	VAR_GLOBAL	M12
unGetTag_ReadData	Word [Unsigned]/Bit String [16-bit](0..721)	...	VAR_GLOBAL	D2000
unSetTag_WriteData	Word [Unsigned]/Bit String [16-bit](0..721)	...	VAR_GLOBAL	D1000



(0) Start EtherNet/IP communications.

(7) Specify the connection number set for the tag that you wish to read the current value, and copy the data set for the specified tag to D2000.

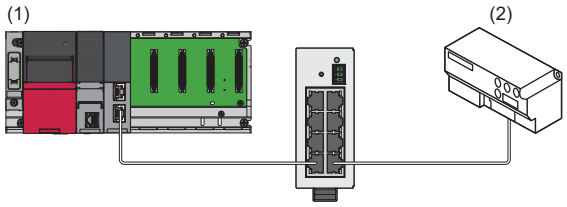
(34) Specify the connection number set for the tag that you wish to update the current value, and update the data set for the specified tag to the data set in D1000.

13.7 Program Example of PING Test

This section provides a program example of PING tests.

System configuration

The following system configuration is used to explain the program example of PING test.



(1) Programmable controller system
- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE TSN Plus module: RJ71GN11-EIP (start I/O number: 0000H to 001FH, IP address: 192.1.0.5)

(2) EtherNet/IP device (IP address: 192.1.0.2)

Communication description

The PING test is performed by transmitting an echo request from the CC-Link IE TSN Plus module to the EtherNet/IP device and checking the reception of the echo response from the EtherNet/IP device.

For the PING test, the buffer memory of the CC-Link IE TSN Plus module is used to operate the program.

The following table lists the buffer memory used by the PING test.

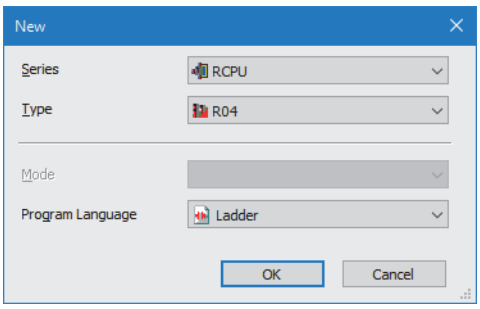
Address	Item		Reference
Un\G7340048	PING test request area	Communication time check	Page 527 PING test request area
Un\G7340049		Transmission count	
Un\G7340050 to Un\G7340051		IP Address	
Un\G7340052	PING test response area	Total Number of packet transmissions	Page 528 PING test response area
Un\G7340053		Number of success	
Un\G7340054		Number of failures	
Un\G7340055 to Un\G7340064		Error code	

Setting parameters

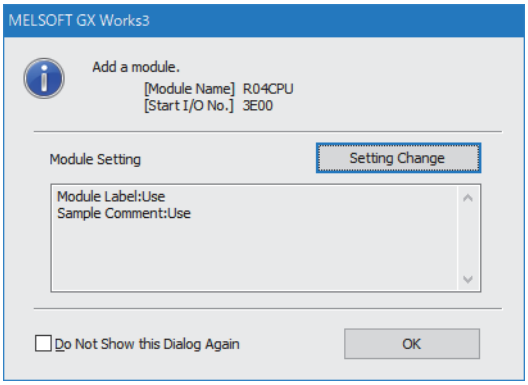
Connect the engineering tool to the CPU module and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]

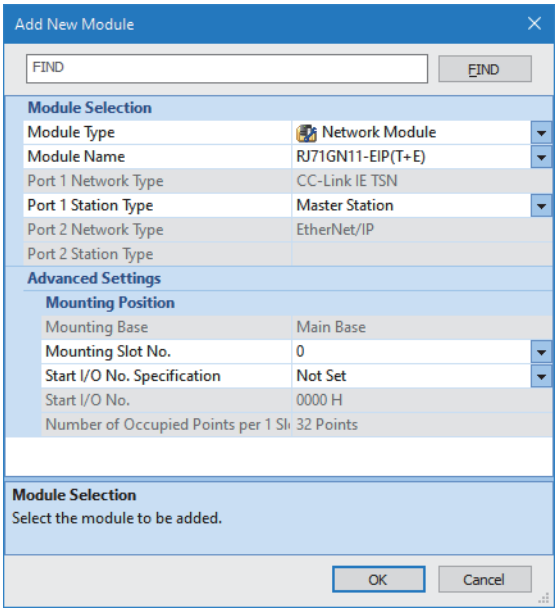


2. Click the [Setting Change] button to use the module label.

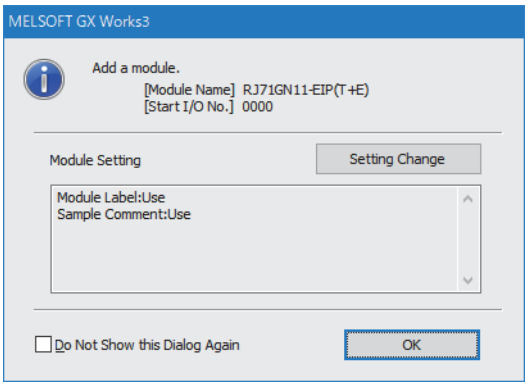


3. Set the CC-Link IE TSN Plus module (RJ71GN11-EIP) as follows.

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



4. Click the [OK] button to add a module label of the CC-Link IE TSN Plus module.



5. Set the items in "Basic Settings" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ [Port2 Module Parameter (EtherNet/IP)] ⇨ [Basic Settings]

Item	Setting
IP Address	
IP Address	192 . 1 . 0 . 5
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	. . .
Refresh Settings	
Refresh Settings	<Detailed Setting>
Ethernet Communication Setting	
Opening Method	Do Not Open by Program
External Device Configuration	<Detailed Setting>

6. Click the [Apply] button.

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

[Online] ⇨ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

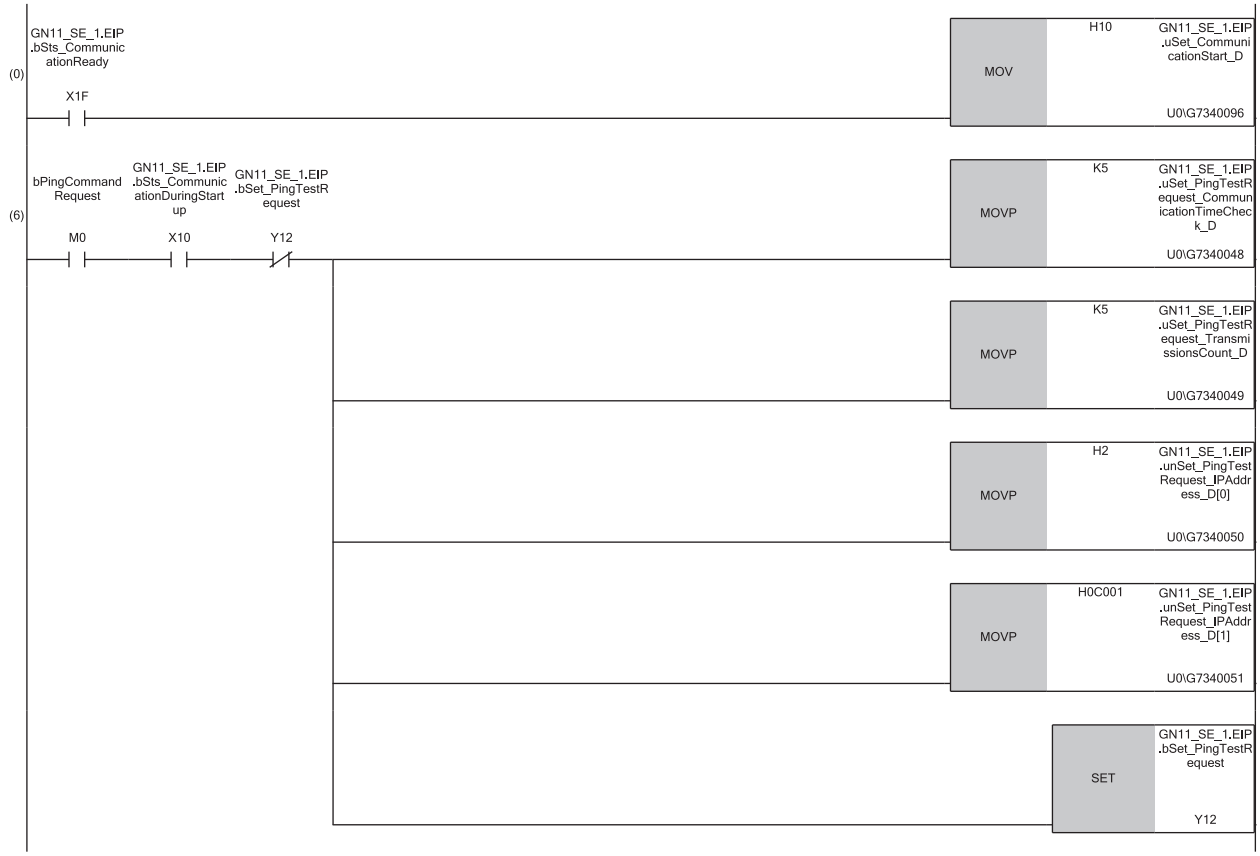
☞ Page 114 EtherNet/IP Parameter Settings

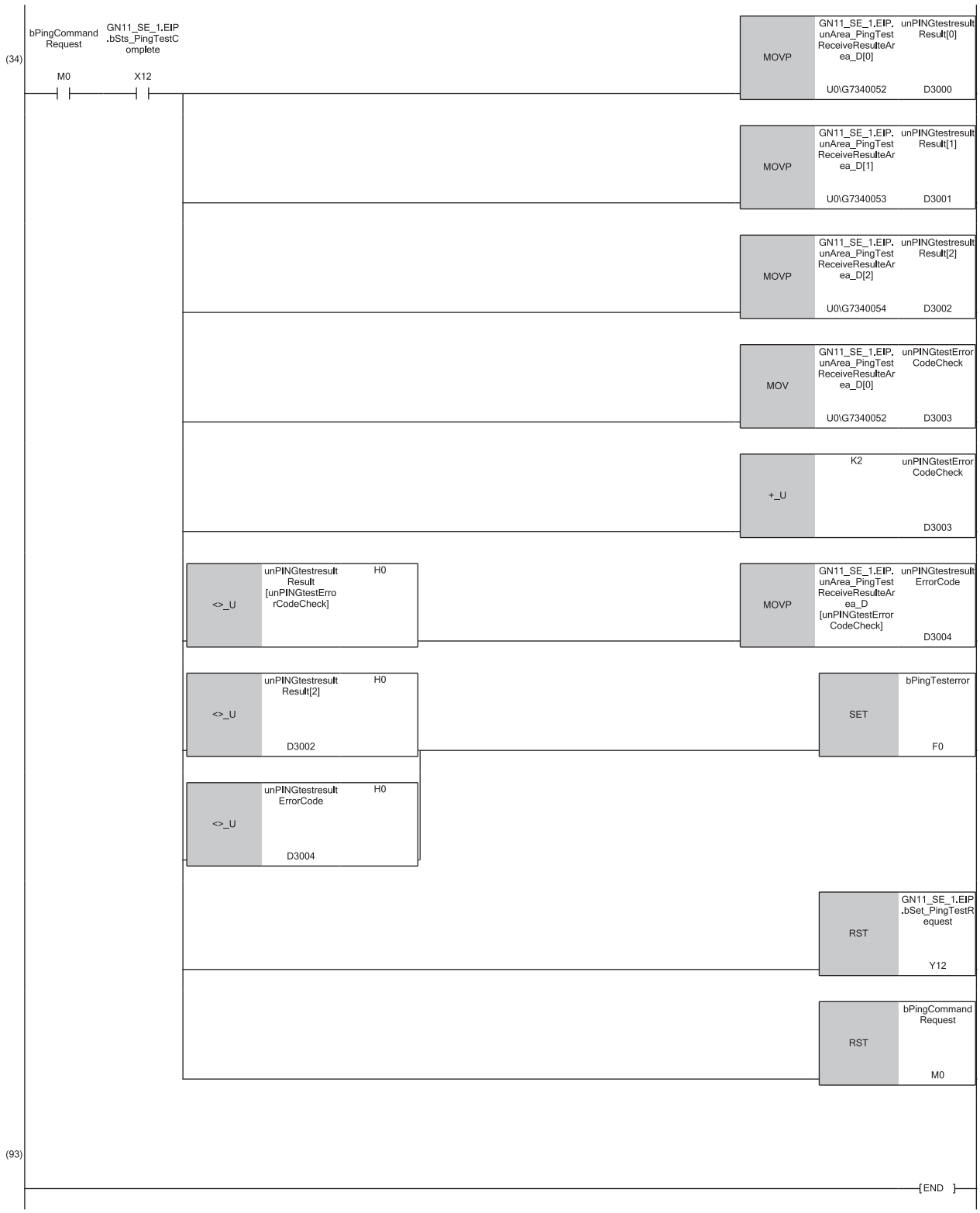
Program example

The following example shows a program to execute the PING test by turning on the PING test request command.

Classification	Label name	Description	Device
Module label	GN11_SE_1.EIP.bSts_CommunicationDuringStartup	EtherNet/IP communication in process	X10
	GN11_SE_1.EIP.bSts_PingTestComplete	PING test completion	X12
	GN11_SE_1.EIP.bSts_CommunicationReady	Communication Ready	X1F
	GN11_SE_1.EIP.bSet_PingTestRequest	PING test execution request	Y12
	GN11_SE_1.EIP.uSet_PingTestRequest_CommunicationTimeCheck_D	PING test request area: Communication time check	U0\G7340048
	GN11_SE_1.EIP.uSet_PingTestRequest_TransmissionsCount_D	PING test request area: Transmission count	U0\G7340049
	GN11_SE_1.EIP.unSet_PingTestRequest_IPAddress_D[0]	PING test request area: IP Address (lower)	U0\G7340050
	GN11_SE_1.EIP.unSet_PingTestRequest_IPAddress_D[1]	PING test request area: IP Address (upper)	U0\G7340051
	GN11_SE_1.EIP.unArea_PingTestReceiveResulteArea_D[0]	PING test response area: Total number of packet transmissions	U0\G7340052
	GN11_SE_1.EIP.unArea_PingTestReceiveResulteArea_D[1]	PING test response area: Receive count	U0\G7340053
	GN11_SE_1.EIP.unArea_PingTestReceiveResulteArea_D[2]	PING test response area: Loss count	U0\G7340054
	GN11_SE_1.EIP.uSet_CommunicationStart_D	EtherNet/IP communication start request	U0\G7340096
Labels to be defined	Define global labels as shown below.		

Label Name	Data Type		Class	Assign (Device/Label)
bPingCommandRequest	Bit	...	VAR_GLOBAL	M0
unPINGtestresultResult	Word [Unsigned]/Bit String [16-bit](0..2)	...	VAR_GLOBAL	D3000
unPINGtestErrorCodeCheck	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3003
unPINGtestresultErrorCode	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	D3004
bPingTesterror	Bit	...	VAR_GLOBAL	F0





(0) Start EtherNet/IP communications.

(6) Specify the communication time check, the transmission count, and the IP address for the PING test, and then start the test.

(34) The PING test response result is stored. (Total number of packet transmissions → D3000, receive count → D3001, loss count → D3002, error code → D3004)
If a timeout or an error occurs, turn on F0.

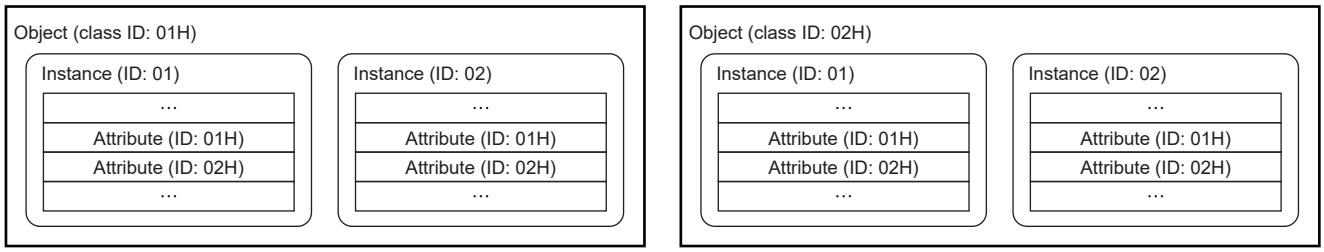
14 MESSAGE COMMUNICATION SUPPORT COMMANDS

This chapter describes the objects and services of the commands used for the message communication function (client). EtherNet/IP devices are provided with objects (functions or data expressed abstractly) and services (operations or functions to be executed by requests).

Explanation of terms

Term	Description
Object	Each object is managed with its class ID inside an EtherNet/IP device. An object has one or more instances.
Instance	Each instance is managed with its instance ID inside an object. An instance has one or more pieces of information called an attribute inside. In addition, an instance has one or more services that can be executed and each service can be used with its service code. Available services are determined by the instance.
Attribute	Each attribute is managed with its attribute ID inside an instance.

The following shows the relationships between objects, instances, and attributes.



Service execution

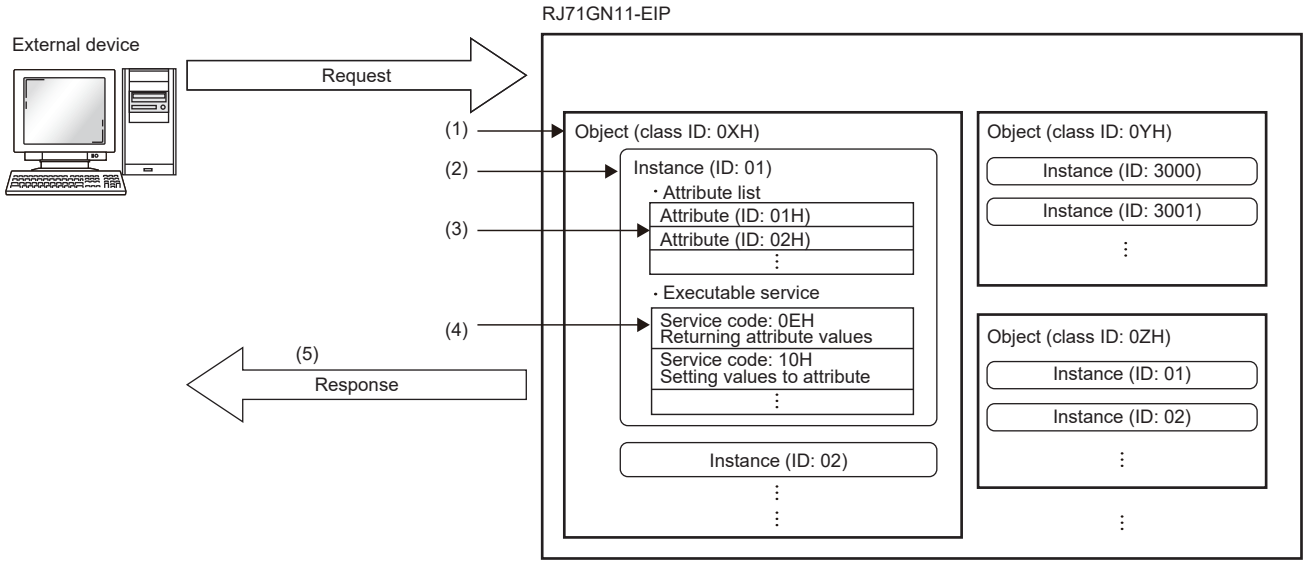
To execute a service, specify a target by using a class ID, instance ID, and attribute ID. (In some services, an attribute ID does not need to be specified.)

The following shows a flow of service execution by using message communication support commands.

Ex.

When the service to be executed below is specified and a request is sent from the external device to the CC-Link IE TSN Plus module

Item	Description
Class ID	0XH
Instance ID	01H
Attribute ID	02H
Service code	0EH



(1) Access the class ID 0XH.
(2) Access the instance ID 01H.
(3) Specify the attribute ID 02H.
(4) Execute the service code 0EH.
(5) The value of the attribute specified in (3) is returned.

Object list

The following table lists the objects that can be used with message communication support commands.

Object name	Class ID	Description	Reference
Identity	01H	An object that holds information such as the identification information of the CC-Link IE TSN Plus module	Page 378 Identity
Message Router	02H	An object that holds information such as the class information of the CC-Link IE TSN Plus module	Page 380 Message Router
Connection Manager	06H	An object that is used when establishing a connection with a CC-Link IE TSN Plus module	Page 381 Connection Manager
TCP/IP Interface	F5H	Holds the settings and status related to TCP/IP.	Page 382 TCP/IP Interface
Ethernet Link	F6H	Holds the settings and status related to Ethernet communications.	Page 385 Ethernet Link

Command explanations

Item	Description
Class attribute	Data possessed by the class of an object.*1
Class service	Service performed by specifying a class.*1
Instance attribute	Data possessed by the instance of an object.*2
Instance service	Service performed by specifying an instance.*2

*1 A class possesses the basic information such as the revision and instance of the object.
*2 An instance possesses the information of each object such as its functions and data.

■Access

This item indicates whether reading and writing using instance services are allowed.

- Get: Reading is possible with services such as Get_Attribute_Single.
- Set: Writing is possible with services such as Set_Attribute_Single.

■Data type

Item	Description	Data size	Range
BOOL	Bit data	1 byte	• 0: Off (False) • 1: On (True)
SINT	Signed 8-bit data	1 byte	-128 to 127
INT	Signed 16-bit data	2 bytes	-32768 to 32767
DINT	Signed 32-bit data	4 bytes	-2147483648 to 2147483647
USINT	Unsigned 8-bit data	1 byte	0 to 255
UINT	Unsigned 16-bit data	2 bytes	0 to 65535
UDINT	Unsigned 32-bit data	4 bytes	0 to 4294967295
ULINT	Unsigned 64-bit data	8 bytes	0 to 18446744073709551615
REAL	Single-precision floating point real number	4 bytes	E ± 1.17549435 - 38 to E ± 3.40282347 + 38
LREAL	Double-precision floating point real number	8 bytes	E ± 2.2250738585072014 - 308 to E ± 1.7976931348623157 + 308
STRING	Character string data	Depends on the number of characters.	—
SHORT_STRING	Character string size + character string data*1	Depends on the number of characters. Number of characters + 1 byte	—
BYTE	Bit string (8 bits)	1 byte	—
WORD	Bit string (16 bits)	2 bytes	—
DWORD	Bit string (32 bits)	4 bytes	—
Padded EPATH	CIP path segment	4 bytes	—

*1 The size of the obtained character string is set to the beginning of a character string as USINT-type one byte.

■Setting value (Set)/stored value (Get)

When Get access is available, the setting value (Set)/stored value (Get) can be read from the CC-Link IE TSN Plus module.
When Set access is available, the setting value (Set)/stored value (Get) can be set on the CC-Link IE TSN Plus module.

14.1 Identity

Object name	Class ID
Identity	01H

Class attribute (instance ID: 00H)

Attribute ID	Access (○: Available, ×: Not available)		Name	Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set				
1	○	×	Revision	UINT	Object revision	0002H*1
2	○	×	Max Instance	UINT	Maximum instance ID	0001H
3	○	×	Number of instances	UINT	Number of created instances	0001H

*1 The value is 0001H when the firmware version of the CC-Link IE TSN Plus module is "03" or earlier.

Class service

Service code	Service	Remarks
01H	Get_Attributes_All	When this service is executed for the class attributes, the following values are returned. • Attribute ID1: Value of attribute ID1 • Attribute ID2: Value of attribute ID2 • Attribute ID6: 0000H • Attribute ID7: 0000H
0EH	Get_Attribute_Single	—

Instance attribute (instance ID: 01H)

Attribute ID	Access (○: Available, ×: Not available)		Name		Data type	Description	Setting value (Set)/ stored value (Get)
	Get	Set					
1	○	×	Vendor Id		UINT	Vendor ID number	00A1H
2	○	×	Device Type		UINT	Device type	000CH
3	○	×	Product Code		UINT	Product ID number	000CH
4	○	×	Revision	Major Revision	USINT	Major revision	03H*2
				Minor Revision	USINT	Minor revision	01H
5	○	×	Status		WORD	Product status	☞ Page 379 Details of product status
6	○	×	Serial Number		UDINT	Serial number	Varies between modules.
7	○	×	Product Name		SHORT_STRING	Product name	"RJ71GN11-EIP(T+E)"*1

*1 Since the data type is SHORT_STRING, the number of characters in the product name is added to the beginning of a character string.

*2 The value is 01H when the firmware version of the CC-Link IE TSN Plus module is "03" or earlier. In addition, the value is 02H when the firmware version of the CC-Link IE TSN Plus module is "04".

■Details of product status

Bit	Description	Value
0	Owned	• 0: EtherNet/IP communications are not connected as the target device. • 1: At least one connection of EtherNet/IP communications is connected as the target device.
1	Reserved	Fixed to 0
2	Configured	Fixed to 1
3	Reserved	Fixed to 0
4 to 7	Extended Device Status	• 0010 (2H): Error occurring on one or more connections • 0011 (3H): No connections established • 0101 (5H): Major Fault occurring (bit 10 or bit 11 turned on) • 0110 (6H): One or more connections performing normal communications in RUN mode • 0111 (7H): One or more connections all performing communications in IDLE mode
8	Minor Recoverable Fault	• 0: No error • 1: Minor error occurring
9	Minor Unrecoverable Fault	Fixed to 0
10	Major Recoverable Fault	• 0: No error • 1: Moderate error occurring
11	Major Unrecoverable Fault	• 0: No error • 1: Major error occurring
12 to 15	Extended Device Status 2	Fixed to 0

Instance service

Service code	Service	Remarks
01H	Get_Attributes_All	—
05H	Reset	When this service is received while cyclic transmission is stopped, a normal response is returned and the following operation is performed. • Stop of EtherNet/IP communications • LED test (same as at module startup) • Startup of EtherNet/IP communications When this service is received during cyclic transmission, an error response is returned.
0EH	Get_Attribute_Single	—

14.2 Message Router

Object name	Class ID
Message Router	02H

Class attribute (instance ID: 00H)

Attribute ID	Access (○: Available, ×: Not available)		Name	Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set				
1	○	×	Revision	UINT	Object revision	0001H
2	○	×	Max Instance	UINT	Maximum instance ID	0001H
3	○	×	Number of instances	UINT	Number of created instances	0001H

Class service

Service code	Service	Remarks
0EH	Get_Attribute_Single	—

Instance attribute (instance ID: 01H)

Attribute ID	Access (○: Available, ×: Not available)		Name		Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set					
1	○	×	Object List	Number	UINT	Number of supported classes in a class array	0006H
				Classes	USINT array [6]	List of supported class codes (class IDs)	• 0: 0001H • 1: 0002H • 2: 0004H • 3: 0006H • 4: 00F5H • 5: 00F6H
2	○	×	NumberAvailable		UINT	Maximum number of connections supported	0100H

Instance service

Service code	Service
0EH	Get_Attribute_Single

14.3 Connection Manager

Object name	Class ID
Connection Manager	06H

Class attribute (instance ID: 00H)

Attribute ID	Access (○: Available, ×: Not available)		Name	Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set				
1	○	×	Revision	UINT	Object revision	0001H
2	○	×	Max Instance	UINT	Maximum instance ID	0001H
3	○	×	Number of instances	UINT	Number of created instances	0001H

Class service

Service code	Service	Remarks
01H	Get_Attributes_All	When this service is executed for the class attributes, the following values are returned. • Attribute ID1: Value of attribute ID1 • Attribute ID2: Value of attribute ID2 • Attribute ID6: 0000H • Attribute ID7: 0000H
0EH	Get_Attribute_Single	—

Instance attribute (instance ID: 01H)

Attribute ID	Access (○: Available, ×: Not available)		Name	Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set				
1	○	×	Open Requests	UINT	Number of received Forward_Open services	Value on the left
2	○	×	Open Format Rejects	UINT	Number of Forward_Open services rejected due to format incompatibility	Value on the left
3	○	×	Open Resource Rejects	UINT	Number of Forward_Open services rejected due to insufficient resources	Value on the left
4	○	×	Open Other Rejects	UINT	Number of Forward_Open services rejected due to reasons other than format incompatibility and insufficient resources	Value on the left
5	○	×	Close Requests	UINT	Number of received Forward_Close services	Value on the left
6	○	×	Close Format Requests	UINT	Number of Forward_Close services rejected due to format incompatibility	Value on the left
7	○	×	Close Other Requests	UINT	Number of Forward_Close services rejected due to reasons other than format incompatibility	Value on the left
8	○	×	Connection Timeouts	UINT	Total number of connection timeouts that occurred in connections controlled by the Connection Manager	Value on the left

Instance service

Service code	Service
01H	Get_Attributes_All
0EH	Get_Attribute_Single
4EH	Forward_Close
54H	Forward_Open
5BH	Large_Forward_Open

14.4 TCP/IP Interface

Object name	Class ID
TCP/IP Interface	F5H

Class attribute (instance ID: 00H)

Attribute ID	Access (○: Available, ×: Not available)		Name	Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set				
1	○	×	Revision	UINT	Object revision	0004H
2	○	×	Max Instance	UINT	Maximum instance ID	0001H
3	○	×	Number of instances	UINT	Number of created instances	0001H
6	○	×	Maximum ID Number Class Attributes	UINT	Attribute ID number of class attribute	0007H
7	○	×	Maximum ID Number Instance Attributes	UINT	Attribute ID number of instance attribute	000DH

Class service

Service code	Service	Remarks
01H	Get_Attributes_All	When this service is executed for the class attributes, the following values are returned. • Attribute ID1: Value of attribute ID1 • Attribute ID2: Value of attribute ID2 • Attribute ID3: Value of attribute ID3 • Attribute ID4: 0000H • Attribute ID5: 0000H • Attribute ID6: Value of attribute ID6 • Attribute ID7: Value of attribute ID7
0EH	Get_Attribute_Single	—

Instance attribute (instance ID: 01H)

Attribute ID	Access (○: Available, ×: Not available)		Name		Data type	Description	Setting value (Set)/ stored value (Get)
	Get	Set					
1	○	×	Status		DWORD	Interface status	☞ Page 383 Details of interface status
2	○	×	Configuration Capability		DWORD	Interface capability flag	☞ Page 384 Details of interface capability flag
3	○	×	Configuration Control		DWORD	Interface control flag	☞ Page 384 Details of interface control flag
4	○	×	Physical Link Object	Path size	UINT	Path size of physical link object	0002H
				Path	Padded EPATH	Logical segment that identifies the physical link object	• 0: 20H • 1: F6H • 2: 24H • 3: 01H
5	○	×	Interface Configuration	IP Address	UDINT	IP address of the device	Set values of parameters
				Network Mask	UDINT	Network mask of the device	
				Gateway Address	UDINT	Default gateway address	
				Name Server	UDINT	Primary name server	00000000H
				Name Server 2	UDINT	Secondary name server	00000000H
				Domain Name	STRING	Default domain name	" " (null character)
6	○	×	Host Name		STRING	Host name	" " (null character)
8	×	×	TTL Value		USINT	TTL value for EtherNet/IP multicast packets	1 to 255
9	×	×	MCast Config	Alloc Control	USINT	IP multicast address setting	Value on the left
				Reserved	USINT	Reserved	00H
				Num Mcast	UINT	Number of IP multicast addresses to assign for EtherNet/IP	1 to 32
				Mcast Start Addr	UDINT	First multicast address from which to start assignment	Value on the left
13	○	○*1	Encapsulation Inactivity Timeout		UINT	Setting of the time until the TCP connection or DTLS session closes (unit: seconds)	• 1 to 3600 0 is invalid. (Default: 120)

*1 The setting data is saved to non-volatile memory.

■Details of interface status

Bit	Description	Value
0 to 3	Interface Configuration Status	Fixed to 2 (to set the IP address acquired from the parameter settings)
4	Mcast Pending	• 0: No changes to TTL Value and Mcast Config • 1: In the wait-for-restart state due to changes to TTL Value and Mcast Config

■Details of interface capability flag

Bit	Description	Value
0	BOOTP Client	Fixed to 0 (because the BOOTP setting is not supported)
1	DNS Client	Fixed to 0 (because the name resolution setting with DNS is not supported)
2	DHCP Client	Fixed to 0 (because IP address setting with DHCP is not supported)
3	DHCP-DNS Update	Fixed to 0 (because the host name transmitting setting with DHCP requests is not supported)
4	Configuration Settable	Fixed to 0 (because Interface Configuration attribute setting is not supported)
5	Hardware Configurable	Fixed to 1 (available for IP addresses set with parameters)
6	Interface Configuration Change Requires Reset	Fixed to 0 (because Interface Configuration attribute setting is not supported)
7	AcdCapable	Fixed to 0 (because the address duplication detection setting is not supported)
8 to 31	Reserved	Fixed to 0

■Details of interface control flag

Bit	Description	Value
0 to 3	Configuration Method	Fixed to 0 (to use IP addresses set with parameters)
4	DNS Enable	Fixed to 0 (because the name resolution setting with DNS is not supported)
5 to 31	Reserved	Fixed to 0

Instance service

Service code	Service
01H	Get_Attributes_All
0EH	Get_Attribute_Single
10H	Set_Attribute_Single

14.5 Ethernet Link

Object name	Class ID
Ethernet Link	F6H

Class attribute (instance ID: 00H)

Attribute ID	Access (○: Available, ×: Not available)		Name	Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set				
1	○	×	Revision	UINT	Object revision	0004H
2	○	×	Max Instance	UINT	Maximum instance ID	0001H
3	○	×	Number of instances	UINT	Number of created instances	0001H

Class service

Service code	Service	Remarks
01H	Get_Attributes_All	When this service is executed for the class attributes, the following values are returned. • Attribute ID1: Value of attribute ID1 • Attribute ID2: Value of attribute ID2 • Attribute ID3: Value of attribute ID3
0EH	Get_Attribute_Single	—

Instance attribute (instance ID: 01H)

Attribute ID	Access (○: Available, ×: Not available)		Name	Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set				
1	○	×	Interface Speed	UDINT	Communication speed of the current interface in use	• 100Mbps • 1000Mbps
2	○	×	Interface Flags	DWORD	Interface status flag	☞ Page 388 Details of status flag
3	○	×	Physical Address	USINT array [6]	MAC layer address	Varies between modules.

Attribute ID	Access (○: Available, ×: Not available)		Name		Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set					
4	○*2	×	Interface Counters	In Octets	UDINT	Number of octets received through the interface	Value on the left
				In Ucast Packets	UDINT	Number of unicast packets received through the interface	Value on the left
				In NUcast Packets	UDINT	Number of non-unicast packets received through the interface	Value on the left
				In Discards	UDINT	Number of receive packets received through the interface but discarded	Value on the left
				In Errors	UDINT	Number of receive packets including errors (number of packets not included in In Discards)	Value on the left
				In Unknown Protos	UDINT	Number of receive packets including unknown protocols	Value on the left
				Out Octets	UDINT	Number of octets transmitted through the interface	Value on the left
				Out Ucast Packets	UDINT	Number of unicast packets transmitted through the interface	Value on the left
				Out NUcast Packets	UDINT	Number of non-unicast packets transmitted through the interface	Value on the left
				Out Discards	UDINT	Number of discarded transmission packets	Value on the left
				Out Errors	UDINT	Number of transmission packets including errors	Value on the left

Attribute ID	Access (○: Available, ×: Not available)		Name				Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set							
5	○*2	×	Media Counters	Alignment Errors			UDINT	Number of receive frames with lengths that are not octet integers	Value on the left
				FCS Errors			UDINT	Number of receive frames that do not pass the FCS check	Value on the left
				Single Collisions			UDINT	Number of frames transmitted successfully with only one collision	Value on the left
				Multiple Collisions			UDINT	Number of frames transmitted successfully with two or more collisions	Value on the left
				SQE Test Errors			UDINT	Number of times SQE test error messages were created	0
				Deferred Transmissions			UDINT	Number of frames for which the first transmission test was delayed due to the medium being busy	Value on the left
				Late Collisions			UDINT	Number of collisions detected in packet transmission after 512 bit time or later in packet transmission	Value on the left
				Excessive Collisions			UDINT	Number of failed frames in transmission due to excessive collisions	Value on the left
				MAC Transmit Errors			UDINT	Number of frames that failed to be transmitted due to internal MAC sublayer transmission errors	Value on the left
				Carrier Sense Errors			UDINT	Number of times the carrier sense condition was lost or was not asserted during attempts to transmit frames	Value on the left
				Frame Too Long			UDINT	Number of receive frames that exceeded the maximum allowable frame size	Value on the left
				MAC Receive Errors			UDINT	Number of frames that failed to be received through interface due to internal MAC sublayer receiving errors	Value on the left
6	○	○	Interface Control	Control Bits			WORD	Interface control bits	0001H
				Forced Interface Speed			UINT	Forced interface operation speed	0000H
7	○	×	Interface Type				USINT	Interface type	02H
8	○	×	Interface State				USINT	Current interface status	01H
9	○	○	Admin State				USINT	Current administration status	01H
11	○	×	Interface Capability	Capability Bits			DWORD	Interface function other than Speed/Duplex	00000006H
				Speed/Duplex Options	Speed/Duplex Array Count		USINT	Number of Speed/Duplex arrays	00H
					Speed/Duplex Array	Interface Speed	UINT	Speed to force the interface to operate at	—
						Interface Duplex Mode	USINT	Duplex mode of the interface*1	—

Attribute ID	Access (○: Available, ×: Not available)		Name		Data type	Description	Setting value (Set)/stored value (Get)
	Get	Set					
12	○*2	×	HC Interface Counters	HCInOctets	ULINT	Number of octets received through the interface	Value on the left
				HCInUcastPkts	ULINT	Number of unicast packets received through the interface	Value on the left
				HCInMulticastPkts	ULINT	Number of multicast packets received through the interface	Value on the left
				HCInBroadcastPkts	ULINT	Number of broadcast packets received through the interface	Value on the left
				HCOutOctets	ULINT	Number of octets transmitted through the interface	Value on the left
				HCOutUcastPkts	ULINT	Number of packets transmitted through the interface	Value on the left
				HCOutMulticastPkts	ULINT	Number of multicast packets transmitted through the interface	Value on the left
				HCOutBroadcastPkts	ULINT	Number of broadcast packets transmitted through the interface	Value on the left
13	○*2	×	HC Media Counters	HCStatsAlignmentErrors	ULINT	64-bit version of Alignment Errors	Value on the left
				HCStatsFCSErrors	ULINT	64-bit version of FCS Errors	Value on the left
				HCStatsInternalMacTransmitErrors	ULINT	64-bit version of MAC Transmit Errors	Value on the left
				HCStatsFrameTooLongs	ULINT	64-bit version of Frame Too Long	Value on the left
				HCStatsInternalMacReceiveErrors	ULINT	64-bit version of MAC Receive Errors	Value on the left
				HCStatsSymbolErrors	ULINT	Number of illegal data symbols in the media when a valid carrier exists	0

*1 Arrays are displayed in combination with Interface Speed. This indicates the speed and Duplex mode supported by the module.
*2 Get_and_Clear can be used as well.

■Details of status flag

Bit	Description	Value
0	Link-up status	• 0: Link-down • 1: Link-up
1	Connection status (full-duplex/half-duplex)	• 1: Full-duplex (fixed)
2 to 4	Auto-negotiation status	• 0: Auto-negotiation being executed • 1: Auto-negotiation failed and operation in progress with the default communication speed and method • 2: Communication method detection failed, but communication speed detection succeeded • 3: Auto-negotiation completed successfully • 4: Auto-negotiation unexecuted
5	Necessity of restart after manual settings	Fixed to 0 (because manual settings are not supported)
6	Local Hardware Fault detection status	Fixed to 0 (because Local Hardware Faults are not detected)
7 to 31	Fixed value	0

Instance service

Service code	Service
01H	Get_Attributes_All
0EH	Get_Attribute_Single
10H	Set_Attribute_Single
4CH	Get_and_Clear*1

*1 Clear after obtaining the value of the specified attribute. Can be used only for attribute IDs [4, 5, 12, 13].

PART 6 TROUBLESHOOTING

This part consists of the following chapters.

15 CHECKING WITH LED

16 CHECKING THE MODULE STATUS

17 CHECKING THE NETWORK STATUS

18 TROUBLESHOOTING BY SYMPTOM

19 LIST OF ERROR CODES

20 LIST OF PARAMETER NUMBERS

21 EVENT LIST

15 CHECKING WITH LED

This chapter describes troubleshooting of the CC-Link IE TSN Plus module with LED.

When the RUN LED turns off

When the RUN LED turns off after the CC-Link IE TSN Plus module is powered on, check the following.

Check item	Action
Is the CC-Link IE TSN Plus module correctly inserted?	If not, properly mount the CC-Link IE TSN Plus module on the base unit.

If the above actions do not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 397 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 a data link faulty station displayed on the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window?	• Correct "Network Configuration Settings" and "Communication Period Setting" under "Basic Settings" of the master station in accordance with the device station actually connected. • Perform troubleshooting for when the D LINK LED turns off or is flashing in the data link faulty station. (☞ Page 391 When the D LINK LED turns off or is flashing) • When the communication speed of the data link faulty station is 100Mbps and the communication speed of the master station is 1Gbps, connect the data link faulty station to the device supporting the multicast filter and activate the multicast mode. (📖 Manual of the device used)
Is Initialization failure (parameter mismatch between master and device stations) (event code: 00C71) registered in the event history of the master station? (A mismatch of the synchronization setting and inter-module synchronization cycle may occur between the master station and device stations.)	Take the following actions for the device station with the IP address displayed in the detailed information of the event history. • For a local station, match "Fixed Scan Interval Setting of Inter-module Synchronization" in "Inter-module Synchronization Setting" in "System Parameter" to the setting on the master side. • Replace the device with a device supporting CC-Link IE TSN Class B network synchronous communication. • Match "Network Synchronous Communication" in "Network Configuration Settings" under "Basic Settings" of the master station to the synchronization setting of the device station.
Is the event code 00C81 registered in the event history?	Take the following actions for the device station with the IP address displayed in the detailed information of the event history. • Match "CC-Link IE TSN Class Setting" in "Network Configuration Settings" under "Basic Settings" of the master station to the CC-Link IE TSN Class of the device station.
Is the event code 00C72 registered in the event history?	• Update the engineering tool to the latest version. • Update the firmware of the device station whose IP address is displayed in the detailed information of the event history to the latest version.
Is the event code 00C80 registered in the event history when "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A" or "CC-Link IE TSN Class A Only"?	Take one of the following actions. • Check 'Station protocol version 2.0 support status' (SW01A0 to SW01A7), and update the firmware of all the device stations to a version that supports protocol version 2.0. Alternatively, replace the device stations with the stations that support protocol version 2.0. • For firmware version "02" or later, set 'Protocol setting' (Un\G1294018) of the master station to '1: Protocol version 1.0 fixed'. (☞ Page 518 Protocol information (Un\G1294016 to Un\G1294031)) • After powering on the device stations and the devices on the communication path, power on the master station.
Is the device station connected to P2 of the CC-Link IE TSN Plus module?	Connect the device station to P1 of the CC-Link IE TSN Plus module.

If the above actions do not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 397 Module Communication Test)

When the D LINK LED turns off or is flashing

When the D LINK LED turns off or is flashing, check the following.

Check item	Action
Is the master station operating normally?	• If an error has occurred in the CPU module on the master station, eliminate the cause of the CPU module error. (📖 MELSEC iQ-R CPU Module User's Manual (Application)) • If an error occurs in the CC-Link IE TSN Plus module on the master station, take action according to the module diagnosis procedure. (☞ Page 394 Module Diagnostics)
Is the master station connected to the network?	Connect the master station to the network.
Does the IP address of each station match the "Network Configuration Settings" under "Basic Settings" of the master station?	Correct the setting of the IP address in "Network Configuration Settings" under "Basic Settings" of the master station. • Set IP addresses in a way that does not overlap the third to fourth octets of the IP address in all stations. • Set the IP address and subnet mask to match the network addresses of all stations. • Set the third and fourth octets of the IP address to values other than all 0 or all 1. • Set the host address of the IP address to values other than all 0 or all 1. • Set an IP address other than a reserved address.
In the "Network Configuration Settings" under "Basic Settings", are the third and fourth octets of the IP address of the master station overlapped with those of any other stations?	
In the "Network Configuration Settings" under "Basic Settings", does the network address (subnet mask part) of the IP address of the master station match that of other stations?	
Are the third and fourth octets of the IP address set to all 0 or all 1?	
Is the host address of the IP address set to all 0 or all 1?	
Is a reserved address set to the IP address?	
Do the used Ethernet cables conform to the Ethernet standard?	Replace the cables with Ethernet cables which conform to the standard. (☞ Page 71 Wiring products)
Is the switching hub used operating normally?	• Use a switching hub that conforms to the standard. (☞ Page 71 Switching hub (when the system configured with CC-Link IE TSN)) • Power off and on the switching hub.
Does the station-to-station distance meet the specifications?	Set the station-to-station distance within range. (☞ Page 60 Performance Specifications of CC-Link IE TSN)
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable, and correct the bending radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Is the connection different from the one set for "Network Topology" under "Basic Settings" of the master station?	Correct the wiring according to "Network Topology" under "Basic Settings" of the master station. (☞ Page 79 Network Topology)
Has the time synchronization source station been reset?	• Since a station is temporarily disconnected after switching the time synchronization source, wait for it to return. • Avoid unnecessary disconnections or returns in a station that is the time synchronization source.
Is the time synchronization source station turned off?	
Is the time synchronization source station operating normally?	Check the manual of the module used for the time synchronization source station.
Has any other station been reset?	• Avoid unnecessary reset, since a station is disconnected while resetting. • Start other stations.
Are other stations turned off?	Power on other stations.
Are other stations connected to the CC-Link IE TSN Plus module operating normally?	• Check if the modules on the other stations are performing data link using CC-Link IE TSN/CC-Link IE Field diagnostics. (☞ Page 398 CC-Link IE TSN/CC-Link IE Field Diagnostics) • Check the operation status of modules on other stations. (📖 User's manual for the module used)
Is the IP address of another station set?	Set an IP address to a device station with no IP address set.
Is there a station with no IP address set among other stations?	
Are other disconnected stations set in the network configuration of the master station?	Set the connected device station to the network configuration of the master station.
Among other stations, is there a station not set in the network configuration of the master station?	
Is a network topology with restrictions used for connection?	Correct the wiring. (☞ Page 70 WIRING)
Are station numbers unique?	Change the overlapped station number.

Check item	Action
Is the IP address overlapped with another station?	Change the IP address of the overlapped station.
Are 121 or more device stations connected?	Change the connection of the device stations to 120 stations or less.
Do CC-Link IE TSN devices, Ethernet devices, and EtherNet/IP devices coexist on the same network line?	Correct the mixed structure of the Ethernet device. (☞ Page 26 CC-Link IE TSN SYSTEM CONFIGURATION)
Is the IP address of the device station blocked by the IP filter setting of the master station?	Correct the "IP Filter Settings" under "Application Settings". (☞ Page 87 IP Filter Settings)
Is the IP address of the master station blocked by the IP filter setting of the device station?	
Are time synchronization devices with time synchronization priority of 0 to 15 connected?	Remove time synchronization devices with time synchronization priority of 0 to 15, or change the priority setting to between 16 and 255. (📖 Manual for the time synchronization devices used)
Is the connected NZ2MHG-TSNT☐ operating normally?	Power off and on the NZ2MHG-TSNT☐.
	Set the parameters for the NZ2MHG-TSNT☐ as follows. • Enable each port of the NZ2MHG-TSNT☐. • Set the communication speed and port type to Auto. • Match the settings of the time synchronization and communication cycle of the NZ2MHG-TSNT☐ to those of the master station. • Match the VLAN setting of the master station to the VLAN setting of the device station. For the setting method, refer to the following. 📖 CC-Link IE TSN Industrial Managed Ethernet Switch User's Manual

When the L ER LED turns on

When the L ER LED turns on, check the following.

Check item	Action
Are the Ethernet cables used normally?	• Use an Ethernet cable that conforms to the standard. (☞ Page 71 Wiring products) • Set the station-to-station distance within range. (☞ Page 60 Performance Specifications of CC-Link IE TSN) • If the Ethernet cable is disconnected, reconnect it.
Is the switching hub used operating normally?	• Use a switching hub that conforms to the standard. (☞ Page 71 Switching hub (when the system configured with CC-Link IE TSN)) • Power off and on the switching hub.
Is there any source of noise near the module or cables?	Change the location of the module or cables.

When the LINK LED turns off

When the LINK LED turns off, check the following.

Check item	Action
Do the used Ethernet cables conform to the Ethernet standard?	Replace the cables with Ethernet cables which conform to the standard. (☞ Page 71 Wiring products)
Does the station-to-station distance meet the specifications?	Set the station-to-station distance within range. (☞ Page 60 Performance Specifications of CC-Link IE TSN)
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable, and correct the bending radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Is the switching hub used operating normally?	• Use a switching hub that conforms to the standard. (☞ Page 71 Switching hub (when the system configured with CC-Link IE TSN)) • Power off and on the switching hub.
Are other stations connected to the CC-Link IE TSN Plus module operating normally?	Check the manual of the module used for the other stations and take action accordingly. (📖 User's manual for the module used)
Does the communication speed of the connected device match the communication speed set in "Communication Speed"?	Connect the device with the communication speed set in "Communication Speed".
If "Communication Speed" is set to 100Mbps for the master station and local station to connect a device with a communication speed of 100Mbps, is the auto-negotiation of the device valid?	Enable the auto-negotiation of the connected device. Or, connect a device with auto-negotiation enabled.

If data sending/receiving for EtherNet/IP communications are not possible with the LINK LED for P2 turned off, check the following items.

Check item	Action
Is the STATUS LED lit in red or flashing in red?	Take the actions displayed on the window. (☞ Page 394 Module Diagnostics)
Is the Ethernet cable connected correctly?	Connect the Ethernet cable again. Use a PING test to check the connection with the EtherNet/IP device. (☞ Page 412 PING test)
Are the parameter settings correct?	Correct the following details for the settings in the "EtherNet/IP Configuration" window. • Model and name of the connected EtherNet/IP device • IP address of the connected EtherNet/IP device • Version of the registered EDS file
Are there any errors in the program?	Check whether communications are started by 'EtherNet/IP communication start request' (Un\G7340096). If not, correct the program.

If the above actions do not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 397 Module Communication Test)

When the STATUS LED turns on in red or is flashing in red

When the STATUS LED turns on in red or is flashing in red, check the following.

Check item	Action
Does any error occur in the module diagnostics?	Take the actions displayed on the window. (☞ Page 394 Module Diagnostics)

■Error status determination

The error status can be determined as follows based on the lit/flashing status of the P2 STATUS LED.

P2 STATUS LED	Error status*1	Description
On in red	Major error	An error such as hardware failure or memory failure. The module stops operating.
	Moderate error	An error that causes the EtherNet/IP communication function to stop operating, due to a reason such as a parameter error related to module operation
Flashing in red	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 STATUS LED is flashing in green

When the P2 STATUS LED is flashing in green, check the following.

Check item	Action
Have the following buffer memory values been checked? • 'Class1 communication status' (Un\G7734272 to Un\G7734319) • 'Class1 connection error status' (Un\G7734528 to Un\G7735551)	• Check the value of 'Class1 Connection Behavior Error status' (Un\G7734528 to Un\G7735551) on the engineering tool monitor (device/buffer memory batch monitor or intelligent function module monitor), and take action. (☞ Page 465 Error Codes When a Connection Error Occurs)
Has communication start processing been performed correctly with 'EtherNet/IP communication start request' (Un\G7340096)?	• Check that a value other than 0 (start request) is set for "EtherNet/IP communication start request' (Un\G7340096). • If 'EtherNet/IP communication continuation specification request' (Un\G7340104) is set to 16 (continue EtherNet/IP communication), set 'EtherNet/IP communication start request' (Un\G7340096) to 0 (stop request) and then to a value other than 0 (start request) again.

16 CHECKING THE MODULE STATUS

This section describes troubleshooting to check the status of the module by executing diagnostics and operation tests using the engineering tool.

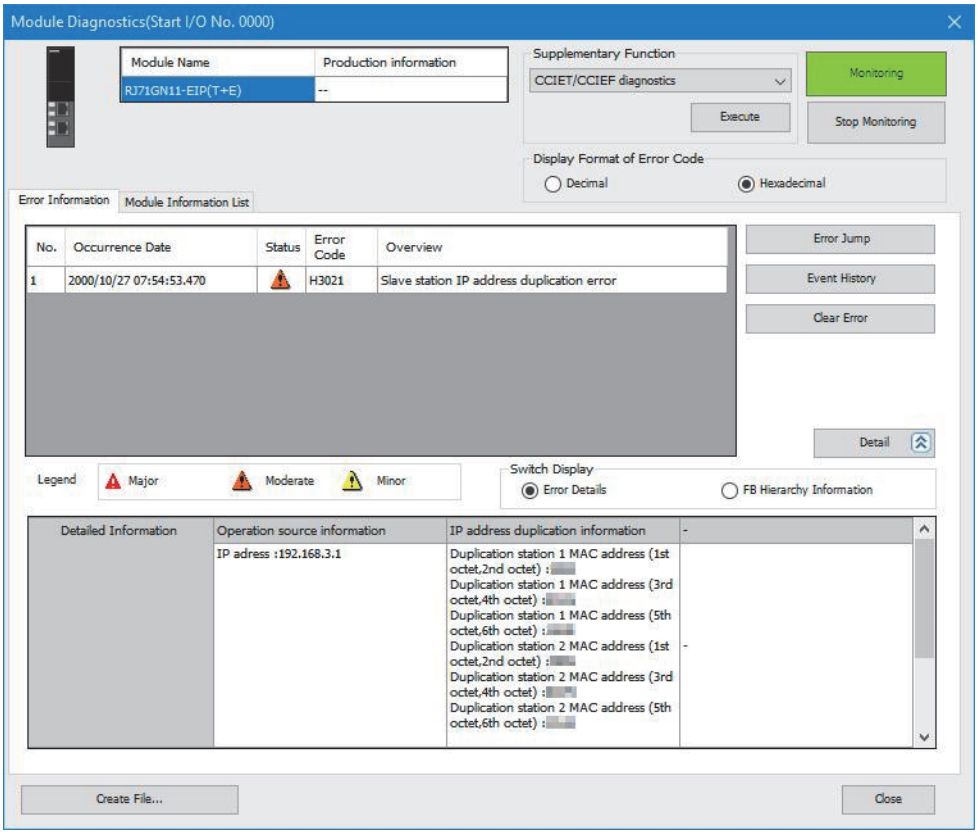
16.1 Module Diagnostics

The following can be checked in the "Module Diagnostics" window of the CC-Link IE TSN Plus module.

Item		Description
[Error Information] tab		Displays the details of the errors currently occurring and the corrective actions for these errors. "-" may be displayed in "Occurrence Data" of an error that occurred immediately after the power was turned on. To check the occurrence date, click the [Event History] button and refer to the event history.
[Module Information List] tab		Displays the LED information and individual information of the CC-Link IE TSN Plus module.
Supplementary Function	CCIET/CCIEF diagnostics	Enables checking the cause to resolve the problem when an error occurs in the CC-Link IE TSN. (☞ Page 398 CC-Link IE TSN/CC-Link IE Field Diagnostics)

Error Information

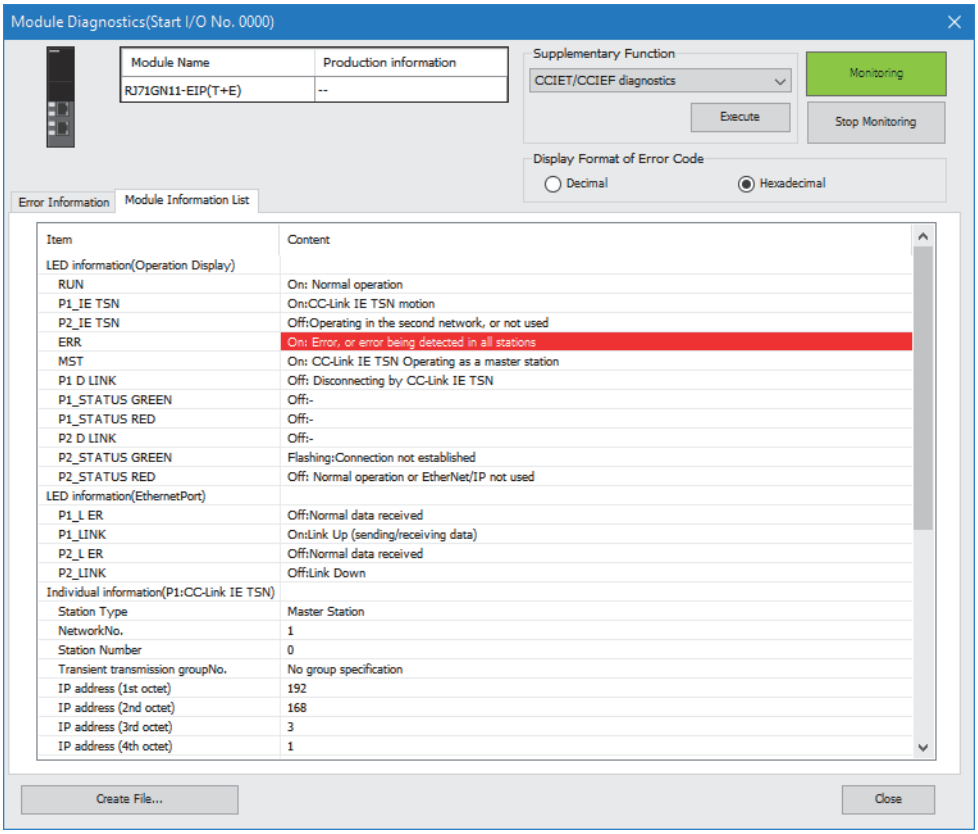
The details of the errors currently occurring and the corrective actions for these errors are displayed in the [Error Information] tab.



Item	Description
Status	Major: An error such as hardware failure or memory failure. The module stops operating.
	Moderate: An error, such as parameter error, which affects module operation. The module stops operating.
	Minor: An error such as communication failure. The module continues operating.
Error code	☞ Page 433 Error Codes When a Module Error Occurs
[Event History] button	Click this button to check the history of errors that have occurred on the network, errors detected for each module, and operations that have been executed. (☞ Page 488 EVENT LIST)
Detailed Information	Displays up to three information items for each error, such as parameter information, operation source information, and system configuration information. (☞ Page 484 LIST OF PARAMETER NUMBERS)
Cause	Displays the detailed error causes.
Corrective Action	Displays the actions to eliminate the error causes.

Module Information List

The LED information and individual information of the CC-Link IE TSN Plus module are displayed in the [Module Information List] tab.



Item		Description
LED information (Operation Display)		Displays the LED status of the CC-Link IE TSN Plus module.
LED information (EthernetPort)		
Individual information (P1: CC-Link IE TSN)	Station Type	Displays the station type set for the selected module.
	Network No.	Displays the network number set for the selected module.
	Station Number	Displays the station number set for the selected module.
	Transient transmission group No.	Displays the transient transmission group number set for the selected module.
	IP address	Displays the IP address set for the selected module.
	MAC address	Displays the MAC address of the selected module.
	Communication speed	Displays the communication speed set using the auto-negotiation function.
Individual information (P2: EtherNet/IP)	IP address	Displays the IP address set for the selected module.
	MAC address	Displays the MAC address of the selected module.
	Communication speed	Displays the communication speed set using the auto-negotiation function.

Module Communication Test

This function checks the module hardware when the communication using the CC-Link IE TSN Plus module is unstable.
The following table lists the tests performed.

Test item	Description
Internal self-loopback test	Checks whether the communication function of the module can be performed normally.
External self-loopback test	Checks whether the communication can be performed normally with the Ethernet cable connected between two connectors of the module.

Procedure

1. Set the module operation mode to module communication test mode in the following item.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Application Settings] ⇨ [Module Operation Mode]

2. Connect P1 and P2 of the CC-Link IE TSN Plus module with an Ethernet cable.
3. Write the module parameters to the CPU module.
4. Reset or power off and on the CPU module to start the module communication test.

Point

- Do not perform a module communication test while connected to another station. The operation of the other station may fail.
- While a module communication test is being performed, do not access the buffer memory. Otherwise, the module communication test may be completed with an error.

Checking the status and result

The test status and result can be checked with the LED indications of the module.

Test status	LED indication
Test in progress	The dot matrix LED displays "UCT".
Normal completion	The dot matrix LED displays "OK".
Completed with an error	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 completed with an error

The dot matrix LED indicates an error with the form of "P1 or P2_Error number".
For example, "1_3" is displayed when error No.3 occurs in P1.
If the module communication test is completed with an error, check the following.

Error number	Description	Action
1	Internal selfloopback test error	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 results in an error 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 results in an error again, please consult your local Mitsubishi representative.

17 CHECKING THE NETWORK STATUS

This section describes troubleshooting to check the status of the network by executing diagnostics and operation tests using the engineering tool.

17.1 Checking the Status of CC-Link IE TSN

CC-Link IE TSN/CC-Link IE Field Diagnostics

For CC-Link IE TSN, perform status monitoring, operation tests, or others.

Precautions

In the following cases, the CC-Link IE TSN/CC-Link IE Field diagnostics cannot start.

- The CC-Link IE TSN Plus module is not connected to CPU modules specified on the "Specify Connection Destination Connection" window.
- In CPU parameters of CPU modules specified on the "Specify Connection Destination Connection" window, "Link Direct Device Setting" of "Memory/Device Setting" is not "Extended Mode (iQ-R Series Mode)".
- "Module Operation Mode Setting" in "Application Settings" of the CC-Link IE TSN Plus module is not set to online mode.
- The error code 20E0H occurs.
- The engineering tool is not connected to a station with the same communication speed as the master station.
- The network topology of the diagnostics destination does not support the version of the engineering tool or module.

Diagnostic items

When starting the CC-Link IE TSN/CC-Link IE Field diagnostics by specifying "No Specification" in "Other Station Setting" on the "Specify Connection Destination Connection" window, the following items can be used.

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

Item		Overview	Connection destination of engineering tool		Reference
			Master station	Local station	
Status monitor	Network map	Check if any errors are being caused by the devices and cables that configure the network. In addition, check the operating status of each station.	○	○	Page 405 Network map
	Data Unlinked	Check that there is no station that is set on an actual network.	○	○	
	Selected Station Communication Status Monitor	Check details of, or actions for, errors that occurred in a selected station.	○	○	
Operation Test	Communication Test	Check whether outgoing/incoming paths of transient transmission between the own station and the communication target are correct.	○	○	Page 408 Communication Test
Information Confirmation/ Setting	Station Information List	Check information of the device stations which are performing data link in list form.	○	○	Page 409 Station Information List
Selected Station Operation	Remote Operation	Operate remotely from the engineering tool to device stations.	△*1	△*1	Page 410 Remote Operation

*1 If the setting on the "Specify Connection Destination Connection" window of the engineering tool is as follows, remote operation cannot be executed with "All Stations Specified".
Connection via Ethernet with the selections "Ethernet Board" for the personal computer-side I/F and "CC IE TSN/Field Module" for the programmable controller-side I/F

Restriction

When starting the CC-Link IE TSN/CC-Link IE Field diagnostics by specifying "Other Station (Single Network)" or "Other Station (Co-existence Network)" in "Other Station Setting" on the "Specify Connection Destination Connection" window, the following restrictions apply.

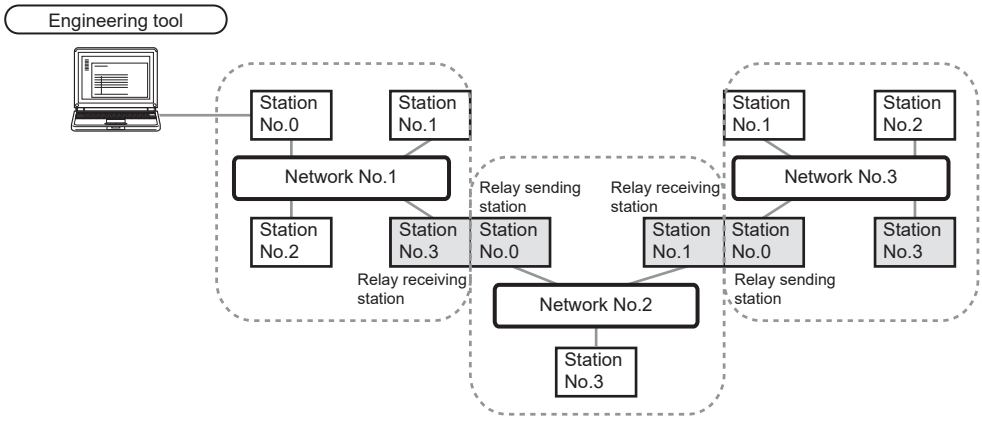
- A communication test cannot be used.
- A station information list cannot be used.
- If MELSECNET/H, multidrop connection of serial communication modules, an interface board for personal computer, a GOT (FA transparent function used), or network modules of the MELSEC-Q/L series are included in the communication path, diagnostics cannot start.

When "Other Station (Co-existence Network)" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window and "CC-Link" or "C24" is specified in "Co-existence Network Route", diagnostics cannot start.

Point

When starting the CC-Link IE TSN/CC-Link IE Field diagnostics by specifying "Other Station (Single Network)" or "Other Station (Co-existence Network)" in "Other Station Setting" on the "Specify Connection Destination Connection" window, specify the network number and station number of the relay receiving station or relay sending station for "Network No." and "Station No." in "Network Communication Route" on the "Specify Connection Destination Connection" window.

For example, to start the CC-Link IE TSN/CC-Link IE Field diagnostics of the network number 2, specify the network number 1 and station number 3, or the network number 2 and station number 0 in "Network No." and "Station No.".



- Although the CC-Link IE TSN/CC-Link IE Field diagnostics of the network to which the relay sending station belongs can be started, that of the network to which the relay receiving station belongs cannot be started.
- The CC-Link IE TSN/CC-Link IE Field diagnostics can be started for stations of up to eight networks ahead (number of relay stations: 7) including the station directly connected to the engineering tool.

Usage methods

The following describes how to use the CC-Link IE TSN/CC-Link IE Field diagnostics.

■When "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window

1. Connect the engineering tool to the CPU module.

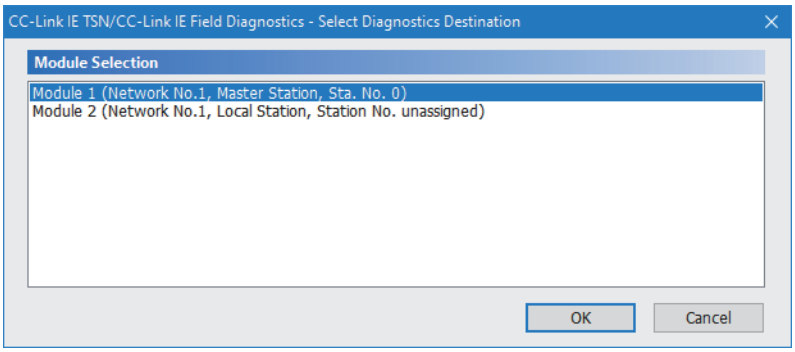
If a device station cannot be monitored due to an error such as cable disconnection, directly connect the engineering tool to the device station.

2. Start the CC-Link IE TSN/CC-Link IE Field diagnostics.

[Diagnostics] ⇨ [CC-Link IE TSN/CC-Link IE Field Diagnostics]

3. When the following window opens, select the CC-Link IE TSN Plus module to be diagnosed and click the [OK] button to start the CC-Link IE TSN/CC-Link IE Field diagnostics.

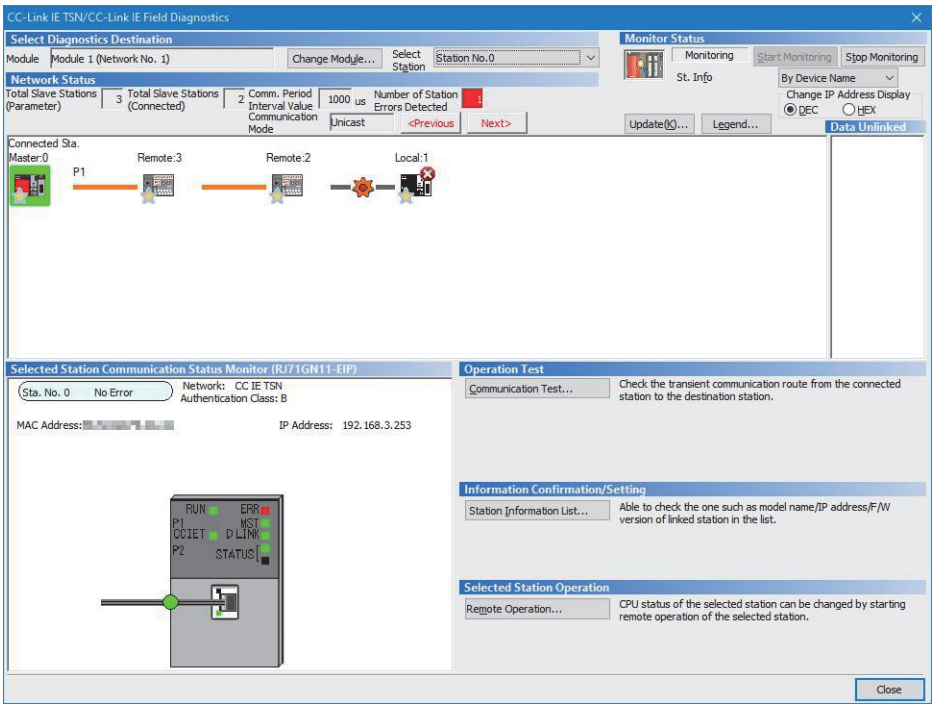
Modules are listed in the order configured in module information.



Point

When multiple CC-Link IE TSN Plus modules with the same network number are mounted on the same base unit, the module with the smallest slot number on that base unit is always diagnosed, regardless of setting.

4. Select the station to be diagnosed from "Select Station" or in the network map.



In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

- An icon indicating an error is displayed on the module icon of the station where an error occurs.
- A disconnected station that has performed data link is indicated with the "Disconnected Station" icon in the network map. However, a disconnected station in following case is displayed on the right end of the area.

Stations displayed on the right end of the area.

- A station that was reconnected to a network after disconnecting/inserting the cable or powering off and on the system, and remains disconnected
- A disconnected station with the station icon deleted in the network map by clicking the [Update] button

- The "Error" icon is displayed on the icon of a cable where a communication error occurs. To check the details of the communication error, click the neighboring stations of the "Error" icon.

Point

When the station to be diagnosed cannot be selected, the status of network number mismatch or overlap of master stations cannot be checked using the CC-Link TSN/CC-Link IE Field diagnostics. Check the error details by directly connecting the engineering tool to the station where an error occurs, and opening the "System Monitor" window.

5. The status of a station selected in "Network Status" is displayed in "Selected Station Communication Status Monitor". (☞ Page 403 "CC-Link IE TSN/CC-Link IE Field Diagnostics" window)

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

If an error occurs, a button indicating the error such as [PORT2 Communication Error] is displayed in "Selected Station Communication Status Monitor". Click the button to check the error details and actions.

6. Various tests and operations can be performed by clicking the "Operation Test" or "Selected Station Operation" on the bottom left of the window. (☞ Page 408 Communication Test, ☞ Page 410 Remote Operation)

■When a setting other than "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window

1. Connect the engineering tool to the CPU module.
2. Start the CC-Link IE TSN/CC-Link IE Field diagnostics.

[Diagnostics] ⇨ [CC-Link IE TSN/CC-Link IE Field Diagnostics]

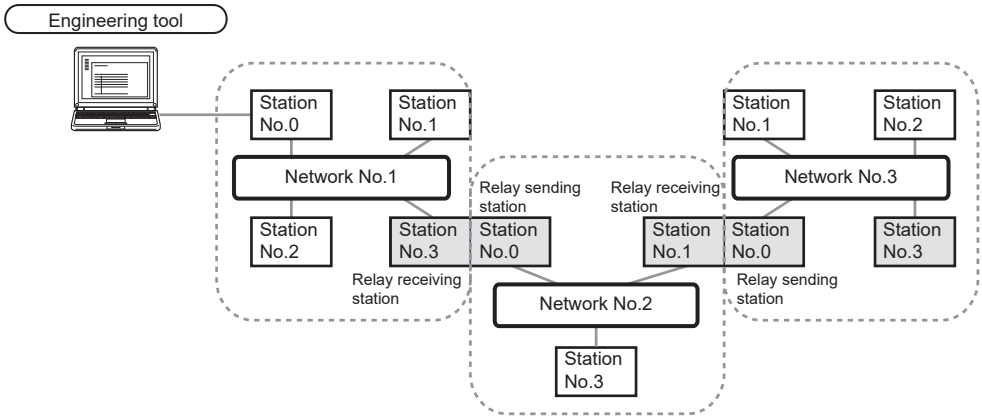
Point

The CC-Link IE TSN/CC-Link IE Field diagnostics cannot be started when "Other Station (Co-existence Network)" has been specified in "Other Station Setting" on the "Specify Connection Destination Connection" window and "CC-Link" or "C24" has been specified in "Co-existence Network Route".

3. Select the CC-Link IE TSN Plus module with the network number to be diagnosed and click the [OK] button to start the CC-Link IE TSN/CC-Link IE Field diagnostics.

Point

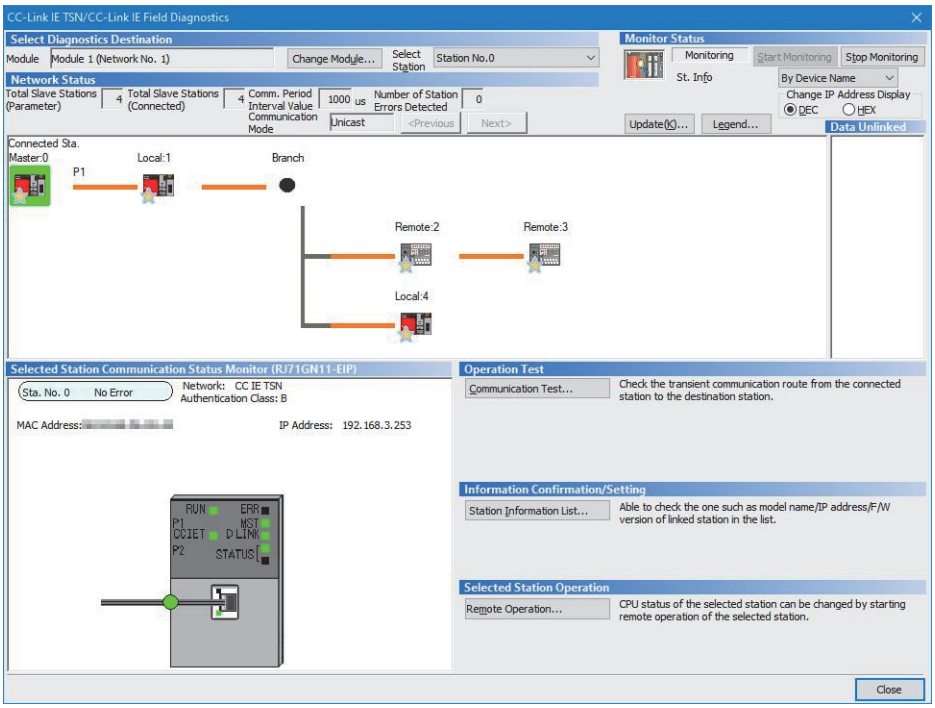
- Although the CC-Link IE TSN/CC-Link IE Field diagnostics of the network to which the relay sending station belongs can be started, that of the network to which the relay receiving station belongs cannot be started.
- To start the CC-Link IE TSN/CC-Link IE Field diagnostics, specify the network number and station number of the relay receiving station or relay sending station for "Network No." and "Station No." in "Network Communication Route" on the "Specify Connection Destination Connection" window. For example, to start the CC-Link IE TSN/CC-Link IE Field diagnostics of the network number 2, specify the network number 1 and station number 3, or the network number 2 and station number 0 in "Network No." and "Station No.".



- The CC-Link IE TSN/CC-Link IE Field diagnostics can be started for stations of up to eight networks ahead (number of relay stations: 7) including the station directly connected to the engineering tool.
- The selected station communication status monitor of the RJ72GF15-T2 cannot be executed in the CC-Link IE TSN/CC-Link IE Field diagnostics for the stations of five networks ahead (number of relay stations: 4) or later.

4. Step 4 and later is the same procedure as when "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window. (☞ Page 400 When "No Specification" is specified in "Other Station Setting" on the "Specify Connection Destination Connection" window)

"CC-Link IE TSN/CC-Link IE Field Diagnostics" window



In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

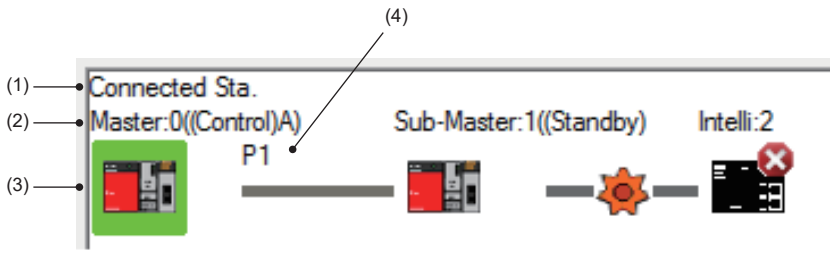
Item		Description
Select Diagnostics Destination	Module	Displays the CC-Link IE TSN Plus module being diagnosed.
	[Change Module] button	When multiple CC-Link IE TSN Plus modules are mounted, changes the CC-Link IE TSN Plus module to be diagnosed. However, when multiple CC-Link IE TSN Plus modules with the same network number are mounted on the same base unit, the module with the smallest slot number on that base unit is always diagnosed, regardless of setting.
	Select Station	Selects the station number of the station to be diagnosed. A station to be diagnosed can also be selected by clicking the module icon displayed in the network map.
Monitor Status	[Start Monitoring] button	Starts monitoring the CC-Link IE TSN/CC-Link IE Field diagnostics.
	[Stop Monitoring] button	Stops monitoring the CC-Link IE TSN/CC-Link IE Field diagnostics.
[Update] button		If the actual network configuration and network map of the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window are inconsistent, the network map update is executed so they are matched. A data link error may momentarily occur in all the stations and outputs of the connected device stations may turn off since all stations on the network will be reconnected when executing the network map update. Set output data if needed.
[Legend] button		Displays the meaning of icons displayed in the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window.
St. Info		The display name of the device station can be selected from "By Device Name", "By Station Type", "By Model Name", or "IP Address". "By Device Name" displays the information entered in "Alias" of "Network Configuration Settings" under "Basic Settings". The station type is displayed when the "Alias" is not entered.

Item		Description
Network Status	Total Linked Stations (Parameter)	Displays the total number of device stations set in "Network Configuration Settings" of "Basic Settings".
	Total Linked Stations (Connected)	Stores the total number of device stations that are actually connected by data link in the CC-Link IE TSN.
	Communication Cycle Interval Setting value	The communication cycle interval set in "Communication Period Setting" under "Basic Settings" of the master station is displayed. (μs unit)
	Number of Station Errors Detected	Indicates the number of error stations in the displayed network.
	Communication Mode	Indicates the communication mode set in "Communication Mode" under "Application Settings" of the master station.
	Change IP Address Display	Allows to select from "DEC" or "HEX" for IP address display on the selected communication status monitor and network map. (Default: Decimal)
	Network map	Indicates the CC-Link IE TSN structure and the status of each station. (☞ Page 405 Network map) If the status of each station is not displayed, check whether there are any overlaps of master stations.
	Data Unlinked	Displays a disconnected station that has been set in "Network Configuration Settings" under "Basic Settings" but has not yet performed data link. Reserved stations or error invalid stations are also included. However, even if a disconnected station had performed data link, disconnected stations in the following cases are displayed in this area. • A station that was reconnected to a network after disconnecting/inserting the cable or powering off and on the system, and remains disconnected • A disconnected station with the station icon deleted in the network map by clicking the [Update] button Displays the station number on the station icon. The "Other Modules" icon indicates a station that has not yet performed data link. Icons other than the "Other Modules" icon indicate stations that had performed data link before disconnection. For details on the displayed icon, click the [Legend] button.
Selected Station Communication Status Monitor		Status of the station selected in "Network Status" is displayed. (☞ Page 407 Selected Station Communication Status Monitor)
Operation Test	[Communication Test] button	Performs a communication test. (☞ Page 408 Communication Test)
Information Confirmation/ Setting	[Station Information List] button	Displays information of the device stations which are performing data link in list form. (☞ Page 409 Station Information List)
Selected Station Operation	[Remote Operation] button	Performs remote operation (such as RUN, STOP, or RESET operations) to the CPU module. (☞ Page 410 Remote Operation)

Network map

■Icon

The module type and station number are displayed with an icon.

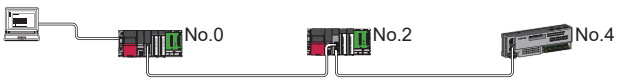
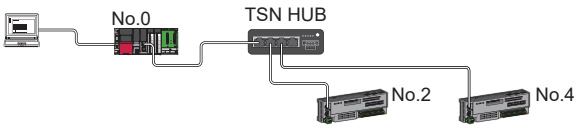
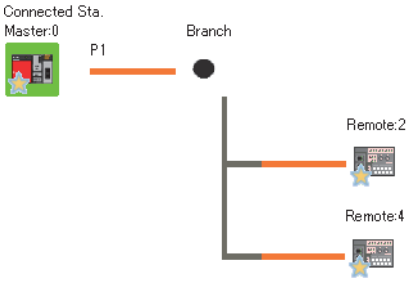
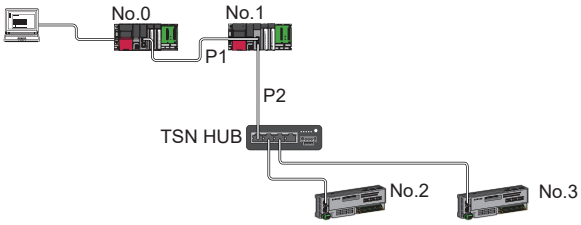
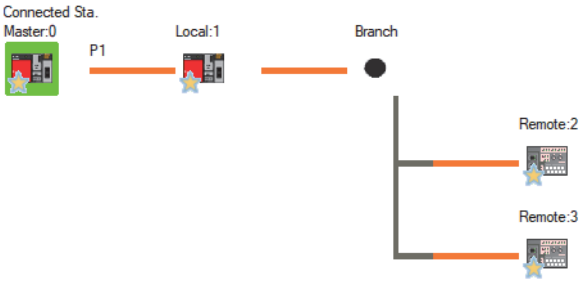


- Click: Selection
- Right-click: Executes tests or debugging.
- ↑ ↓ ← → keys on the keyboard: Move the focus to the module to be diagnosed, and determine it with the Space key.

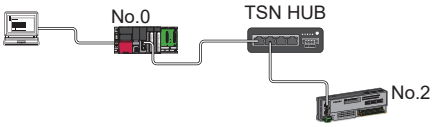
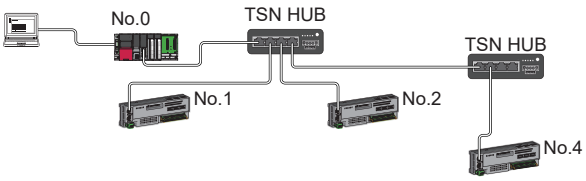
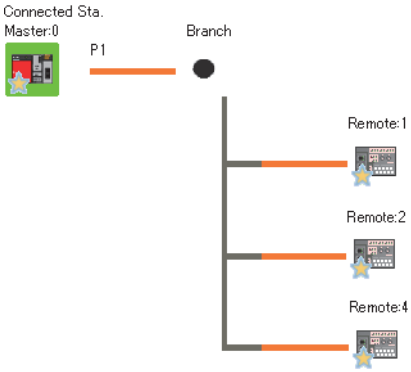
No.	Description
(1)	Displays the station (own station) where the engineering tool is connected.
(2)	Displays the station type and station number. "?" is displayed when a station number has not been set. When the background of the text if colored, the relevant station may have been set as a reserved station or an error invalid station. Click the [Legend] button to check the meaning of the background colors.
(3)	Module status is displayed. Click the [Legend] button to check the meaning of the icon. When the "Error (Illegal ring connection detected)" icon is displayed, take actions displayed in "Troubleshooting" of "Error details". (☞ Page 407 Selected Station Communication Status Monitor)
(4)	P1 or P2 to which an Ethernet cable is connected is displayed.

■Network map

A network map is displayed according to the connection status.

Connection status	Display of the network map
Line topology 	
Star topology 	
Coexistence of line and star topologies 	

In the following cases, the network map is displayed differently from the actual connection status.

Connection status	Display of the network map
Two stations are connected through a switching hub. 	Branches are not displayed in the network map. 
Switching hubs are in cascade connection. 	Only one branch is displayed. 

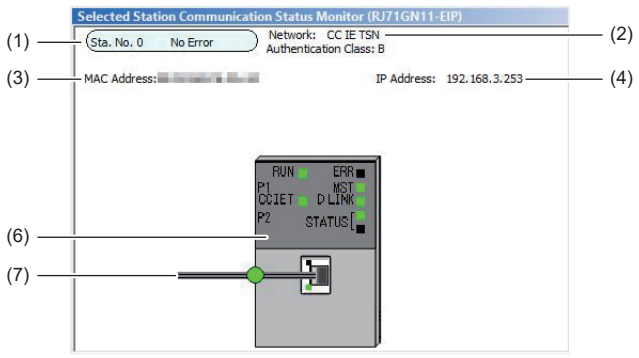
■Precautions

- Stations in offline mode are not displayed in the network map. In line topology, stations connected after a station in offline mode are not displayed because they are disconnected.
- If a station whose connection information cannot be obtained exists in a line topology, the network map will be displayed as a star topology.

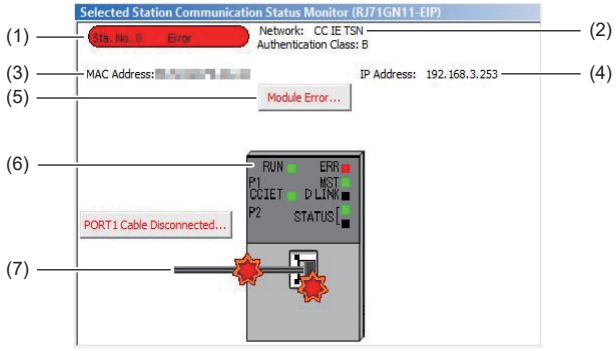
Selected Station Communication Status Monitor

Displays status of the station selected in "Network Status".

■Normal operation



■Error status



In this manual, "Authentication Class" is described as "CC-Link IE TSN Class".

No.	Description
(1)	Indicates the station number and operating status. ■Normal operation • Station number No error (light blue): Normal operation ■Error status • Station number Error (yellow): Error (Data link is continued) • Station number Error (red): Error (Data link is stopped)
(2)	Displays the network type.
(3)	Displays the MAC address of P1.*1
(4)	Displays the IP address of P1.
(5)	Click this button to check error details. Take actions following the description displayed in "Error Factor" and "Troubleshooting".
(6)	The LED status of a module and communication status of P1 is displayed. (☞ Page 66 PART NAMES)
(7)	The status of the Ethernet cable connected to P1 is displayed.

*1 When 00-00-00-00-00-00 is displayed as a MAC address, the status of the selected station cannot be checked with the selected station communication status monitor. Check the error details by directly connecting the engineering tool to the station where an error occurs, and opening the "System Monitor" window.

■When a selected station is not available for communication status monitor

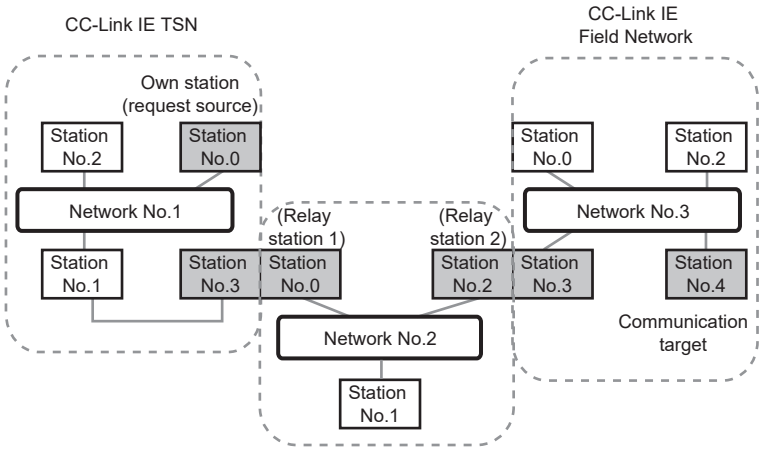
The information of devices are not displayed. The "Error details" window (detailed information, error factor, troubleshooting) is displayed.

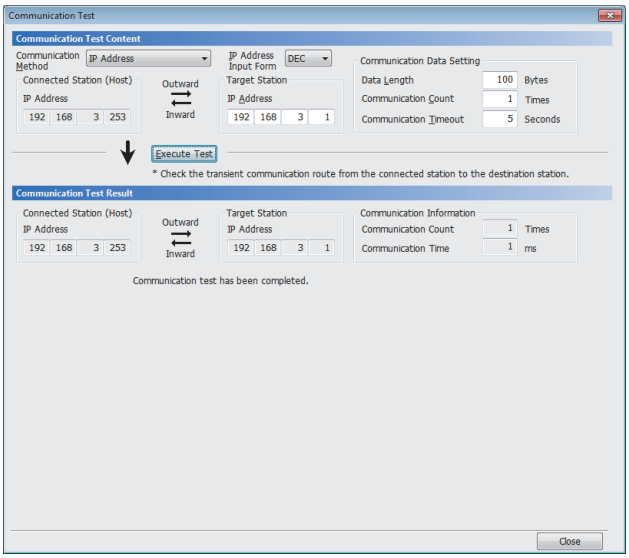
Communication Test

This function checks if transient transmission data can be properly routed from the own station to the communication target. Depending on selection for "Communication Method" ("Network No./Station No." or "IP Address"), the range that can be checked may vary.

Selection of "Communication Method"	Communication target of transient transmission	
	Stations on the same network	Stations on the other network
Network No./Station No.	○ Available for check	○ Available for check (relay stations to be transmitted through can also be checked)
IP Address	○ Available for check	× Not available for check

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





1. Display the "Communication Test" window and select "Network No./Station No." or "IP Address" from "Communication Method".

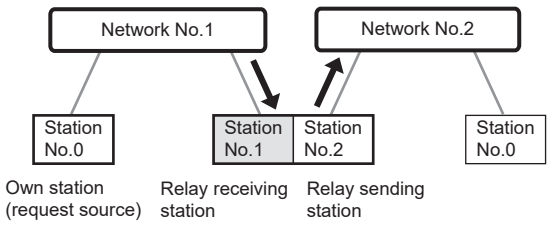
   [Diagnostics] ⇨ [CC-Link IE TSN/CC-Link IE Field Diagnostics] ⇨ [Communication Test] button

2. Enter values for "Target Station" and "Communication Data Setting".

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

Precautions

- When a relay sending station is set to "Target Station", the communication test ends with an error. Set a relay receiving station to "Target Station".

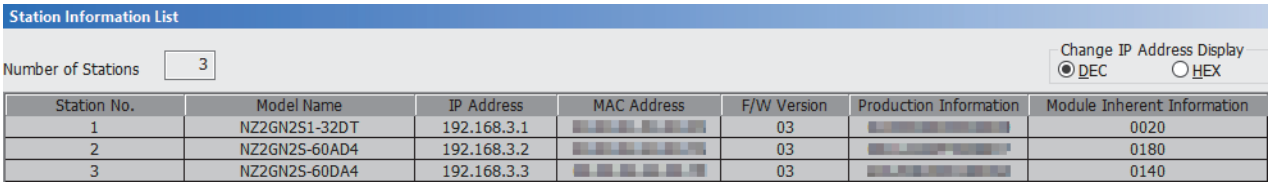


- When "Network No./Station No." is selected for "Communication Method" and a station mounted on the same base unit (main base unit and extension base unit) is set to "Target Station", the communication test ends with an error.
- Whether or not transient transmission can be executed from the connected station (own station) to a station in another network by specifying an IP address cannot be checked.
- Since this function uses PING, a communication test target station communication error (error code D919H) occurs if the communication target does not respond to PING. When executing this function, check if the security setting (such as firewall) of the communication target is set to respond to PING. Moreover, if the target is set not to respond to PING in the security settings (such as a firewall), it may take some time until a timeout error occurs on the engineering tool. For details on when communication using the engineering tool is not allowed in the settings of Windows Firewall, refer to the following.

GX Works3 Operating Manual

Station Information List

The station information list displays information of the device stations which are performing data link in list form.



Item	Description
Number of Stations	Displays the number of device stations to be displayed in the station information list.
Change IP Address Display	Select an IP address display format.
Station No.	Displays the station number of the device station.
Model Name	Displays the model name of the device station.
IP Address	Displays the IP address of the device station.*1
MAC Address	Displays the MAC address of the device station.*1
F/W Version	Displays the firmware version of the device station.
Production Information	Displays the production information of the device station.
Module Inherent Information	Displays the module-specific information of the device station.

*1 When the CC-Link IE TSN Plus module is connected as a device station, information of P1 is displayed.

Point

- The station information list displays only the device stations which are performing data link.
- If the engineering tool does not have information of the device station, "—" is displayed for each item.
- If the relevant device station is an unsupported module, "Other Modules" is displayed.

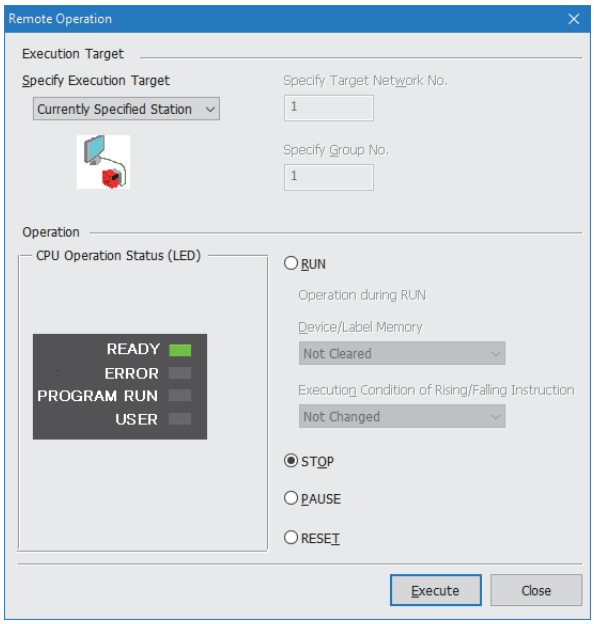
Remote Operation

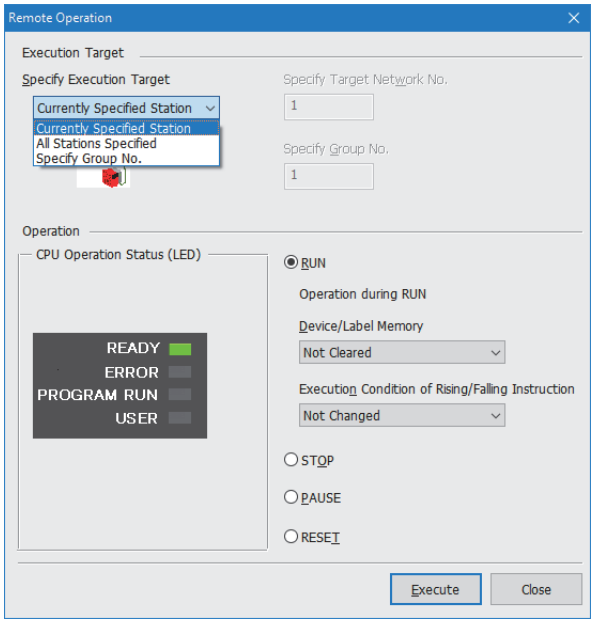
This function executes remote operations (such as RUN, STOP, and RESET operations) to the station selected on the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window, from the engineering tool. (Remote operation for device stations is available only for RESET.)

The displayed window varies depending on the station selected. For the operations with a module other than the CC-Link IE TSN Plus module selected, refer to the manual for the module used.

Procedure

To perform remote operations, follow the steps below.





1. Select the module where the remote operations are performed in the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window.
2. Click the [Remote Operation] button in the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window, or right-click a module icon in the "Network Status" and click [Remote Operation].

The "Remote Operation" window is displayed.

3. Specify the target station in "Specify Execution Target".
   - "Currently Specified Station": The remote operations are performed only to the CPU module on the station selected in the CC-Link IE TSN/CC-Link IE Field diagnostics.
   - "All Stations Specified": Remote operations are performed on all stations under "Specify Target Network No.".
   - "Specify Group No.": Among the stations for which a transient transmission group number has been set, remote operations are performed only on the stations that are selected in "Specify Group No.".
4. Select a remote operation (RUN, STOP, PAUSE, or RESET) to the CPU module to be performed in "Operation".*1
5. Click the [Execute] button to perform the remote operation.

*1 To perform remote RESET, set "Remote Reset Setting" under "Operation Related Setting" of "CPU Parameter" to "Enable" in advance.

Point

For details on the remote operations, refer to the user's manual for the CPU module used.

17.2 Checking the Status of EtherNet/IP

Use "intelligent function module monitor" or "device/buffer memory batch monitor" of the engineering tool to check the status of the Class1 communications network.

Intelligent function module monitor

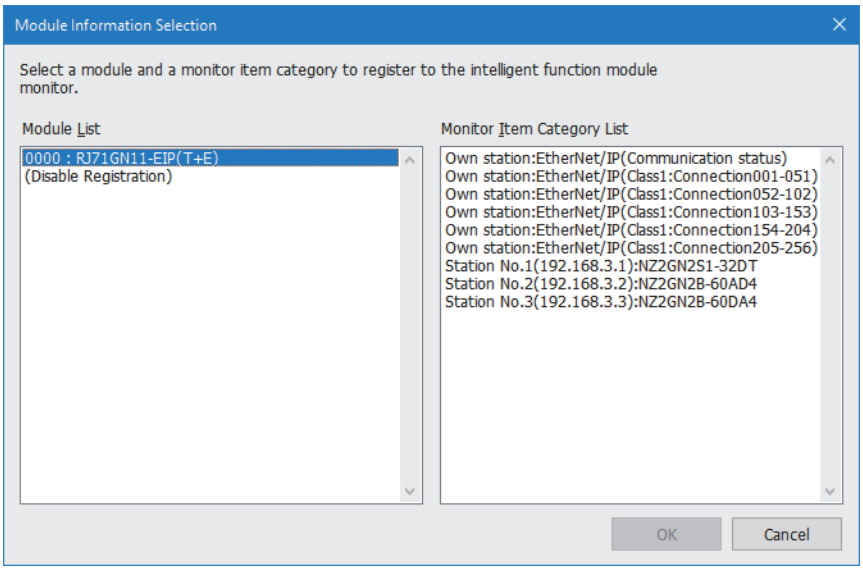
Use "intelligent function module monitor" of the engineering tool to check the communication status of the Class1 communications.

For details, refer to the following.

GX Works3 Operating Manual

1. Register a CC-Link IE TSN Plus module in the intelligent function module monitor to display the following window (module information selection).

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-EIP(T+E)] ⇨ Right-click ⇨ [Register to Intelligent Function Module Monitor]



2. From "Monitor Item Category List", select the target item for monitoring, and click the [OK] button to display the intelligent function module monitor. The following table lists the content of each item in "Monitor Item Category List".

Monitor Item Category List	Description
Own station: EtherNet/IP (Communication status)	Displays the EtherNet/IP communication status, such as intelligent auto refresh status and EtherNet/IP communication control.
Own station: EtherNet/IP (Class1: Connection 001-051)	Displays information such as Class1 input/output, communication status, and connection information, for connection setting numbers 001 to 051.
Own station: EtherNet/IP (Class1: Connection 052-102)	Displays information such as Class1 input/output, communication status, and connection information, for connection setting numbers 052 to 102.
Own station: EtherNet/IP (Class1: Connection 103-153)	Displays information such as Class1 input/output, communication status, and connection information, for connection setting numbers 103 to 153.
Own station: EtherNet/IP (Class1: Connection 154-204)	Displays information such as Class1 input/output, communication status, and connection information, for connection setting numbers 154 to 204.
Own station: EtherNet/IP (Class1: Connection 205-256)	Displays information such as Class1 input/output, communication status, and connection information, for connection setting numbers 205 to 256.
Station number (IP address): Module model name (Example: Station No.4 (192.168.3.1): NZ2GN2B1-32DT)	Displays information of the device station added in the CC-Link IE TSN configuration when the CC-Link IE TSN at port 1 is a master station.

Device/buffer memory batch monitor

The status of the Class1 communication connections and the error details can be checked with the following buffer memory areas.

- 'Class1 data link status' (Un\G7734272 to Un\G7734287)
- 'Class1 error status' (Un\G7734288 to Un\G7734303)
- 'Class1 connection error status' (Un\G7734528 to Un\G7735551)

■Status of each connection

The connection status of each connection can be checked with the bit corresponding to each connection in 'Class1 data link status' (Un\G7734272 to Un\G7734287) and 'Class1 error status' (Un\G7734288 to Un\G7734303).

'Class1 data link status' (Un\G7734272 to Un\G7734287)	'Class1 error status' (Un\G7734288 to Un\G7734303)	Status of each connection
Off	Off	Not connected or data link not in operation.
On	Off	Data link in operation. No error has occurred.
Off	On	Error has occurred with data link not in operation.

For details on the buffer memory, refer to the following.

☞ Page 534 Class1 communication status

■Error details of each connection

The error code of each connection can be checked with 'Class1 connection error status' (Un\G7734528 to Un\G7735551).

For details on the buffer memory, refer to the following.

☞ Page 535 Class1 connection error status (Un\G7734528 to Un\G7735551)

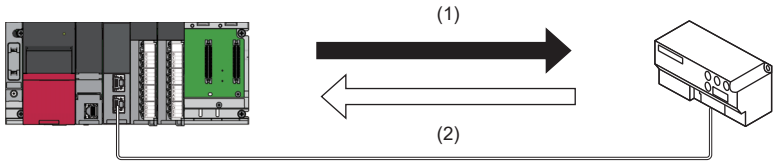
For error code descriptions, refer to the following.

☞ Page 465 Error Codes When a Connection Error Occurs

PING test

A PING test is used to check that an EtherNet/IP device exists on the same EtherNet/IP network.

The CC-Link IE TSN Plus module transmits a packet to the EtherNet/IP device to check its existence (an echo request). Then, the CC-Link IE TSN Plus module checks whether communication is possible by seeing whether a response (an echo response) is returned.



(1) Echo request
(2) Echo response

■Check method

Execute a PING test by operating a program that uses the buffer memory.

For the program example of PING tests, refer to the following.

☞ Page 370 Program Example of PING Test

■Checking the result

The result of a PING test can be checked with 'PING test response area' (Un\G7340052 to Un\G7340064). (☞ Page 464 Error codes when a PING test error occurs)

18 TROUBLESHOOTING BY SYMPTOM

This chapter describes troubleshooting when a data link cannot be performed with the target station regardless of no error occurring in the CC-Link IE TSN Plus module.
If an error has occurred in the CC-Link IE TSN Plus module, identify the error cause using the engineering tool. (☞ Page 398 CHECKING THE NETWORK STATUS)

Troubleshooting Related to CC-Link IE TSN

Item	Reference
Cyclic transmission failed	Page 414 Cyclic transmission failed
Transient transmission failed	Page 417 Transient transmission failed
Station is disconnected from the network	Page 419 Station is disconnected from the network
Station is repeatedly disconnected and reconnected	Page 420 Station is repeatedly disconnected and reconnected
Communications are unstable	Page 421 Communications are unstable
SLMP communications failed	Page 421 SLMP communications failed
The control CPU of the local station cannot be synchronized time	Page 421 The control CPU of the local station cannot be synchronized time
Communications with Ethernet devices failed	Page 422 Communications with Ethernet devices failed
Although the data link is normal, communications for the link device failed	Page 423 Although the data link is normal, communications for the link device failed
Desynchronization with CC-Link IE TSN network synchronous communication function	Page 424 Desynchronization with CC-Link IE TSN network synchronous communication function
Cannot be monitored using the CC-Link IE TSN Communication Software	Page 424 Cannot be monitored using the CC-Link IE TSN Communication Software
Data is not displayed correctly in the "CC-Link IE TSN/CC-Link IE Field Diagnostics"	Page 424 Data is not displayed correctly in the "CC-Link IE TSN/CC-Link IE Field Diagnostics"
A CC-Link IE TSN Class A device does not perform data link	Page 425 A CC-Link IE TSN Class A device does not perform data link
Cannot communicate using socket communications	Page 427 Cannot communicate using socket communications

Troubleshooting Related to EtherNet/IP

Item	Reference
Communications with EtherNet/IP devices failed	Page 428 Communications with EtherNet/IP devices failed
Tag communications failed	Page 429 Tag communications failed
Class1 tag communications failed	Page 429 Class1 tag communications failed
UCMM tag communications failed	Page 429 UCMM tag communications failed
Class3 tag communications failed	Page 430 Class3 tag communications failed
Instance communications or message communications failed	Page 430 Instance communications or message communications failed
Class1 instance communications failed	Page 431 Class1 instance communications failed
UCMM message communications failed	Page 431 UCMM message communications failed
Class3 message communications failed	Page 431 Class3 message communications failed
EtherNet/IP devices cannot be detected	Page 432 EtherNet/IP devices cannot be detected

18.1 Troubleshooting Related to CC-Link IE TSN

Cyclic transmission failed

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

Check item		Action
Is the D LINK LED of the CC-Link IE TSN Plus module turned on?		Perform troubleshooting for when the D LINK LED turns off or is flashing. (☞ Page 391 When the D LINK LED turns off or is flashing)
Do the station types set in "Network Configuration Settings" under "Basic Settings" of the master station match those set for the connected device stations?		Check 'Station type match status of each station' (SB00E8) and 'Station type match status' (SW00E8 to SW00EF) to correct the station type of stations in which the station type does not match.
Is a dedicated TSN hub used?		• Correct the used switching hub and the switching hub settings. For the setting method, refer to the manual for the switching hub used. • When using a TSN hub, check the precautions and restrictions for system configuration on the CC-Link Partner Association website (www.cc-link.org). • Correct the switching hub delay time according to the switching hub used. (☞ Page 568 Communication cycle intervals) For the switching hub delay time, refer to the manual for the switching hub used.
When "Communication Speed" under "Application Settings" of the master station is set to "100Mbps", is "System Reservation Time" in "Communication Period Setting" under "Basic Settings" of the master station set to 20μs?		Set "System Reservation Time" to 200μs.
Is "— — —" displayed on the dot matrix LED of the CC-Link IE TSN Plus module?		Set the module parameters.
When "Connection Device Information" under "Basic Settings" of the master station is set to "CC-Link IE TSN Class B Only"	Are CC-Link IE TSN Class A devices connected?	• Check the connected device and disconnect the CC-Link IE TSN Class A devices. • When connecting a CC-Link IE TSN Class A device, set "Connection Device Information" of the master station to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only".
	Is a general-purpose hub connected between CC-Link IE TSN Class B devices?	Check the connected device and disconnect the general-purpose hub or replace it with a TSN hub.
When "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only"	Are nine or more CC-Link IE TSN Class B devices and TSN hubs connected in total to each port of the master station in the transmission path from the master station to the CC-Link IE TSN Class B device of the end?	Check the connected devices and reduce the number of CC-Link IE TSN Class B devices and TSN hubs to eight or less in total for each port of the master station in the transmission path from the master station to the CC-Link IE TSN Class B device of the end.
	Is a CC-Link IE TSN Class B device other than the master station connected in a star topology via a general-purpose hub?	• Other than the master station, do not connect CC-Link IE TSN Class B devices to a general-purpose hub in the star topology. • Connect CC-Link IE TSN Class B devices to a TSN hub.
	Is a CC-Link IE TSN Class B device connected to the master station via a general-purpose hub?	• Check the connected device and connect the master station to CC-Link IE TSN Class B devices in a line topology without using a general-purpose hub. • Check the connected device and connect the master station and CC-Link IE TSN Class B devices to a TSN hub.
	In multicast mode, is the CC-Link IE TSN Class A remote station connected to the master station?	• Connect the CC-Link IE TSN Class A remote station to a local station or remote station supporting the multicast filter. • Set unicast mode.
	In multicast mode, is the CC-Link IE TSN Class A remote station connected to a local station or remote station that does not support the multicast filter?	
	In multicast mode, are a local station and a CC-Link IE TSN Class A remote station connected on the end side via a switching hub?	• Configure settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the CC-Link IE TSN Class A remote station. • Check the connected device and do not connect both a local station and a CC-Link IE TSN Class A remote station on the end side of the switching hub. • Set unicast mode.
	Is an Ethernet device connected to places other than the end of the network?	Check the connected device and connect the Ethernet device at the end of the network.
	Does the connected switching hub support the CC-Link IE TSN Class used?	Use the switching hubs that support "CC-Link IE TSN Class Setting" set to the master station. For the models and usage methods of the switching hubs, refer to the CC-Link Partner Association website (www.cc-link.org).
	■For firmware version "02" or later Is the event code 00C81 registered in the event history?	Change "CC-Link IE TSN Class Setting" under "Network Configuration Settings" or "CC-Link IE TSN Class Setting" on the device station side so that "CC-Link IE TSN Class Setting" for each station match.

Check item			Action
When "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only"	If the device stations being used support protocol version 2.0, is a master station that does not support protocol version 2.0 being used?		Update the master station firmware to a version that supports protocol version 2.0. Alternatively, replace the master station with a master station that supports protocol version 2.0.
	■When connected devices are protocol version 2.0 Is the event code 00C80 registered in the event history?		Take one of the following actions. • Check 'Station protocol version 2.0 support status' (SW01A0 to SW01A7), and update the firmware of all the device stations to a version that supports protocol version 2.0. Alternatively, replace the device stations with stations that support protocol version 2.0. • For firmware version "02" or later, set 'Protocol setting' (Un\G1294018) of the master station to '1: Protocol version 1.0 fixed'. (☞ Page 518 Protocol information (Un\G1294016 to Un\G1294031)) • After powering on the device stations and the devices on the communication path, power on the master station.
	■When connected devices are protocol version 2.0 Is '2: Operating with the protocol version 2.0' stored in 'Protocol operating status' (Un\G1294016)?	Is information on stations that do not support the protocol version 2.0 stored in 'Station protocol version 2.0 support status' (SW01A0 to SW01A7)?	Take one of the following actions. • Check 'Station protocol version 2.0 support status' (SW01A0 to SW01A7), and update the firmware of all the device stations to a version that supports protocol version 2.0. Alternatively, replace the device stations with stations that support protocol version 2.0. • For firmware version "02" or later, set 'Protocol setting' (Un\G1294018) of the master station to '1: Protocol version 1.0 fixed'. (☞ Page 518 Protocol information (Un\G1294016 to Un\G1294031)) • After powering on the device stations and the devices on the communication path, power on the master station.
	■When connected devices are protocol version 2.0 Is '1: Operating with the protocol version 1.0' stored in 'Protocol operating status' (Un\G1294016)?	Is information on stations that do not support the protocol version 2.0 stored in 'Station protocol version 2.0 support status' (SW01A0 to SW01A7)?	Check 'Station protocol version 2.0 support status' (SW01A0 to SW01A7), and update the firmware of all the device stations to a version that supports protocol version 2.0. Alternatively, replace the device stations with stations that support protocol version 2.0.
		Is a CC-Link IE TSN Class A device that supports protocol version 2.0 connected to a general-purpose hub?	Check whether the device connected to a general-purpose hub. When connecting a CC-Link IE TSN Class A device to a general-purpose hub, set the VLAN function of the general-purpose hub to "Disabled".
		Are nine or more CC-Link IE TSN Class B devices and TSN hubs connected in total to each port of the master station in the transmission path from the master station to the CC-Link IE TSN Class B device of the end?	Check the connected devices and reduce the number of CC-Link IE TSN Class B devices and TSN hubs to eight or less in total for each port of the master station in the transmission path from the master station to the CC-Link IE TSN Class B device of the end.
		Does the cyclic data size exceed 2K bytes in total for CC-Link IE TSN Class A devices connected to a CC-Link IE TSN Class B device except for the master station? (Including when a CC-Link IE TSN Class B device is connected via a general-purpose hub)	• Connect to CC-Link IE TSN Class B devices via NZ2MHG-TSNT□. (When connecting via a general-purpose hub, change the general-purpose hub to NZ2MHG-TSNT□.) • Restrict the number of connected stations so that the cyclic data size of the CC-Link IE TSN Class A devices does not exceed 2K bytes in total. • Connect the CC-Link IE TSN Class A devices to the master station.
	■When connected devices are protocol version 2.0 Is there any difference between the CC-Link IE TSN Class B/A mixed system configuration and the "TSN HUB Setting" in "Connection Device Information" under "Basic Settings"?		For details, refer to the following. ☞ Page 425 A CC-Link IE TSN Class A device does not perform data link

Check item		Action
When "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only"	■When connected devices are protocol version 2.0 If "CC-Link IE TSN Class Setting" of the general CC-Link IE TSN module added to the station list in the "CC-Link IE TSN Configuration" window is CC-Link IE TSN Class A, are the minimum values of the communication cycle interval and the cyclic transmission time set to "Communication Period Interval Setting" and "Cyclic Transmission Time" in "Communication Period Setting" under "Basic Settings"?	Select the actual device to be used from "Module List" in the "CC-Link IE TSN Configuration" window and add it to the list of stations, or refer to the manual for the device to be connected to check the maximum response time for the time managed polling method and set the calculated values for the communication period interval and cyclic transmission time.
	Is the event code 00C72 registered in the event history?	• Update the version of the engineering tool to the latest version. • Update the firmware of the device station whose IP address is displayed in the detailed information of the event history to the latest version.
	■For firmware version "01" Is a CC-Link IE TSN Class A device that supports the CANopen profile with the protocol version 2.0 connected?	Update the firmware version of the master station to "02" or later.
If the stations are connected in a line topology, do "Communication Speed" for the stations match one another?		Correct "Communication Speed" under "Application Settings" for the stations so that the communication speeds match one another.
Is there any reason why cyclic transmission cannot be performed on the device station side?		• Check if an error has occurred on the device station. • Check if the device station settings and parameters are correct. • Refer to the manual of the device station for troubleshooting.
Is the event code 00C44 registered in the event history?		Match the communication speed of the master station to the communication speed of the station for which the device station parameter automatic setting is to be configured.
In multicast mode, are a local station and a CC-Link IE TSN Class A remote station connected on the end side via a switching hub?		• Configure settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the CC-Link IE TSN Class A remote station. • Check the connected device and do not connect both a local station and a CC-Link IE TSN Class A remote station on the end side of the switching hub. • Set unicast mode.
Is the minimum value for communication cycle interval set to both "Communication Period Interval Setting" and "Cyclic Transmission Time" in "Communication Period Setting" under "Basic Settings" of the module parameter?		Set "Cyclic Transmission Time" to a value obtained by the following formula: Minimum value of cyclic transmission time + Greatest value among the two values shown below. • 10% of the calculated minimum cyclic transmission time • When the communication speed of the master station is set to 1Gbps: Number of device stations × 2μs • When the communication speed of the master station is set to 100Mbps: Number of device stations × 20μs
In multicast mode, has an external device sent a frame to a station before data link establishment of all stations?		Ensure that the external device will not send a frame before data link establishment of all stations, then reset the master station.
When "Communication Speed" of the master station is 1Gbps, has the cyclic data size exceeded 2K bytes in total for all device stations on the CC-Link IE TSN Class B device side with the communication speed of 100Mbps at the boundary between CC-Link IE TSN Class B devices (except for the master station) with the communication speed of 1Gbps and CC-Link IE TSN Class B device with the communication speed of 100Mbps?		• Restrict the number of the connected stations so that the cyclic data size of the devices with communication speed of 100Mbps does not exceed 2K bytes in total. • Connect the device with communication speed of 100Mbps to the master station.
Is the device station connected to P2?		Connect the device station to P1.

If the above actions do not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 397 Module Communication Test)

Transient transmission failed

The following lists the actions to be taken if transient transmission cannot be performed with the target station, and the engineering tool cannot perform monitoring.

Check item		Action
Is the D LINK LED on the CC-Link IE TSN Plus module flashing or turned on?		If turned off, perform troubleshooting for when the D LINK LED turns off or is flashing. (☞ Page 391 When the D LINK LED turns off or is flashing)
Is the data link status of the target station normal?		In the CC-Link IE TSN/CC-Link IE Field diagnostics, identify the cause of the error and take action. (☞ Page 398 CC-Link IE TSN/CC-Link IE Field Diagnostics)
Is the following control data of the module FB or dedicated instruction correct? • CPU type of the target module • Target network number • Target station number		Correct the control data of the module FB or dedicated instruction.
Is the network number overlapped on the network?		Change the overlapped network number.
Are multiple link dedicated instructions with the same channel setting executed simultaneously?		• Set a different channel to each instruction. • Shift the execution timing of the link dedicated instructions.
Is "— — —" displayed on the dot matrix LED of the CC-Link IE TSN Plus module?		Set the module parameters.
When "Connection Device Information" under "Basic Settings" of the master station is set to "CC-Link IE TSN Class B Only"	Are CC-Link IE TSN Class A devices connected?	• Check the connected device and disconnect the CC-Link IE TSN Class A devices. • When connecting a CC-Link IE TSN Class A device, set "Connection Device Information" of the master station to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only".
	Is a general-purpose hub connected between CC-Link IE TSN Class B devices?	Check the connected device and disconnect the general-purpose hub or replace it with a TSN hub.
When "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only"	Are nine or more CC-Link IE TSN Class B devices and TSN hubs connected in total to each port of the master station in the transmission path from the master station to the CC-Link IE TSN Class B device of the end?	Check the connected devices and reduce the number of CC-Link IE TSN Class B devices and TSN hubs to eight or less in total for each port of the master station in the transmission path from the master station to the CC-Link IE TSN Class B device of the end.
	Is a CC-Link IE TSN Class B device other than the master station connected in a star topology via a general-purpose hub?	• Other than the master station, do not connect CC-Link IE TSN Class B devices to a general-purpose hub in the star topology. • Connect CC-Link IE TSN Class B devices to a TSN hub.
	Is a CC-Link IE TSN Class B device connected to the master station via a general-purpose hub?	• Check the connected device and connect the master station to CC-Link IE TSN Class B devices in a line topology without using a general-purpose hub. • Check the connected device and connect the master station and CC-Link IE TSN Class B devices to a TSN hub.
	In multicast mode, is the CC-Link IE TSN Class A remote station connected to the master station?	• Connect the CC-Link IE TSN Class A remote station to a local station or remote station supporting the multicast filter. • Set unicast mode.
	In multicast mode, is the CC-Link IE TSN Class A remote station connected to a local station or remote station that does not support the multicast filter?	
	In multicast mode, are a local station and a CC-Link IE TSN Class A remote station connected on the end side via a switching hub?	• Configure settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the CC-Link IE TSN Class A remote station. • Check the connected device and do not connect both a local station and a CC-Link IE TSN Class A remote station on the end side of the switching hub. • Set unicast mode.
	Is an Ethernet device connected to places other than the end of the network?	Check the connected device and connect the Ethernet device at the end of the network.
	Does the connected switching hub support the CC-Link IE TSN Class used?	Use the switching hubs that support "CC-Link IE TSN Class Setting" set to the master station. For the models and usage methods of the switching hubs, refer to the CC-Link Partner Association website (www.cc-link.org).
	■For firmware version "02" or later Is the event code 00C81 registered in the event history?	Change "CC-Link IE TSN Class Setting" under "Network Configuration Settings" or "CC-Link IE TSN Class Setting" on the device station side so that "CC-Link IE TSN Class Setting" for each station match.

Check item			Action
When "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only"	If the device stations being used support protocol version 2.0, is a master station that does not support protocol version 2.0 being used?		Update the master station firmware to a version that supports protocol version 2.0. Alternatively, replace the master station with a master station that supports protocol version 2.0.
	■When connected devices are protocol version 2.0 Is the event code 00C80 registered in the event history?		Take one of the following actions. • Check 'Station protocol version 2.0 support status' (SW01A0 to SW01A7), and update the firmware of all the device stations to a version that supports protocol version 2.0. Alternatively, replace the device stations with stations that support protocol version 2.0. • For firmware version "02" or later, set 'Protocol setting' (Un\G1294018) of the master station to '1: Protocol version 1.0 fixed'. (☞ Page 518 Protocol information (Un\G1294016 to Un\G1294031)) • After powering on the device stations and the devices on the communication path, power on the master station.
	■When connected devices are protocol version 2.0 Is '2: Operating with the protocol version 2.0' stored in 'Protocol operating status' (Un\G1294016)?	Is information on stations that do not support the protocol version 2.0 stored in 'Station protocol version 2.0 support status' (SW01A0 to SW01A7)?	Take one of the following actions. • Check 'Station protocol version 2.0 support status' (SW01A0 to SW01A7), and update the firmware of all the device stations to a version that supports protocol version 2.0. Alternatively, replace the device stations with stations that support protocol version 2.0. • For firmware version "02" or later, set 'Protocol setting' (Un\G1294018) of the master station to '1: Protocol version 1.0 fixed'. (☞ Page 518 Protocol information (Un\G1294016 to Un\G1294031)) • After powering on the device stations and the devices on the communication path, power on the master station.
	■When connected devices are protocol version 2.0 Is '1: Operating with the protocol version 1.0' stored in 'Protocol operating status' (Un\G1294016)?	Is information on stations that do not support the protocol version 2.0 stored in 'Station protocol version 2.0 support status' (SW01A0 to SW01A7)?	Check 'Station protocol version 2.0 support status' (SW01A0 to SW01A7), and update the firmware of all the device stations to a version that supports protocol version 2.0. Alternatively, replace the device stations with stations that support protocol version 2.0.
		Are nine or more CC-Link IE TSN Class B devices and TSN hubs connected in total to each port of the master station in the transmission path from the master station to the CC-Link IE TSN Class B device of the end?	Check the connected devices and reduce the number of CC-Link IE TSN Class B devices and TSN hubs to eight or less in total for each port of the master station in the transmission path from the master station to the CC-Link IE TSN Class B device of the end.
		Does the cyclic data size exceed 2K bytes in total for CC-Link IE TSN Class A devices connected to a CC-Link IE TSN Class B device except for the master station? (Including when a CC-Link IE TSN Class B device is connected via a general-purpose hub)	• Connect to CC-Link IE TSN Class B devices via NZ2MHG-TSNT□. (When connecting via a general-purpose hub, change the general-purpose hub to NZ2MHG-TSNT□.) • Restrict the number of connected stations so that the cyclic data size of the CC-Link IE TSN Class A devices does not exceed 2K bytes in total. • Connect the CC-Link IE TSN Class A devices to the master station.
	■When connected devices are protocol version 2.0 Is there any difference between the CC-Link IE TSN Class B/A mixed system configuration and the "TSN HUB Setting" in "Connection Device Information" under "Basic Settings"?		For details, refer to the following. ☞ Page 425 A CC-Link IE TSN Class A device does not perform data link
	■When connected devices are protocol version 2.0 If "CC-Link IE TSN Class Setting" of the general CC-Link IE TSN module added to the station list in the "CC-Link IE TSN Configuration" window is CC-Link IE TSN Class A, are the minimum values of the communication cycle interval and the cyclic transmission time set to "Communication Period Interval Setting" and "Cyclic Transmission Time" in "Communication Period Setting" under "Basic Settings"?		Select the actual device to be used from "Module List" in the "CC-Link IE TSN Configuration" window and add it to the list of stations, or refer to the manual for the device to be connected to check the maximum response time for the time managed polling method and set the calculated values for the communication period interval and cyclic transmission time.

Check item		Action
When "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only"	Is the event code 00C72 registered in the event history?	• Update the version of the engineering tool to the latest version. • Update the firmware of the device station whose IP address is displayed in the detailed information of the event history to the latest version.
	■For firmware version "01" Is a CC-Link IE TSN Class A device that supports the CANopen profile with the protocol version 2.0 connected?	Update the firmware version of the master station to "02" or later.
If the stations are connected in a line topology, do "Communication Speed" for the stations match one another?		Correct "Communication Speed" under "Application Settings" for the stations so that the communication speeds match one another.
Is there any reason why cyclic transmission cannot be performed on the device station side?		• Check if an error has occurred on the device station. • Check if the device station settings and parameters are correct. • Refer to the manual of the device station for troubleshooting.
Is the event code 00C44 registered in the event history?		Match the communication speed of the master station to the communication speed of the station for which the device station parameter automatic setting is to be configured.
In multicast mode, are a local station and a CC-Link IE TSN Class A remote station connected on the end side via a switching hub?		• Configure settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the CC-Link IE TSN Class A remote station. • Check the connected device and do not connect both a local station and a CC-Link IE TSN Class A remote station on the end side of the switching hub. • Set unicast mode.
Is the minimum value for communication cycle interval set to both "Communication Period Interval Setting" and "Cyclic Transmission Time" in "Communication Period Setting" under "Basic Settings" of the module parameter?		Set "Cyclic Transmission Time" to a value obtained by the following formula: Minimum value of cyclic transmission time + Greatest value among the two values shown below. • 10% of the calculated minimum cyclic transmission time • When the communication speed of the master station is set to 1Gbps: Number of device stations × 2μs • When the communication speed of the master station is set to 100Mbps: Number of device stations × 20μs
In multicast mode, has an external device sent a frame to a station before data link establishment of all stations?		Ensure that the external device will not send a frame before data link establishment of all stations, then reset the master station.
When "Communication Speed" of the master station is 1Gbps, has the cyclic data size exceeded 2K bytes in total for all device stations on the CC-Link IE TSN Class B device side with the communication speed of 100Mbps at the boundary between CC-Link IE TSN Class B devices (except for the master station) with the communication speed of 1Gbps and CC-Link IE TSN Class B device with the communication speed of 100Mbps?		• Restrict the number of the connected stations so that the cyclic data size of the devices with communication speed of 100Mbps does not exceed 2K bytes in total. • Connect the device with communication speed of 100Mbps to the master station.
Is the device station connected to P2?		Connect the device station to P1.
Has the communication path using the dynamic routing function been determined?		• Power on the system, and then start transient transmission after a while. • When "Dynamic Routing" is set to "Disable" for the stations on the communication path, change the settings to "Enable".
Do the relay stations that pass through support the dynamic routing function?		If the relay stations that pass through do not support the dynamic routing function, set the "Routing Setting" of "CPU parameter" to all stations on the communication path.

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

- Module communication test (☞ Page 397 Module Communication Test)
- Communication test (☞ Page 408 Communication Test)

Station is disconnected from the network

The following is the action to be taken when a station in data link is disconnected.

Check item	Action
Is the ambient temperature for the module outside the specified range?	Keep the ambient temperature within the specified range by taking action such as removing heat source.

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

- Module communication test (☞ Page 397 Module Communication Test)

Station is repeatedly disconnected and reconnected

The following lists the actions to be taken when a station in data link is repeatedly disconnected and reconnected.

Check item		Action
Do the used Ethernet cables conform to the Ethernet standard?		Replace the cables with Ethernet cables which conform to the standard. (☞ Page 71 Wiring products)
Is the station-to-station distance 100m or less?		Change the station-to-station distance to 100m or less.
Does the cabling condition (bending radius) meet the specifications?		Refer to the manual for the Ethernet cable, and if the bending radius exceeds the specified range, correct the bending radius.
Is any Ethernet cable disconnected?		If an Ethernet cable is disconnected, replace the Ethernet cable.
Is the switching hub used operating normally?		• Use a switching hub that conforms to the standard. (☞ Page 71 Switching hub (when the system configured with CC-Link IE TSN)) • Power off and on the switching hub.
Is the station that is the time synchronization source normal?		Check the manual of the module used for the time synchronization source station.
Are resets of other stations repeated?		Avoid unnecessary reset since a station is disconnected while resetting.
Are other stations repeatedly powering on/off?		Avoid unnecessary power-off, since a station is disconnected while turned off.
When "Communication Speed" of the master station is set to "100Mbps", is "System Reservation Time" in "Communication Period Setting" under "Basic Settings" of the master station set to 20μs?		Set "System Reservation Time" to 200μs.
When "Communication Speed" of the master station is set to "1Gbps" and a CC-Link IE TSN Class B/A device with a communication speed of 100Mbps is used, is "Communication Period Setting" set to "Basic Period" or "Normal-Speed"?		For a CC-Link IE TSN Class B/A device with a communication speed of 100Mbps, set "Communication Period Setting" to "Low-Speed".
In multicast mode, are a local station and a CC-Link IE TSN Class A remote station connected on the end side via a switching hub?		• Configure settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the CC-Link IE TSN Class A remote station. • Check the connected device and do not connect both a local station and a CC-Link IE TSN Class A remote station on the end side of the switching hub. • Set unicast mode.
When 'Protocol operating status' (Un\G1294016) is '1: Operating with the protocol version 1.0'	Does the cyclic data size exceed 2K bytes in total for CC-Link IE TSN Class A devices connected to a CC-Link IE TSN Class B device except for the master station? (Including when a CC-Link IE TSN Class B device is connected via a general-purpose hub)	• Connect to CC-Link IE TSN Class B devices via NZ2MHG-TSNT□. (When connecting via a general-purpose hub, change the general-purpose hub to NZ2MHG-TSNT□.) • Restrict the number of connected stations so that the cyclic data size of the CC-Link IE TSN Class A devices does not exceed 2K bytes in total. • Connect the CC-Link IE TSN Class A devices to the master station.
If the master station supports protocol version 2.0, do the system configuration of mixture of CC-Link IE TSN Class B/A and "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" differ?		For details, refer to the following. ☞ Page 425 A CC-Link IE TSN Class A device does not perform data link
Does any of the stations break the restrictions of the TSN hub?		Comply with the restrictions of the TSN hub. For the restrictions, refer to the manual for the TSN hub used.
When the communication speed of the master station is 1Gbps, has the cyclic data size exceeded 2K bytes in total for all device stations on the 100Mbps device side at the boundary between CC-Link IE TSN Class B 1Gbps devices except for the master station and CC-Link IE TSN Class B 100Mbps devices?		• Restrict the number of connected stations so that the cyclic data size of the 100Mbps devices does not exceed 2K bytes in total. • Connect the 100Mbps device to the master station.
In multicast mode, is the CC-Link IE TSN Class A remote station connected to a local station or remote station that does not support the multicast filter?		• Connect the CC-Link IE TSN Class A remote station to a local station or remote station supporting the multicast filter. • Set unicast mode.
■For firmware version "01" Is a CC-Link IE TSN Class A device that supports the CANopen profile with the protocol version 2.0 connected?		Update the firmware version of the master station to "02" or later.

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

- Module communication test (☞ Page 397 Module Communication Test)

Communications are unstable

When cyclic data transfer processing time or transmission delay time is long or when a transient transmission timeout occurred, check the following items.

Check item	Action
Is the L ER LED of the CC-Link IE TSN Plus module turned on?	If turned on, perform troubleshooting for a case when the L ER LED is turned on. (☞ Page 392 When the L ER LED turns on)
Is the ambient temperature for the module outside the specified range?	Keep the ambient temperature within the specified range by taking action such as removing heat source.
Is any error shown in "Selected Station Communications Status Monitor" of CC-Link IE TSN/CC-Link IE Field diagnostics?	If an error is identified, perform a module communication test.
Is there any noise affecting the system?	Change the placement and/or wiring of the modules so that the system is not affected by noise.

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

- Module communication test (☞ Page 397 Module Communication Test)

SLMP communications failed

When communications using the SLMP cannot be performed, check the following items.

Check item	Action
Has the connection with the external device been opened?	• If the connection with the external device is not opened, perform the open processing.*1 • If an error occurs, check and eliminate the error cause.
Is the correct command format used for the command type, device specification, address specification, and others?	Correct the command format. (📖 SLMP Reference Manual)
Did the external device send a command?	If the device did not send a command, send a command to the CC-Link IE TSN Plus module.
Was a response returned to the device that had sent the command?	• If no response was returned, check if the correct IP address was specified in the command. If not, correct the IP address and send the command again. • If a response was returned, check the end and error codes to correct the faulty area.
Is the same communication speed set for the connected device and access destination?	Change the connection destination so that the connected device and access destination have the same communication speed.
In multicast mode, is a standard Ethernet device connected to a local station or remote station that does not support the multicast filter?	• Connect the local station or remote station supporting the multicast filter to the standard Ethernet device. • Set unicast mode. • Take actions so that the Ethernet device does not receive multicast cyclic data.
In multicast mode, are a local station and an Ethernet device connected on the end side via a switching hub?	Configure settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the standard Ethernet device.

*1 If the connection of only the external device is closed due to communication cable disconnection, personal computer restart, or other reasons, reopen the connection using the same port used before the error occurred. A connection is not closed if another Active open request is received from the external device with a different IP address or a port number.

If the above actions do not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 397 Module Communication Test)

The control CPU of the local station cannot be synchronized time

When the time synchronization does not operate for the control CPU of a local station, check the following items.

Check item	Action
Is the daylight savings time set to CPU modules different between the master station and local stations?	Set the same daylight savings time to the CPU modules of the master station and local stations.
Has the clock data been changed by the clock function of the CPU module?	Check whether the clock data has been changed by the clock function of the CPU module.

Communications with Ethernet devices failed

When communications with Ethernet devices cannot be performed, check the following items.

Check item	Action
Is the firewall or proxy server setting enabled on the Ethernet device?	Check and correct the settings on the Ethernet device. Is a response to the PING command (ICMP echo request) disabled?
Is the antivirus software on the Ethernet device blocking the communication?	Check and correct the antivirus software settings on the Ethernet device. • Is the security setting level of the antivirus software low? • Is a response to the PING command (ICMP echo request) disabled in the firewall settings?
In multicast mode, is a standard Ethernet device connected to the master station?	• Connect the local station or remote station supporting the multicast filter to the standard Ethernet device. • Set unicast mode. • Take actions so that the Ethernet device does not receive multicast cyclic data.
In multicast mode, is a standard Ethernet device connected to a local station or remote station that does not support the multicast filter?	• Connect the local station or remote station supporting the multicast filter to the standard Ethernet device. • Set unicast mode. • Take actions so that the Ethernet device does not receive multicast cyclic data.
In multicast mode, are a local station and an Ethernet device connected on the end side via a switching hub?	• Configure settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the standard Ethernet device. • Check the connected device and do not connect both a local station and an Ethernet device on the end side of the switching hub. • Set unicast mode. • Take actions so that the Ethernet device does not receive cyclic data in multicast mode.

For details on when communication using the engineering tool is not allowed in the settings of Windows Firewall, refer to the following.

📖 GX Works3 Operating Manual

If the above actions do not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 397 Module Communication Test)

Although the data link is normal, communications for the link device failed

When the link device cannot communicate although the data link is normal (D LINK LED is on), check the following items.

Check item	Action
Is "Reserved/Error Invalid Station" of the device station set to "Reserved Station" in "Network Configuration Settings" of the master station?	Set "Reserved/Error Invalid Station" of the device station to "No Setting".
Is the input/output bit setting or input/output word setting of the device station set in "Network Configuration Settings" of the master station? (Simple display)	Set a link device used in the device station correctly.
Are "RX Setting", "RY Setting", "RWw Setting", "RWr Setting", "LB Setting", and "LW Setting" of the device station set in "Network Configuration Settings" of the master station? (Detailed display)	Set a link device used in the device station correctly.
Does the device station support the link devices set in "Network Configuration Settings" of the master station?	Correct the link devices to be assigned to the device station in "Network Configuration Settings" of the master station.
Is the link refresh setting range correct?	Correct the setting in "Refresh Settings" of "Basic Settings".
Is the refresh range of "CPU Side" in "Refresh Settings" overlapped with that of "CPU Side" of another network module?	Correct the setting in "Refresh Settings" of "Basic Settings".
Is the transfer range set in "Interlink Transmission Settings" correct?	Correct the transfer range set in "Interlink Transmission Settings".
Are the settings in "Transfer Source Module" and "Transfer Destination Module" of "Interlink Transmission Settings" correct?	Correct the settings in "Transfer Source Module" and "Transfer Destination Module" of "Interlink Transmission Settings".
When the local station cannot receive cyclic data from another station, is "Communication Mode" of the master station set to "Multicast"?	Set "Communication Mode" of the master station to "Multicast".
Is an error with the error code 1D20H detected in the CC-Link IE TSN Plus module?	• The communication cycle is too fast and the cyclic transmission of the device station may not be performed within the communication cycle. Make the setting value greater than the current setting for "Communication Period Interval Setting" and "Transient Transmission Time" in "Communication Period Setting" under "Basic Settings". • To use the inter-module synchronization function, also set the inter-module synchronization cycle longer than the current setting in "Fixed Scan Interval Setting" under "Inter-module Synchronization Setting" in "System Parameter". • Check if an error has occurred on the device station.
Has an inter-module synchronous transmission omission occurred?	The amount of time equal to the total value of the execution time of the inter-module synchronous interrupt program (I44) and the cyclic processing time*1 may not have passed completely by the next inter-module synchronization cycle (next communication cycle). Consider the following actions. • Consider the possibility of reducing the volume of the synchronous interrupt program. (Reduction of program processing time) • Consider the possibility of reducing the refresh target data for the synchronization target modules. (Reduction of refresh processing time) • Check if a module that does not need to be synchronized is set as a synchronization target module. • Change the inter-module synchronization cycle set in the inter-module synchronization cycle setting and the values for "Communication Period Interval Setting" and "Transient transmission time' of "Communication Period Setting" under "Basic Settings" to values longer than the current settings.

*1 For details on the processing time, refer to the following.
☞ Page 563 CC-Link IE TSN Processing Time

Desynchronization with CC-Link IE TSN network synchronous communication function

When synchronization cannot be performed with the CC-Link IE TSN network synchronous communication function, check the following items.

Check item	Action
Is an inter-module synchronization target module selected?	Set "Select Inter-module Synchronization Target Module" under "Inter-module Synchronization Setting" in the "System Parameter" window to "Synchronous".
Is an inter-module synchronous master set?	For "Synchronization Master Setting of CC IE TSN/CC IE Field" in "Inter-module Synchronization Master Setting" of "Inter-Module Synchronization Setting" in "System Parameter", set "Mounting Slot No." for the inter-module synchronous master. For details on the inter-module synchronous master, refer to the following. 📖 MELSEC iQ-R Inter-Module Synchronization Function Reference Manual
Is the network synchronous communication of the device station set in the network configuration settings of the master station?	By using "Network Configuration Settings" under "Basic Settings" of the module parameter, set "Network Synchronous Communication" of the device station to "Synchronous".
Is the network synchronous communication set in the parameter settings of the device station?	Set "Network Synchronous Communication" in the parameter settings of the device station to "Synchronous". (📖 Manual for the module used)
Does the firmware version of the CPU module support the CC-Link IE TSN network synchronous communication function?	Check the firmware version of the CPU module in "Product Information List" of "System Monitor". If the firmware version of the CPU module does not support the CC-Link IE TSN network synchronous communication function, either update the firmware of the CPU module or change the CPU module to a CPU module supporting that function.

Cannot be monitored using the CC-Link IE TSN Communication Software

The following lists the actions to be taken if information cannot be monitored using the CC-Link IE TSN Communication Software.

Check item	Action
Are three or more modules connected to CC-Link IE TSN Communication Software?	Connect two or fewer modules.
Is the CC-Link IE TSN Communication Software connected to a CC-Link IE TSN Class A device?	Connect the CC-Link IE TSN Communication Software to a CC-Link IE TSN Class B device or a TSN hub.
Is "Communication Mode" under "Application Settings" set to "Unicast"?	Set "Communication Mode" under "Application Settings" to "Multicast".
Is the CC-Link IE TSN Communication Software connected to a general-purpose hub?	Connect the CC-Link IE TSN Communication Software to a CC-Link IE TSN Class B device or a TSN hub.
Does the CC-Link IE TSN Communication Software reconnect within 20 seconds of disconnecting?	Before reconnecting the CC-Link IE TSN Communication Software, wait more than 20 seconds.

In addition to the above actions, refer to the following troubleshooting methods.

📖 CC-Link IE TSN Communication Software for Windows User's Manual

Data is not displayed correctly in the "CC-Link IE TSN/CC-Link IE Field Diagnostics"

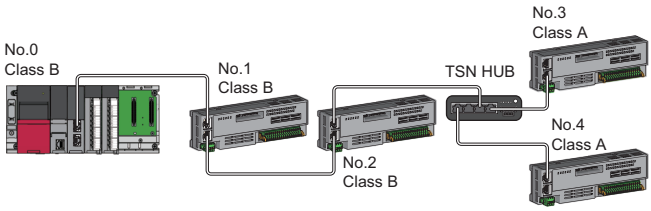
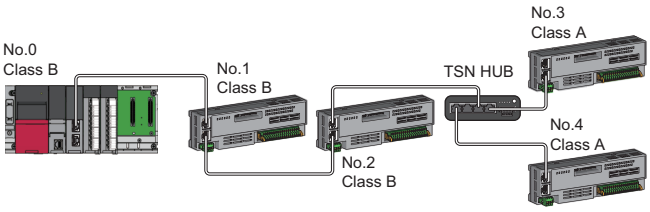
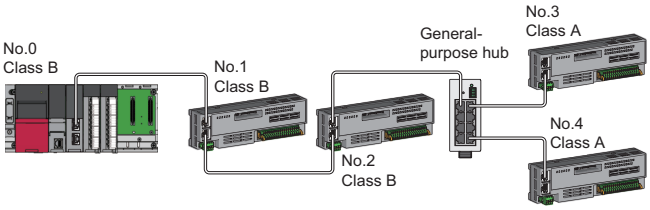
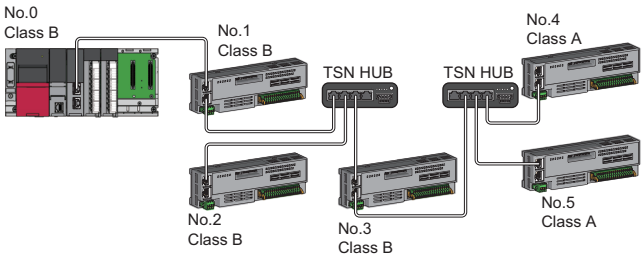
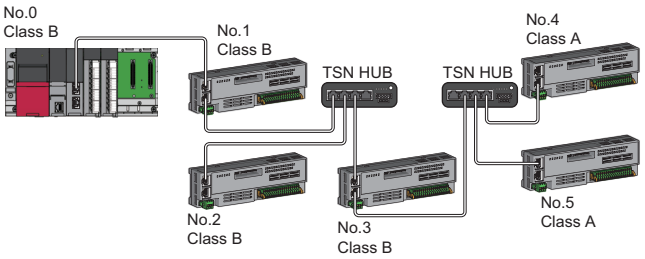
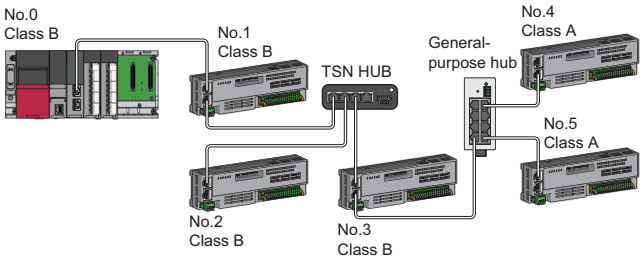
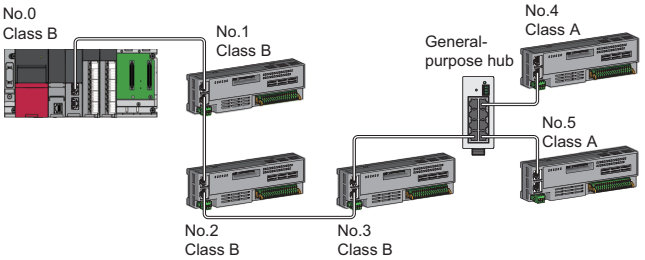
If data is not displayed correctly in the network map or selected station communications status monitor of the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window, check the following items.

Check item	Action
Is the network configured in the ring topology?	Correct the wiring so that the connection becomes same as the connection in "Network Topology" under "Basic Settings" of the master station.

A CC-Link IE TSN Class A device does not perform data link

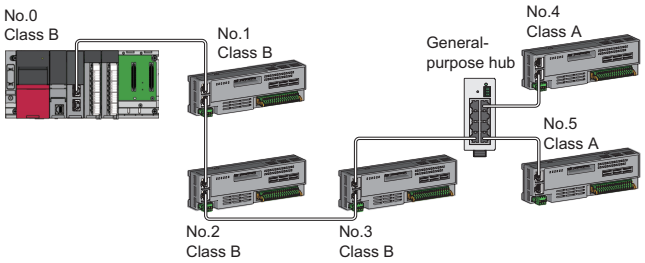
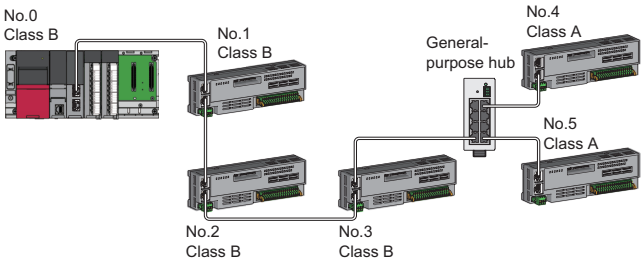
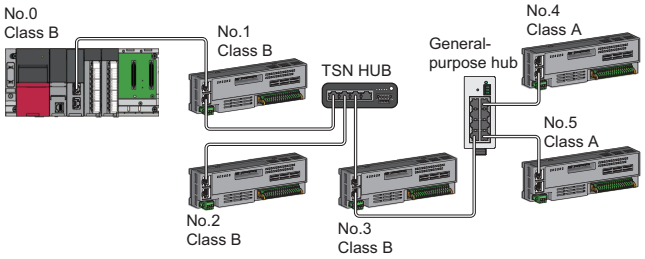
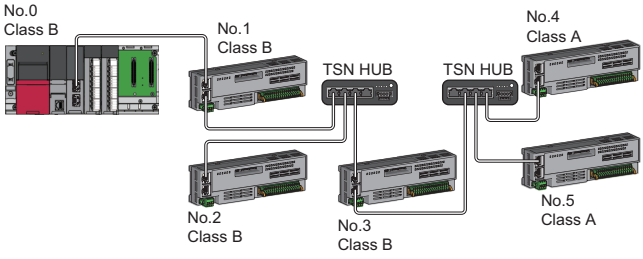
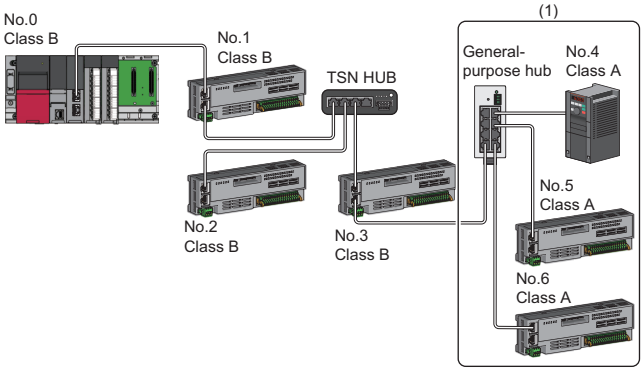
■When "Not to Use TSN HUB" is set

When "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" is set to "Not to Use TSN HUB", check the following.

Check item	Action
Are a CC-Link IE TSN Class B device and CC-Link IE TSN Class A device connected via a TSN hub? 	Set "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" to "Use TSN HUB". 
	Connect the CC-Link IE TSN Class B device and CC-Link IE TSN Class A device directly. Alternatively, connect the devices via a general-purpose hub. 
Is a TSN hub used for connection between CC-Link IE TSN Class B devices? 	Set "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" to "Use TSN HUB". 
Is a TSN hub used for connection between CC-Link IE TSN Class B devices? 	Remove the TSN hub used for connection between CC-Link IE TSN Class B devices. 

■When "Use TSN HUB" is set

If "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" is set to "Use TSN HUB", check the following.

Check item	Action
Are a CC-Link IE TSN Class B device and CC-Link IE TSN Class A device connected directly or via a general-purpose hub? 	Set "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" to "Not to Use TSN HUB". 
Are a CC-Link IE TSN Class B device and CC-Link IE TSN Class A device connected directly or via a general-purpose hub? 	Connect the CC-Link IE TSN Class B device and CC-Link IE TSN Class A device via a TSN hub.  Do not allow the cyclic data size to exceed 2K bytes in total (1) for all device stations on the CC-Link IE TSN Class A device side at the boundary between CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices. 

Cannot communicate using socket communications

If send/receive using socket communications cannot be performed, check the following items.

Check item	Action
Has the connection with the external device been opened normally? (Check 'Open completion signal' (Un\G6291456).)	• If the connection with the external device is not opened, perform the open processing.*1 • If an error occurs, check and eliminate the error cause.
Has the send/receive processing been executed correctly?	• If send/receive processing is not executed, correct the execution conditions. • If send/receive processing has completed with an error, check the error code in the completion status and eliminate the cause of the error.
Is 'Socket reception status signal' (Un\G6291472) turned on during execution of receive processing?	• Send data from the external device. • When transmission is being performed, check whether the destination (IP address, port number) is set correctly.
Is 'Receive abort count' (Un\G2102181, Un\G4199333) not incremented?	• Reduce the communication load on the CC-Link IE TSN Plus module by reducing the size of the data sent from the external device or lowering the transmission frequency. • If the line is heavily loaded, reduce the load.

If the above actions do not solve the problem, perform the module communication test to check for hardware failure. (☞ Page 397 Module Communication Test)

*1 If the connection of only the external device is closed due to cable disconnection, personal computer restart, or other reasons, reopen the connection using the same port used before the error occurred.
A connection is not closed if another Active open request is received from the external device with a different IP address or a port number.

18.2 Troubleshooting Related to EtherNet/IP

Communications with EtherNet/IP devices failed

The following table lists the actions to be taken if communications with EtherNet/IP devices cannot be performed.

Check item	Action
Is the RUN LED of the CC-Link IE TSN Plus module turned off?	If the RUN LED is off, reset the CPU module. If resetting does not cause the RUN LED to turn on, a hardware failure may have occurred. Replace the CC-Link IE TSN Plus module, and restart the connected EtherNet/IP device.
Is the Ethernet cable connected correctly?	Connect the Ethernet cable again.
Is the EtherNet/IP device compatible with the communication functions (Class1 communications, UCMM communications, and Class3 communications) of the CC-Link IE TSN Plus module?	Check the specifications of the EtherNet/IP device.
Is the power supply of the EtherNet/IP device on?	Turn on the power supply of the EtherNet/IP device.
Has an error occurred on the EtherNet/IP device, switching hub, or a similar device?	If an error has occurred on the EtherNet/IP device, switching hub, or a similar device, check the manual of each device.
Is the IP address setting of the EtherNet/IP device correct?	Use a PING test to check the connection with the EtherNet/IP device. (☞ Page 412 PING test)
Is the module operation mode setting of the CC-Link IE TSN Plus module set to other than "Online"?	Use the engineering tool to change the module operation mode setting of the function CC-Link IE TSN Plus module to "Online". (☞ Page 86 Module Operation Mode)
Has the initial processing completed successfully?	Check whether communication is starting after 'Module Ready' (XF) and 'Communication Ready' (X1F) turn on.
Has communication start processing been performed correctly with 'EtherNet/IP communication start request' (Un\G7340096)?	• Check that a value other than 0 (start request) is set for "EtherNet/IP communication start request' (Un\G7340096). • If 'EtherNet/IP communication continuation specification request' (Un\G7340104) is set to 16 (continue EtherNet/IP communication), set 'EtherNet/IP communication start request' (Un\G7340096) to 0 (stop request) and then to a value other than 0 (start request) again.
Has a timeout error occurred on the connection that performs communications normally?	Depending on the EtherNet/IP device used, the connection that performs communications normally may be disconnected and a timeout error may occur after the time specified by Encapsulation Inactivity Timeout has elapsed. Therefore, set Encapsulation Inactivity Timeout to 0 (invalid). (☞ Page 383 Instance attribute (instance ID: 01H))
Has the number of currently active connections with the target EtherNet/IP device reached the maximum number of simultaneous open connections?	• If a CC-Link IE TSN Plus module is the target, set the system configuration so that the number of communication connections does not exceed 256. (The number of connections used can be checked in 'Number of consumed connection (Port 2)' (Un\G8474724). (☞ Page 547 Number of consumed connections)) • If a module other than a CC-Link IE TSN Plus module is the target, set the system configuration so that the number of communication connections does not exceed the maximum value including the module itself.
Are there duplicate IP addresses on the network?	Check if duplicate IP addresses exist on the network. • If a station with a duplicate IP address exists on the network, communication cannot start normally. Therefore, remove the station with the duplicate IP address from the network. • When IP address duplication occurs during communication, the hub may relay the line data to the station with the duplicate IP address, which may cause the line data to temporarily stop arriving or the communication to stop. If communication does not restart even after removing the station with the duplicate IP address from the network, reconnect the own module.
Is the 'Receive abort count' (Un\G4199333) not incremented?	Reduce the communication load of the CC-Link IE TSN Plus module by correcting the following parameters in the EtherNet/IP configuration. • Increase the timeout multiplier value. • Reduce the data size. • Reduce the number of connections. • Increase RPI. If the line is heavily loaded, reduce the load.

If the above actions do not solve the problem, check the parameter set in "EtherNet/IP Configuration", write to the CPU module again, and check if the problem persists.

Tag communications failed

The following table lists the actions to be taken if tag communications cannot be performed.

Check item	Action
Has communication start processing been performed correctly with 'EtherNet/IP communication start request' (Un\G7340096)?	• Check that a value other than 0 (start request) is set for "EtherNet/IP communication start request' (Un\G7340096). • If 'EtherNet/IP communication continuation specification request' (Un\G7340104) is set to 16 (continue EtherNet/IP communication), set 'EtherNet/IP communication start request' (Un\G7340096) to 0 (stop request) and then to a value other than 0 (start request) again.
Has the connection destination EtherNet/IP device been registered in "EtherNet/IP Configuration"?	When performing Class1 communications and Class3 communications, if the connection destination EtherNet/IP device has not been registered in "EtherNet/IP Configuration", register it and write the parameters again.
Is the tag name specified correctly?	Check that the tag name set to the CC-Link IE TSN Plus module and the tag name set to the external device match. If they do not match, correct the tag names and write the parameters again.
Can Class1 tag communications be performed?	☞ Page 429 Class1 tag communications failed
Can UCMM tag communications be performed?	☞ Page 429 UCMM tag communications failed
Can Class3 tag communications be performed?	☞ Page 430 Class3 tag communications failed

Class1 tag communications failed

The following table lists the actions to be taken if Class1 tag communications cannot be performed.

Check item	Action
When the CC-Link IE TSN Plus module is the originator, has the external device already performed the multicast communication with other originators?	• Mach the settings of the CC-Link IE TSN Plus module with those of other originators that are being communicated with. • Check the settings of other originators that are being communicated with the external device. • Correct the system configuration so that the external device communicates with the CC-Link IE TSN Plus module only.

UCMM tag communications failed

The following table lists the actions to be taken if UCMM tag communications cannot be performed.

Check item	Action
Is the tag data type specified correctly?	Check that the data type of the tag set to the CC-Link IE TSN Plus module and the data type of the tag set to the external device match. If they do not match, check the following. • When the CC-Link IE TSN Plus module is an originator, correct the data type of the tag set in the buffer memory. • When the CC-Link IE TSN Plus module is a target, correct the data type of the tag set in "EtherNet/IP Configuration".
When the CC-Link IE TSN Plus module is an originator, is a Class3-dedicated area used?	• Check that 0001H (UCMM communications) is set as the initial value for the communication method specification area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). • Check whether an area with a connection number for which Class3 communications parameters are set in "EtherNet/IP Configuration" is used.
Is the Path Segment specification set correctly?	Check that the Path Segment specification in the request area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967) is correctly set. (☞ Page 539 Class3/UCMM communication area)
When the CC-Link IE TSN Plus module is an originator, is the data in the response area of the Class3/UCMM communication area correct?	When the CC-Link IE TSN Plus module is a client, check the value of the result storage area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). If the value is not 0, check the error code. (☞ Page 481 Error Codes for the Message Communication Function (Client))

Class3 tag communications failed

The following table lists the actions to be taken if Class3 tag communications cannot be performed.

Check item	Action
Are the settings in "EtherNet/IP Configuration" correct?	Check the values set in "EtherNet/IP Configuration". When the following module function blocks are used, check the values set for the arguments. • M+RJ71GN11_SE_EIP_Class3Originator_ReadTagData • M+RJ71GN11_SE_EIP_Class3Originator_WriteTagData
Is the tag data type specified correctly?	Check that the data type of the tag set to the CC-Link IE TSN Plus module and the data type of the tag set to the external device match. If they do not match, correct the tag data types and write the parameters again.
When the CC-Link IE TSN Plus module is an originator, is an area not available for Class3 used?	• Check that 0002H (Class3 communications) is set as the initial value for the communication method specification area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). • Check whether an area with a connection number for which Class3 communications parameters are set in "EtherNet/IP Configuration" is used.
Is the Path Segment specification set correctly?	Check that the Path Segment specification in the request area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967) is correctly set. (☞ Page 539 Class3/UCMM communication area)
When the CC-Link IE TSN Plus module is an originator, is the data in the response area of the Class3/UCMM communication area correct?	Check the value of the result storage area of Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). If the value is not 0, refer to the error code and perform troubleshooting. (☞ Page 481 Error Codes for the Message Communication Function (Client))
When the external device (target) is the CC-Link IE TSN Plus module or RJ71EIP91, is the specified tag set as a reserved connection?	Check whether the specified tag of the external device (target) is set as a reserved connection.

Instance communications or message communications failed

The following table lists the actions to be taken if instance communications or message communications cannot be performed.

Check item	Action
Has communication start processing been performed correctly with 'EtherNet/IP communication start request' (Un\G7340096)?	• Check that a value other than 0 (start request) is set for 'EtherNet/IP communication start request' (Un\G7340096). • If 'EtherNet/IP communication continuation specification request' (Un\G7340104) is set to 16 (continue EtherNet/IP communication), set 'EtherNet/IP communication start request' (Un\G7340096) to 0 (stop request) and then to a value other than 0 (start request) again.
Has the connection destination EtherNet/IP device been registered in "EtherNet/IP Configuration"?	When performing Class1 communications and Class3 communications, if the connection destination EtherNet/IP device has not been registered in "EtherNet/IP Configuration", register it and write the parameters again.
Can Class1 instance communications be performed?	☞ Page 431 Class1 instance communications failed
Can UCMM message communications be performed?	☞ Page 431 UCMM message communications failed
Can Class3 message communications be performed?	☞ Page 431 Class3 message communications failed

Class1 instance communications failed

The following table lists the actions to be taken if Class1 instance communications cannot be performed.

Check item	Action
Is the instance ID specified correctly? (Applicable to only EtherNet/IP devices for which an instance ID can be specified)	Check with the manual for the external device that an instance ID receivable by the external device is set to the CC-Link IE TSN Plus module (originator). Otherwise, change the instance ID to a receivable one and write the parameters again.

UCMM message communications failed

The following table lists the actions to be taken if UCMM message communications cannot be performed.

Check item	Action
Are the settings of the commands to request correct?	• Check the value set for 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). • When the module FB (M+RJ71GN11_SE_EIP_UCMMOriginator_MessageSend) is used, check the value set for the argument.
When the CC-Link IE TSN Plus module is a target, is the command requested by the EtherNet/IP device supported?	Check whether the EtherNet/IP device sent a command listed among the message communication support commands. (☞ Page 375 MESSAGE COMMUNICATION SUPPORT COMMANDS)
When the CC-Link IE TSN Plus module is an originator, is a Class3-dedicated area used?	• Check that 0001H (UCMM communications) is set as the initial value for the communication method specification area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). • Check that an area with a connection number for which Class3 communications parameters are set in "EtherNet/IP Configuration" is used.
Is the data in the response area of the Class3/UCMM communication area correct?	When the CC-Link IE TSN Plus module is an originator, check the value of the result storage area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). If the value is not 0, refer to the error code and perform troubleshooting. (☞ Page 481 Error Codes for the Message Communication Function (Client))

Class3 message communications failed

The following table lists the actions to be taken if Class3 message communications cannot be performed.

Check item	Action
When the CC-Link IE TSN Plus module is a target, is the command requested by the EtherNet/IP device supported?	Check whether the EtherNet/IP device sent a command listed among the message communication support commands. (☞ Page 375 MESSAGE COMMUNICATION SUPPORT COMMANDS)
Are the settings in "EtherNet/IP Configuration" correct?	Check the values set in "EtherNet/IP Configuration". When the following module function blocks are used, check the values set for the arguments. • M+RJ71GN11_SE_EIP_Class3Originator_ReadTagData • M+RJ71GN11_SE_EIP_Class3Originator_WriteTagData
When the CC-Link IE TSN Plus module is an originator, is an area not available for Class3 used?	• Check that 0002H (Class3 communications) is set as the initial value for the communication method specification area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). • Check that an area with a connection number for which Class3 communications parameters are set in "EtherNet/IP Configuration" is used.
Is the data in the response area of the Class3/UCMM communication area correct?	When the CC-Link IE TSN Plus module is an originator, check the value of the result storage area of 'Class3/UCMM communication area' (Un\G7751680 to Un\G8275967). If the value is not 0, refer to the error code and perform troubleshooting. (☞ Page 481 Error Codes for the Message Communication Function (Client))

EtherNet/IP devices cannot be detected

Check the following items if the EtherNet/IP devices connected to the network cannot be detected.

Check item	Action
Have the EtherNet/IP devices to be detected started up?	• Check that the EtherNet/IP devices to be detected have started up. • When the EtherNet/IP device to be detected is a CC-Link IE TSN Plus module, check that the RUN LED of the CC-Link IE TSN Plus module is lit.
Is communication enabled on the EtherNet/IP devices to be detected?	• Check that the EtherNet/IP devices to be detected are linked up. • If the EtherNet/IP device to be detected is a CC-Link IE TSN Plus module, check that 'EtherNet/IP communication start status' (Un\G7340097) is set to 1 (operating). • If the EtherNet/IP device to be detected is other than the CC-Link IE TSN Plus module, check that EtherNet/IP communication is enabled using documentation such as the manuals of the external device.
Is the EtherNet/IP device to be detected within the range of broadcast frames?	• Check if the EtherNet/IP device to be detected belongs to a network that is different from the CC-Link IE TSN Plus module. • Check that the setting is configured so that the broadcast frame reaches between the CC-Link IE TSN Plus module and the EtherNet/IP device to be detected. Check that the broadcast frame is not blocked by the settings on the switching hub or other devices.
Has the line load become high?	Check if the line load has become high. When the line load is high, the frame for detection may disappear or the external device may not respond in some cases.
Has an error occurred on the CPU module or EtherNet/IP device?	• Check if a moderate or major error has occurred on the CC-Link IE TSN Plus module or the CPU module that controls the CC-Link IE TSN Plus module. If an error has occurred, eliminate the cause of the error. • Check if an error has occurred on the EtherNet/IP device to be detected. If an error has occurred, eliminate the cause of the error.
Does the EtherNet/IP device to be detected support the ListIdentity command?	When the EtherNet/IP device to be detected is other than the CC-Link IE TSN Plus module, check that the EtherNet/IP device supports the ListIdentity command referring to documentation such as manuals of the external device.
Has the 'EtherNet/IP communication start status' (Un\G7340097) or the status of the CPU module changed during the execution of this function?	• Check if the 'EtherNet/IP communication start request' (Un\G7340096) was operated during the execution of the automatic detection of EtherNet/IP devices. If it was operated, perform the process again. • Check if the status of the CPU module has changed from RUN to STOP during the execution of automatic detection of the EtherNet/IP device. If it has changed, perform the process again.

19 LIST OF ERROR CODES

This chapter lists the error codes, error details and causes, and action for the errors occur in the processing for data communication between the CC-Link IE TSN Plus module and external devices or caused by processing requests from the CPU module on the own station.

The following table lists the error codes for the CC-Link IE TSN Plus module.

Type	Reference
Error codes when a module error occurs	Page 433 Error codes when using CC-Link IE TSN communications and Ethernet communications
	Page 463 Error codes when using EtherNet/IP communications
Error codes for I/O signal processing	Page 464 Error Codes for I/O Signal Processing
Error codes when a connection error occurs	Page 465 Error Codes When a Connection Error Occurs
Error codes for the message communication function (client)	Page 481 Error Codes for the Message Communication Function (Client)
Error codes for the tag communication function (server)	Page 483 Error Codes for the Tag Communication Function (Server)

19.1 Error Codes When a Module Error Occurs

Error codes are displayed in the [Error Information] tab in the "Module Diagnostics" window of the CC-Link IE TSN Plus module. (☞ Page 395 Error Information)

Error codes when using CC-Link IE TSN communications and Ethernet communications

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
1080H	The number of writes to the flash ROM has exceeded 100000.	Replace the module.	—
1124H	• The default gateway is not set correctly. • The gateway IP address is not set correctly. • The default gateway/gateway IP address (network address after the subnet mask) is different from that of the IP address of the own node.	• Correct the default gateway IP address. • Set the same network address as that of the IP address.	■Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No. ■—
1128H	The port number is incorrect.	Correct the port number.	—
1152H	The IP address is not set correctly.	Correct the IP addresses.	■Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No. ■—
1155H	• The specified connection was already closed in TCP/IP communications. • Open processing is not performed.	• Perform the open processing for the specified connection. • Check if the open processing has been performed in the external device.	—
1167H	Unsent data found, but could not be sent.	• Check the settings for connection with the external device. • Check the operation of the external device or switching hub. • Since there may be congestion of packets on the line, send data after a certain period of time. • Check if the Ethernet cable is connected properly. • Check that there is no connection failure with the switching hub. • Execute the communication test, and if the test was completed with an error, take corrective action.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
1802H	During data link, overlapping IP addresses have been detected.	Change the IP address of devices with an overlapped IP address.	■Operation source information • IP address ■IP address duplication information • Duplication station 1 MAC address (1st octet, 2nd octet) • Duplication station 1 MAC address (3rd octet, 4th octet) • Duplication station 1 MAC address (5th octet, 6th octet) • Duplication station 2 MAC address (1st octet, 2nd octet) • Duplication station 2 MAC address (3rd octet, 4th octet) • Duplication station 2 MAC address (5th octet, 6th octet)
1803H	Over the number of stations that can be connected.	Reduce the number of CC-Link IE TSN Class B devices and TSN hubs to eight or less in total for each port of the master station in the transmission path from the master station to the CC-Link IE TSN Class B device of the end. Take either or both of the following actions. • Update the master station to a version that supports protocol version 2.0. • Update the firmware of CC-Link IE TSN Class A devices to the latest version or replace them with devices that support protocol version 2.0.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
1804H	During data link, invalid connection structure has been detected. • A CC-Link IE TSN Class B station is connected further on the end side than a CC-Link IE TSN Class A station. • With the master station with a communication speed of 1Gbps, further on the end side than a station with a communication speed of 100Mbps, a station with a communication speed of 1Gbps is connected. • With the master station with a communication speed of 100Mbps, a station with a communication speed of 1Gbps is connected. • For a master station with a communication speed of 100Mbps, "Communication Period Setting" of the CC-Link IE TSN Class B station with a communication speed of 100Mbps is set to "Low-Speed". • With the master station with a communication speed of 1Gbps, "Communication Period Setting" of the station with a communication speed of 100Mbps is set to "Basic Period" or "Normal-Speed" (×4). • The communication speed of the master station and local station are not matched. ■Multicast mode • A CC-Link IE TSN Class A local station is connected further on the end side than a CC-Link IE TSN Class A remote station. • When the master station with a communication speed of 1Gbps, stations with a communication speed of 1Gbps and 100Mbps are connected on the end side of the switching hub.	Check the connection and setting on the end side of the station shown in detailed information 2 and take the following actions. • Connect the CC-Link IE TSN Class A station further on the end side than the CC-Link IE TSN Class B station. • If the master station has a communication speed of 1Gbps, connect the station with a communication speed of 1Gbps on the master station side rather than on the side where a station with a communication speed of 100Mbps is connected. • If the master station has a communication speed of 100Mbps, set the communication speed of the device station to 100Mbps. • If the master station has a communication speed of 100Mbps, set "Communication Period Setting" of the CC-Link IE TSN Class B station with a communication speed of 100Mbps to "Basic Period" or "Normal-Speed" (×4). • If the master station has a communication speed of 1Gbps, set "Communication Period Setting" to "Low-Speed" for the station with a communication speed of 100Mbps. • Set the same communication speed for the master station and local station. ■Multicast mode • Connect the CC-Link IE TSN Class A remote station further on the end side than the CC-Link IE TSN Class A local station. • If the master station has a communication speed of 1Gbps, do not connect both a station with a communication speed of 1Gbps and 100Mbps on the end side of the switching hub.	■Own station information • I/O No. • Network No. • Station No. • IP address ■Target station information • Network No. • Station No. • IP address
1805H	• The cyclic data size exceeds 2K bytes in total for all device stations on the CC-Link IE TSN Class A device side at the boundary between CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices. • The cyclic data size exceeds 2K bytes in total for all device stations on the side of the station with a communication speed of 100Mbps at the boundary between the station with a communication speed of 1Gbps and the station with a communication speed of 100Mbps.	Check the connection and setting on the end side of the station shown in detailed information 2 based on the error definition and cause and take the following actions. • Do not allow the cyclic data size to exceed 2K bytes in total for all device stations on the CC-Link IE TSN Class A device side at the boundary between CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices. • Do not allow the cyclic data size to exceed 2K bytes in total for all device stations on the side of the station with a communication speed of 100Mbps at the boundary between the station with a communication speed of 1Gbps and the station with a communication speed of 100Mbps. For calculation of the total cyclic data size, refer to the following. (☞ Page 568 Communication cycle intervals)	■Own station information • I/O No. • Network No. • Station No. • IP address ■Target station information • Network No. • Station No. • IP address
1806H	• When "TSN HUB Setting" is set to "Not to Use TSN HUB", connection of the CC-Link IE TSN Class B devices in a star topology has been detected. • A CC-Link IE TSN Class B device is connected further on the end side than a CC-Link IE TSN Class A device.	• Disconnect the switching hub connected with the CC-Link IE TSN Class B device. • Set "TSN HUB Setting" to "Use TSN HUB". • Connect the CC-Link IE TSN Class A device further on the end side than the CC-Link IE TSN Class B device.	■Own station information • I/O No. • Network No. • Station No. • IP address ■—
1811H	A stop error has been detected in the CPU module.	Check the error of the CPU module and take action using the module diagnostics of the engineering tool.	—
1830H	Number of reception requests of transient transmission (link dedicated instruction) exceeded the upper limit of simultaneously processable requests.	Execute the instruction again after lower the transient transmission usage frequency.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
1845H	Too much processing of transient transmission (link dedicated instruction) and cannot perform transient transmission.	Correct the transient transmission (link dedicated instruction) execution count.	—
19E0H	An error was detected in the data received during EtherNet/IP communications.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • 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.	—
1D10H	Cyclic transmission skip occurred.	• Increase the value for the inter-module synchronization cycle set in "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronization Setting" in "System Parameter" so that the execution time of synchronization interrupt program does not exceed the inter-module synchronization cycle. • Increase the value for "Communication Period Interval Setting" and "Transient Transmission Time" in "Communication Period Setting" of the module parameter. • If the value is not 0 in 'Transient transmission additional time (calculation value)' (SW007A), add the value (in units of μs) to "Communication Period Interval Setting" and "Transient Transmission Time". • Reduce the program processing time by reducing the program volume so that the execution time of synchronization interrupt program does not exceed the inter-module synchronization cycle. • Reduce the refresh processing time by reducing the data targeted for synchronization refreshing so that the execution time of synchronization interrupt program does not exceed the inter-module synchronization cycle. • Set modules not requiring synchronization to asynchronous so that the execution time of synchronization interrupt program does not exceed the inter-module synchronization cycle. • Do not perform the online change (ladder block) in the CPU module.	—
1D11H	The correction value of time counter calculated by the inter-module synchronization function exceeds allowable range.	• Take measures to reduce noise. • If the same error occurs a few times even after taking the above action, the possible cause is a hardware failure of the module or base unit. Please consult your local Mitsubishi representative.	—
1D20H	The module cannot normally communicate with the device station on CC-Link IE TSN.	• To use the inter-module synchronization function, set the inter-module synchronization cycle longer than the current setting in "Fixed Scan Interval Setting" under "Inter-module Synchronization Setting" in "System Parameter". • Change the setting value greater than the current setting for "Communication Period Interval Setting" and "Transient Transmission Time" in "Communication Period Setting" of the module parameter. • If the value is not 0 in 'Transient transmission additional time (calculation value)' (SW007A), add the value (in units of μs) to "Communication Period Interval Setting" and "Transient Transmission Time". • Refer to the manual for the device stations used and if they do not support the communication cycle of "Normal-Speed" and "Low-Speed", set "Network Configuration Setting" to "Basic Period" under "Basic Settings" of the master station. • Do not perform the online change (ladder block) in the CPU module. • Check if the switching hub and the cables are connected properly. • After taking the above actions, power on the system again or reset the CPU module.	■— ■Target station information • Network No. • Station No. • IP address
1D21H	Initialization processing with the device station on CC-Link IE TSN cannot be performed correctly.	• Update the version of the station shown in detailed information 2 to the one that supports the CC-Link IE TSN network synchronous communication function. • Take measures to reduce noise. • After taking the above actions, power on the system again or reset the CPU module.	■— ■Target station information • Network No. • Station No. • IP address
20E0H	The module cannot communicate with the CPU module.	The hardware failure of the CPU module may have been occurred. Please consult your local Mitsubishi representative.	—
2160H	IP address duplication was detected.	Check and correct the IP addresses.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
2220H	• Parameters that are not supported by the firmware version of the network module have been set. • The parameter setting is corrupted.	• Check the firmware version of the network module. If parameters that are not supported are set, update the firmware version or correct the parameters. • Check the detailed information of the error by executing module diagnostics using the engineering tool, and write the displayed parameter. If the same error occurs again, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.	■Parameter information • Parameter type ■—
2221H	• The set value is out of the range. Or the setting values of the master station and local stations are not consistent. • When executing the CCPASETX instruction, CCPASET instruction, or M_RJ71GN11_SetParameterX, the settings of the master station and device stations in the network configuration setting data are not consistent. • Parameters that are not supported by the firmware version of the network module have been set. • The engineering tool does not support the parameters that are required to execute the set functions.	• Check the detailed information of the error by executing module diagnostics using the engineering tool, and correct the parameter setting corresponding to the displayed parameter number. • After reviewing whether the settings of the master station and device stations are consistent in the network configuration setting data, execute the CCPASETX instruction, CCPASET instruction, or M_RJ71GN11_SetParameterX again. • Check the firmware version of the network module. If parameters that are not supported are set, update the firmware version or correct the parameters. • Update the version of the engineering tool, and then retry the operation.	■Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No. ■—
24C0H	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	■System configuration information • I/O No. • Base No. • Slot No. • CPU No. ■—
24C1H	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	■System configuration information • I/O No. • Base No. • Slot No. • CPU No. ■—
24C2H	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	■System configuration information • I/O No. • Base No. • Slot No. • CPU No. ■—
24C3H	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	■System configuration information • I/O No. • Base No. • Slot No. • CPU No. ■—
24C6H	An error was detected on the system bus.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
2600H	The cyclic processing does not finish before the start timing for the next inter-module synchronization cycle.	• Check that the inter-module synchronous interrupt program (I44) was written to the CPU module. • Set the inter-module synchronization cycle to be longer than the current value in "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronization Setting" in "System Parameter". • Change the setting value greater than the current setting for "Communication Period Interval Setting" and "Transient Transmission Time" in "Communication Period Setting" of the module parameter. • If the value is not 0 in 'Transient transmission additional time (calculation value)' (SW007A), add the value (in units of μs) to "Communication Period Interval Setting" and "Transient Transmission Time". • Reduce the number of cyclic assignment points and the number of connected device stations, and correct the settings so that a shorter value can be set for the communication period interval setting. • Do not perform the online change (ladder block) in the CPU module.	—
2610H	An inter-module synchronization signal error (synchronization loss) was detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—
3000H	Any of the items in the module which is set as a synchronization target in "Inter-module Synchronization Setting" in "System Parameter" are set as follows. • "Station No./IP Address Setting Method" in "Required Settings" is set to "Program". • "Setting Method of Basic/Application Settings" under "Parameter Setting Method" in "Required Settings" is set to "Program". • "Network Topology" in "Basic Settings" is set to "Ring". • Although a device station in which "Network Synchronous Communication" in "Network Configuration Settings" of "Basic Settings" is set to "Synchronous" exists, the master/local module is not set as a synchronization target module in "Inter-module Synchronization Setting" in "System Parameter". • The control CPU of a master/local module is a CPU module in which the inter-module synchronization function cannot be used.	• Correct the parameters shown in cause. • Check that the control CPU is CPU No.1. Update the firmware version of the CPU module to a version supporting the inter-module synchronization function with CC-Link IE TSN, or replace the CPU module with a CPU module that supports this function.	■Parameter information • Parameter type • I/O No. • Parameter No. ■—
3009H	The result when the value set in "Communication Period Interval Setting" in "Communication Period Setting" under "Basic Settings" of the master station is multiplied by "Communication Period Setting" of the device station set in "Network Configuration Settings" under "Basic Settings" is out of the range.	Check the detailed information on module diagnostics of the engineering tool. Correct the parameter settings described below so that the result when the value set in "Communication Period Interval Setting" in "Communication Period Setting" under "Basic Settings" of the master station is multiplied by "Communication Period Setting" of the device station set in "Network Configuration Settings" under "Basic Settings" becomes within 16ms. • "Communication Period Interval Setting" in "Basic Settings" • "Communication Period Setting" of the relevant device station in "Network Configuration Settings" Set a value to "Communication Period Setting" of device stations by selecting a multiple value on "Multiple Period Setting" of "Communication Period Setting" under "Basic Settings".	■— ■Target station information • Station Number • IP address
300AH	• The combination of the local station firmware version and the master station firmware version is incorrect. • The set value is out of the range. Or the setting values of the master station and local stations are not consistent.	• Check the firmware versions of the master station and local station. If the combination is incorrect, update the firmware version of the older local station or that of the master station. • Check the detailed information of the error by executing module diagnostics using the engineering tool, and correct the parameter setting of the master station corresponding to the displayed parameter number. • If the same error occurs again, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.	■Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No. ■—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
300BH	The Announce frame send cycle parameter error was detected.	• Check the Announce frame send cycle parameter setting value of the device operating as the grandmaster. When the RJ71GN11-T2 or RJ71GN11-EIP is operating as the grandmaster, reset the CPU module, and run it again. • If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.	—
300CH	A propagation delay send cycle parameter error was detected.	• Check the propagation delay send cycle parameter setting value of the device operating as the grandmaster. When the RJ71GN11-T2 or RJ71GN11-EIP is operating as the grandmaster, reset the CPU module, and run it again. • If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.	—
300DH	The Sync frame send cycle parameter error was detected.	• Check the Sync frame send cycle parameter setting value of the device operating as the grandmaster. When the RJ71GN11-T2 or RJ71GN11-EIP is operating as the grandmaster, reset the CPU module, and run it again. • If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.	—
300EH	The set values of the master station and local station do not match.	Set the same parameter setting values for "Network No." and "Station No." of the local station to the setting values of the master station.	■Parameter information • Parameter type • I/O No. • Parameter No. • Network No. • Station No. ■—
300FH	Multiple master stations were detected in the network.	• Connect only one master station on the same network. • After taking the above action, power off and on or reset all stations where the error was detected.	■Parameter information • Parameter type • I/O No. • Parameter No. ■Overlapped type information • 5: Master station duplication
3010H	The value set in "Communication Period Interval Setting" in "Communication Period Setting" under "Basic Settings" of the master station is smaller than the communication cycle interval calculated by the number of stations and points of device stations that were set in "Network Configuration Settings" under "Basic Settings".	Set the value of "Communication Period Interval Setting" over the value in the detailed information displayed by module diagnostics using "Communication Period Setting" under "Basic Settings" of the master station. If the value in the detailed information exceeds the upper limit of "Communication Period Interval Setting" that can be set on the master station, reduce the number of modules connected to the master station and the number of link devices assigned to each module in "Network Configuration Settings" so that the value does not exceed the upper limit of "Communication Period Interval Setting".	■— ■Communication Period Interval Information • Communication Period Interval (Calculation value: μs)
3011H	The value set in "Cyclic Transmission Time" in "Communication Period Setting" under "Basic Settings" of the master station is smaller than the cyclic transmission time calculated by the number of stations and points of device stations set in "Network Configuration Settings" under "Basic Settings".	Set the value of "Cyclic Transmission Time" over the value in the detailed information displayed by module diagnostics using "Communication Period Setting" under "Basic Settings" of the master station. If the value in the detailed information exceeds the upper limit of "Cyclic Transmission Time" that can be set on the master station, reduce the number of modules connected to the master station and the number of link devices assigned to each module in "Network Configuration Settings" so that the value does not exceed the upper limit of "Cyclic Transmission Time".	■— ■Communication Period Interval Information • Cyclic Transmission Time (Calculation value: μs)

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
3013H	The value set in "Transient Transmission Time" in "Communication Period Setting" under "Basic Settings" of the master station is smaller than the transient transmission time calculated using the number of device stations and the points of device stations set in "Network Configuration Settings" under "Basic Settings".	Set "Communication Period Interval Setting" and "Cyclic Transmission Time" so that the value of "Transient Transmission Time" in "Communication Period Setting" under "Basic Settings" of the master station is equal to or larger than the value shown in the detailed information of module diagnostics.	■— ■Communication Period Interval Information • Transient Transmission Time (Calculation value: μs)
3014H	When "Communication Mode" under "Application Settings" of the master station is set to "Multicast", in the "Network Configuration Settings" of the "Basic Settings", "Communication Period Setting" of the local station is set to "Normal-Speed" or "Low-Speed".	• Set "Communication Mode" in "Application Settings" of the master station to "Unicast". • In "Network Configuration Settings" under "Basic Settings" of the master station, set "Communication Period Setting" of the local station to "Basic Period".	■Parameter information • Parameter type • I/O No. • Parameter No. ■Target station information • Station Number • IP address
3015H	Any of the items in the module which is set as a synchronization target in "Inter-module Synchronization Setting" in "System Parameter" are set as follows. • For a local station in which "Network Synchronous Communication" in "Network Configuration Settings" of "Basic Settings" is set to "Synchronous", "Communication Period Setting" is set to the setting other than "Basic Period". • For "Inter-module Synchronization Setting" in "System Parameter", a master/local module mounted to an extension base unit is set as a synchronization target module.	Correct the parameters shown in cause.	■Parameter information • Parameter type • I/O No. • Parameter No. ■—
3016H	When "Network Topology" of "Basic Settings" of the master station is set to "Ring", for "Connection Device Information" under "Basic Settings", set "CC-Link IE TSN Class Setting" to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only".	• Set "Network Topology" of "Basic Settings" of the master station to "Line/Star". • For "Connection Device Information" under "Basic Settings" of the master station, set "CC-Link IE TSN Class Setting" to "CC-Link IE TSN Class B Only".	■Parameter information • Parameter type • I/O No. • Parameter No. ■—
3017H	"0.05ms Unit Setting" of "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronization Setting" in "System Parameter" is set to "Not Set".	Set "0.05ms Unit Setting" of "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronization Setting" in "System Parameter" to "Set".	■Parameter information • Parameter type • I/O No. • Parameter No. ■—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
3021H	At startup of data link, an overlapping IP address among device stations has been detected.	Change the IP addresses of the device stations.	■Operation source information • IP address ■IP address duplication information • Duplication station 1 MAC address (1st octet, 2nd octet) • Duplication station 1 MAC address (3rd octet, 4th octet) • Duplication station 1 MAC address (5th octet, 6th octet) • Duplication station 2 MAC address (1st octet, 2nd octet) • Duplication station 2 MAC address (3rd octet, 4th octet) • Duplication station 2 MAC address (5th octet, 6th octet)
3040H	Response data of the dedicated instruction cannot be created.	• Increase the request interval. • Decrease the number of request nodes. • Wait for a response to the previous request before sending the next request. • Correct the timeout value.	—
3060H	The send/receive data size exceeds the allowable range.	• Check and change the send data size of the CC-Link IE TSN-equipped module or the external device. • If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the error module or CPU module. Please consult your local Mitsubishi representative.	—
3110H	An instruction was received to enable network synchronization for a station not supporting network synchronization.	Set "Network Synchronous Communication" for the corresponding local station to "Asynchronous" in "Network Configuration Settings" under "Basic Settings" of the master station.	—
3120H	The station-specific mode settings do not match.	Set "Station-specific mode setting" for the corresponding local station in "Network Configuration Settings" under "Basic Settings" of the master station such that it matches that of the local station.	—
3121H	The cyclic transmission setting information received from the master station exceeds the setting range.	Write the module parameter to the CPU module again. If the same error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
3130H	Devices with time synchronization priority of 0 to 15 have been connected.	Remove devices with time synchronization priority of 0 to 15, or change the priority to between 16 and 255.	■Grandmaster MAC address information • MAC address (1st octet, 2nd octet) • MAC address (3rd octet, 4th octet) • MAC address (5th octet, 6th octet) ■—
3135H	Over the number of stations that can be connected.	• Reduce the total number of stations to 31 stations (master station: 1, device station: 30) or less. • Reduce the number of CC-Link IE TSN Class B devices to eight or less for each port of the master station.	—
3136H	An illegal ring topology was detected.	Set a line topology or star topology, and turn off and on or reset all stations.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
3137H	When the positioning operation was performed in profile position mode or point table mode, a servo amplifier with a firmware version that does not allow correct positioning at the target position was detected.	Upgrade the version of the servo amplifier firmware to B9 or later.	■— ■Target station information • Network No. • Station number • IP address
3160H	The number of link device points of the device stations set to "CC-Link IE TSN Class A" in "CC-Link IE TSN Class" of "Network Configuration Settings" under "Basic Settings" exceeds the number of points that can be assigned.	In "Network Configuration Settings" under "Basic Settings", review the device assignment settings so that the number of link device points of the stations in the target station information does not exceed the number of points assigned to stations with CC-Link IE TSN Class A.	■Parameter information • Parameter type • I/O No. • Parameter No. ■Target station information • Station number • IP address
3180H	The set value is out of the range.	• Write again from the buffer memory, and reset the CPU module or power it off and on. • If the error occurs again even after rewriting, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
3181H	• The parameter was not written correctly. • The power was turned off while the parameter was being written.	• Write again from the buffer memory, and reset the CPU module or power it off and on. • If the error occurs again even after rewriting, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
31ABH	It is not possible to guarantee the send/receive of cyclic data of device stations set to "Low-Speed" in "Communication Period Setting" within the "Low-Speed" cycle.	• For "Low-Speed" under "Multiple Period Setting", set a value that is equal to or greater than the value displayed in 'Multiple cycle setting (low speed)' (Un\G1277442). • For "Communication Period Interval Setting" under "Basic Period Setting", set a value that is equal to or greater than the value displayed in 'Communication cycle intervals (Calculation value)' (Un\G1277443).	■Parameter information • Parameter type ■—
31ACH	"CC-Link IE TSN Class Setting" for the device stations set in "Network Configuration Settings" do not match "CC-Link IE TSN Class Setting" of "Connection Device Information" under "Basic Settings".	Set "CC-Link IE TSN Class Setting" in "Network Configuration Settings" of the device stations to "CC-Link IE TSN Class B". Alternatively, set "CC-Link IE TSN Class Setting" under "Connection Device Information" of "Basic Settings" to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only".	■Parameter information • Parameter type ■—
3600H	• For the inter-module synchronization cycle setting, the setting of the master station does not match the inter-module synchronization cycle setting of the local station. • "Fixed Scan Interval Setting of Inter-module Synchronization" of "Inter-module Synchronization Setting" in "System Parameter" does not match "Communication Period Interval Setting" under "Communication Period Setting" in "Basic Settings" of the module parameter. • The values out of communication cycle setting range of the network module is set in "Fixed Scan Interval Setting of Inter-module Synchronization" under "Inter-module Synchronization Setting" in "System Parameter".	• Correct the parameter so that all modules performing inter-module synchronization have the same cycle setting. • Check that the setting of "Fixed Scan Interval Setting" of "Inter-module Synchronization Setting" in "System Parameter" is consistent with the one of the communication cycle of the network module.	■Parameter information • Parameter type • I/O No. • Parameter No. ■—
3601H	A mismatch occurs between the network synchronous communication setting in the network configuration settings of the master station and the inter-module synchronization target module selection of the local station.	Change the parameter so that the setting of "Select Inter-module Synchronization Target Module" under "Inter-module Synchronization Setting" is the same as the setting of "Network Synchronous Communication" under "Network Configuration Settings" in the "Basic Settings".	■Parameter information • Parameter type • I/O No. • Parameter No. ■—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
3602H	Inter-module synchronization cycle failure occurred between networks.	• Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. • Check if the switching hub and the cables are connected properly. • After taking the above action, power off and on or reset all stations where the error was detected. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
3603H	The number of the slot on which a module that cannot be set as the synchronization master is mounted on is set in "Mounting Slot No." of the synchronization master in "System Parameter".	Correct the setting of "Mounting Slot No." of the synchronization master in "System Parameter".	—
3604H	A module to operate as an inter-module synchronous master could not output an inter-module synchronization signal.	• Check if the switching hub and the cables are connected properly. • Power off and on or reset the own station. • When an error with this error code is detected in multiple RJ71GN11-T2s (local stations) and/or RJ71GN11-EIPs (local stations), power off and on or reset the RJ71GN11-T2s (local stations) and/or RJ71GN11-EIPs (local stations) in order of connection nearest to the master station.	■— ■Synchronous master setting information • Synchronous master mounted slot number
3605H	A module to operate as an inter-module synchronous master could not output an inter-module synchronization signal.	• Check the master station condition. • Check the error of the master station and take action using the module diagnostics of the engineering tool. • Check that the settings of the master station are consistent with those of the device station in "Network Configuration Settings" under "Basic Settings" of the master station. • Check that the settings of the master station are consistent with the one of the local station in "IP Address" under "Required Settings" of the local station. • Correct the "IP Filter Settings" under "Application Settings". • Check if the switching hub and the cables are connected properly. • Power off and on or reset the own station. • When an error with this error code is detected in multiple RJ71GN11-T2s (local stations) and/or RJ71GN11-EIPs (local stations), power off and on or reset the RJ71GN11-T2s (local stations) and/or RJ71GN11-EIPs (local stations) in order of connection nearest to the master station.	■— ■Synchronous master setting information • Synchronous master mounted slot number
3607H	The correction value of time counter calculated by the inter-module synchronization function exceeds allowable range successively.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module or base unit. Please consult your local Mitsubishi representative.	—
3608H	Inter-module synchronization signals have not been input for a certain period of time.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module or base unit. Please consult your local Mitsubishi representative.	—
3609H	An error has been detected in the inter-module synchronization function.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module or base unit. Please consult your local Mitsubishi representative.	—
360AH	An error has been detected in the inter-module synchronization function.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module or base unit. Please consult your local Mitsubishi representative.	—
360BH	An error has been detected in the inter-module synchronization function.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module or base unit. Please consult your local Mitsubishi representative.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
360CH	An error has been detected in the inter-module synchronization function.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module or base unit. Please consult your local Mitsubishi representative.	—
360DH	• When multiple network modules are set as the target modules for inter-module synchronization, the network module with the firmware version that cannot be set as the inter-module synchronous master. • An error has been detected in the inter-module synchronization function.	• Update the firmware version of the network module which is set for the inter-module synchronous master to "11" or later. • Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module or base unit. Please consult your local Mitsubishi representative.	—
3C00H	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—
3C01H	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—
3C02H	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—
3C0FH	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—
3C10H	A hardware failure has been detected.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the module, base unit, or extension cable. Please consult your local Mitsubishi representative.	—
3C13H	A hardware failure has been detected.	Reset the CPU module, and run it again. If the same error occurs again even after doing so, the possible cause is a hardware failure of the error module or CPU module. Please consult your local Mitsubishi representative.	—
3C14H	A hardware failure has been detected.	Reset the CPU module, and run it again. If the same error occurs again even after doing so, the possible cause is a hardware failure of the error module or CPU module. Please consult your local Mitsubishi representative.	—
3C2FH	An error was detected in the memory.	Reset the CPU module, and run it again. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
3E01H	Network type of the own station is unexpected setting.	Rewrite the module parameter using the engineering tool. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
3E02H	A time synchronization error was detected.	Reset the CPU module, and run it again. If the same error occurs again even after doing so, the possible cause is a hardware failure of the error module or CPU module. Please consult your local Mitsubishi representative.	—
3E03H	An error was detected in the memory.	Reset the CPU module, and run it again. If the same error occurs again even after doing so, the possible cause is a hardware failure of the error module or CPU module. Please consult your local Mitsubishi representative.	—
3E04H	A hardware failure has been detected.	Reset the CPU module, and run it again. If the same error occurs again even after doing so, the possible cause is a hardware failure of the error module or CPU module. Please consult your local Mitsubishi representative.	—
3E07H	A hardware failure has been detected.	Reset the CPU module, and run it again. If the same error occurs again even after doing so, the possible cause is a hardware failure of the error module or CPU module. Please consult your local Mitsubishi representative.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
4000H to 4FFFH	Errors detected by the CPU module (MELSEC iQ-R CPU Module User's Manual (Application))		
C011H	The port number of the external device is not set correctly.	Correct the port number of the external device.	—
C012H	The port number used in a connection already opened is set. (For TCP/IP)	Correct the port numbers of the CC-Link IE TSN-equipped module and the external device.	—
C013H	The port number used in a connection already opened is set. (For UDP/IP)	Correct the port numbers of the CC-Link IE TSN-equipped module and the external device.	—
C015H	The data was sent to the connected device while the IP address setting of the device set in the network configuration setting was incorrect.	• Correct the IP address of the connected device in the network configuration setting. • Check that the IP address class of the connected device is set to A, B, or C in the network configuration setting.	—
C017H	A connection could not be established in the open processing.	• Check the operation of the external device. • Check if the open processing has been performed in the external device. • When a firewall is set in the external device, check if access is permitted. • Check if the Ethernet cable is connected properly.	—
C018H	The specified IP address of the external device is incorrect.	Correct the specified IP address of the external device.	—
C020H	The send/receive data length exceeds the allowable range.	• Correct the data length to be sent. • When the amount of data to be sent exceeds the limit, divide the data into smaller chunks to send it.	—
C027H	Sending a message over socket communication failed.	• Check the operation of the external device or switching hub. • Since there may be congestion of packets on the line, send data after a certain period of time. • Check if the connection cable is disconnected. • Check that there is no connection failure with the switching hub. • Execute the communication status test, and if the test was completed with an error, take the corrective action. • Execute the module communication test, and check that there is no failure in the module. • Check the IP address specified as the destination.	—
C032H	The external device does not send an ACK response in the TCP/IP communications.	• Since there may be congestion of packets on the line, send data after a certain period of time. • Check if the Ethernet cable is connected properly.	—
C035H	The alive status of an external device could not be checked.	• Check the operation of the external device. • Correct the timer settings for data communication of the CC-Link IE TSN-equipped module. • Check if the Ethernet cable is connected properly.	—
C037H	• The receive buffer or send buffer is not sufficient. • The window size of the external device is not sufficient.	• Check the operation of the external device or switching hub. • When the value of the 'Receive buffer status storage area' (Un\G6291486) is 0001H, reduce the frequency of data received from the external device.	—
C038H	Data was not sent correctly with UDP/IP.	• Check that the external device (including a switching hub) has no error in the connection setting, operation (an error and being in a reset state, or others), and connection (error such as a connection cable being disconnected). • Since there may be congestion of packets on the line, send data after a certain period of time. • Execute the PING test and communication status test, and if the test was completed with an error, take the corrective action. • Correct the network number and station number or IP address of the target station of the dedicated instruction.	—
C039H	Data was not sent correctly via TCP/IP.	• Check that the external device (including a switching hub) has no error in the connection setting, operation (an error and being in a reset state, or others), and connection (error such as a connection cable being disconnected). • Since there may be congestion of packets on the line, send data after a certain period of time. • Execute the PING test and communication status test, and if the test was completed with an error, take the corrective action.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
C040H	• Not all the data could be received within the response monitoring timer value. • Sufficient data for the data length could not be received. • The remaining part of the message divided at the TCP/IP level could not be received.	• Correct the data length of the communication data. • Since there may be congestion of packets on the line, send the data again from the external device after a random amount of time has passed.	—
C050H	ASCII code data that cannot be converted to binary code was received.	Check if the ASCII code data that cannot be converted into binary code data was sent from the external device.	—
C051H	• The number of read/write points from/to the device of SLMP message is out of the allowable range in the CPU module (in units of words). • The number of write points for the long counter of SLMP message is not in two-word units.	Correct the number of read/write points and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C052H	The number of read/write points from/to the device of SLMP message is out of the allowable range in the CPU module (in units of bits).	Correct the number of read/write points and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C053H	The number of read/write points from/to the random device of SLMP message is out of the allowable range in the CPU module (in units of bits).	Correct the number of read/write points and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C054H	The number of read/write points from/to the random device of SLMP message is out of the allowable range in the CPU module (in units of words, double words).	Correct the number of read/write points and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C055H	The read/write size from/to the file data of SLMP message is out of the allowable range.	Correct the number of read/write points and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C056H	The read/write request exceeds the largest address.	• Correct the start address or the number of read/write points so that the request does not exceed the largest address, and send the data to the CC-Link IE TSN-equipped module again. • If the access target and connection stations are modules of the MELSEC iQ-R series, send the SLMP message to the CC-Link IE TSN-equipped module again using subcommands 00□3 and 00□2.	—
C057H	The request data length of the SLMP message does not match the number of data in the character (a part of text).	Check and correct the text or request data length, and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C058H	The request data length of the SLMP message after the ASCII/binary conversion does not match with the number of data in the character (a part of text).	Check and correct the text or request data length, and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C059H	• The specified command and subcommand of the SLMP message are incorrect • A function that is not supported by the target device was executed.	• Check that there are no errors in the specification of the command and subcommand of the SLMP message. • Check whether the function executed is supported by the target device. • Check the version of the target device.	—
C05AH	The CC-Link IE TSN-equipped module cannot read/write data from/to the device specified in the SLMP message.	Correct the specification of the device to be read/written and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C05BH	The CC-Link IE TSN-equipped module cannot read/write data from/to the device specified in the SLMP message.	Correct the specification of the device to be read/written and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C05CH	The received request data of the SLMP message is incorrect.	Correct the request data and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C05DH	The "Monitor Request" command is received before the monitor registration is performed by the "Monitor Registration/Clear" command of the SLMP message.	Register the monitoring data using "Monitor Registration/Clear" command and perform monitoring.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
C05EH	• The time between reception of the SLMP message by the CC-Link IE TSN-equipped module and the returned response from the access destination exceeded the monitoring timer value set in the SLMP command. • An unresponsive command was sent to another network station as the access destination. (If this error does not cause any problems, it can be ignored.)	• Increase the monitoring timer value. • Check if the access destination is operating normally. • Correct the network number or request destination station number. • If the access destination is a module with a different network number, correct the routing parameter setting. • If the access destination is a module with a different network number, check if the network number is not in use.	—
C05FH	This request cannot be executed to the access destination specified by the SLMP message.	Correct the access destination.	—
C060H	The request details for bit devices of the SLMP message is incorrect.	Correct the request details and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C061H	• The request data length of the SLMP message does not match the number of data in the character (a part of text). • The write data length specified by the label write command is not even byte.	• Check and correct the text or request data length, and send the SLMP message to the CC-Link IE TSN-equipped module again. • Add one byte of dummy data, and specify the length as an even number of bytes.	—
C06FH	The network number of request destination specified by the SLMP request message is not available for communications with the station number 121 or larger.	• If the 3E or 4E frame is used at SLMP, check that there is no error for the network number of the request destination and station number. • If the station number extension frame is used at SLMP, check that there is no error for the network number of the request destination and station number.	—
C070H	The device memory cannot be extended for the access destination specified by the SLMP message.	• Correct the SLMP message to read/write data without the device memory set for extension. • Specify the extension of the device memory only for a CC-Link IE TSN-equipped module mounted station and a MELSEC iQ-R/Q/QnACPU via CC-Link IE Controller Network, MELSECNET/H, or MELSECNET/10.	—
C071H	The number of device points for data read/write set for modules other than a MELSEC iQ-R/Q/QnACPU with the SLMP message is out of the range.	Correct the number of read/write points and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C072H	The request details of the SLMP message are incorrect. (For example, a request for data read/write in bit units has been issued to a word device.)	• Check if the data can be requested to the access destination. • Correct the request details and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C073H	The access destination of the SLMP message cannot issue this request. (For example, the number of double word access points cannot be specified for modules other than a MELSEC iQ-R/Q/QnACPU.)	Correct the request details of the SLMP message.	—
C075H	The request data length for the label access is out of range.	• Correct the number of array points or the number of read/write points and send the SLMP message to the CC-Link IE TSN-equipped module again. • Correct the number of abbreviated label points and send the SLMP message to the CC-Link IE TSN-equipped module again. • Correct the label name length and send the SLMP message to the CC-Link IE TSN-equipped module again. • Correct the label to shorten the label name and send the SLMP message to the CC-Link IE TSN-equipped module again. • Correct the read/write data length and send the SLMP message to the CC-Link IE TSN-equipped module again.	—
C081H	The termination processing for the CC-Link IE TSN-equipped module that is involved with the reinitialization processing is being performed, and arrival of link dedicated instructions cannot be checked.	Finish all the communications to perform the reinitialization processing of the CC-Link IE TSN-equipped module.	—
C087H	IP address of the destination external device could not be acquired.	• Correct the IP address in the network station number ↔ IP information setting. • Check if the network or station number of the external device is correctly specified by using control data of the dedicated instruction. • Check if the Ethernet cable is connected properly.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
C0B2H	There is insufficient space in the receive buffer or the send buffer of the relay station or external station for the MELSOFT connection, link dedicated instructions, or SLMP. (Send · receive buffer full error)	Increase the request interval (execution interval) and execute the operation. • Do not access through one station using the MELSOFT connection, link dedicated instruction, or SLMP. • Wait for a response to the previous request before sending the next request. • Correct the time setting values for data communications of the CC-Link IE TSN-equipped module.	—
C0B3H	A request that cannot be processed was issued from the CPU module.	• Correct the request details. • Correct the network number or request destination station number.	—
C0D4H	The number of relay stations to communicate with other networks exceeds the allowable range.	• Check if the specification (network number/station number) for the communication destination is correct. • Check that the number of relay stations accessing the communication destination is 7 or less. • Correct the settings in the network station number ↔ IP information setting for the stations between the own station and the communication destination.	—
C0D8H	The number of specified blocks exceeded the range.	Correct the number of blocks.	—
C0D9H	The specified subcommand of the SLMP message is incorrect.	Correct the subcommand.	—
C1A4H	• There is an error with the command, subcommand, or request destination module I/O number specified by the SLMP message. • A function that is not supported by the target device was executed.	• Correct the command, subcommand, or request destination module I/O number specified by SLMP message. • Check the version of the target device.	—
C1A6H	The specified connection number is incorrect.	Correct the setting value of the connection number.	—
C1A7H	The specified network number is incorrect.	Correct the specified network number.	—
C1A9H	The specified device number is incorrect.	Correct the specified device number.	—
C1ADH	The specified data length is incorrect.	Correct the specified data length.	—
C1AFH	The specified port number is incorrect.	Correct the specified port number	—
C1B0H	The open processing of the specified connection has been already completed.	• Do not perform the open processing for a connection already opened. • When communications with the external device cannot be performed, perform the close processing before the open processing.	—
C1B1H	The open processing of the specified connection has not been completed.	After completion of the open processing, perform the communication.	—
C1B2H	The open or close processing using the CONOPEN/CONCLOSE/OPEN/CLOSE instruction is being executed in the specified connection.	Execute again after the CONOPEN/CONCLOSE/OPEN/CLOSE instruction is completed.	—
C1B9H	The CONOPEN/OPEN instruction cannot be executed for the specified connection.	Correct the specified connection.	—
C1BAH	The dedicated instruction was executed with the initialization not completed.	Execute the dedicated instruction after the initial processing is completed.	—
C1C2H	When the dedicated instruction was executed, data was received twice.	• Check the network status and take corrective action using the Ethernet diagnostics of the engineering tool. • Check if the switching hub and the cables at the request source are connected properly. • If the request source is on another network, check if the routing parameters are set correctly, and take action.	—
C1CCH	A response of the data length that exceeds the allowable range was received by the SLMPSND instruction.	• Execute the instruction again after correcting the request data to be within the range. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
C1D3H	The dedicated instruction not supported by the communication method of the connection was executed.	• Check that the dedicated instruction can be executed by the specified communication method. Correct the program when the instruction cannot be executed. • Check that there is no error in the connection specification of the dedicated instruction.	—
C200H	The remote password is incorrect.	Correct the remote password, and unlock/lock the remote password again.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
C201H	The remote password status of the port used for communications is in the lock status.	After unlocking the remote password, perform communications.	—
C202H	When another station was accessed, the remote password could not be unlocked.	When accessing another station, do not set the remote password on the relay station or access station, or do not execute the remote password check on them.	—
C203H	An error has occurred when checking the remote password.	Correct the remote password, and unlock/lock the remote password again.	—
C204H	The device is different from the one requesting the remote password unlock processing.	Request the lock processing of the remote password from the external device that requested the unlock processing of the remote password.	—
C207H	The file name has too many characters.	Name the file with 255 characters or less.	—
C208H	The password length is out of range.	Set the password within 6 to 32 characters.	—
C612H	The module processing was completed with an error.	• Execute the communication status test, and if the test was completed with an error, take the corrective action. • Execute the module communication test, and check that there is no failure in the module.	—
C613H	The module processing was completed with an error.	• Execute the communication status test, and if the test was completed with an error, take the corrective action. • Execute the module communication test, and check that there is no failure in the module.	—
C615H	The module processing was completed with an error.	• Execute the communication status test, and if the test was completed with an error, take the corrective action. • Execute the module communication test, and check that there is no failure in the module.	—
C810H	Remote password authentication has failed when required.	Set a correct password and perform password authentication again.	—
C811H	Remote password authentication has failed when required.	Set a correct password and perform password authentication again one minute later.	—
C812H	Remote password authentication has failed when required.	Set a correct password and perform password authentication again 5 minutes later.	—
C813H	Remote password authentication has failed when required.	Set a correct password and perform password authentication again 15 minutes later.	—
C814H	Remote password authentication has failed when required.	Set a correct password and perform password authentication again 60 minutes later.	—
C815H	Remote password authentication has failed when required.	Set a correct password and perform password authentication again 60 minutes later.	—
C816H	The security function was activated and remote password authentication cannot be performed.	Set a correct password and perform password authentication again after a certain period of time.	—
C842H	The routing setting is not set to reach to the destination network number.	• Execute the link dedicated instruction again after correcting the target network number/station number. • When the dynamic routing is used, check that communication path to the destination network number is set. • When the dynamic routing is not used, or the module of the series other than MELSEC iQ-R is included, retry the operation after correcting the routing setting.	—
C844H	Incorrect frame was received. • Unsupported command	• Replace the network module with a module of the version supporting the function that has been executed. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
C900H	Communication failed.	Do not execute communication from multiple engineering tools to the same master station simultaneously.	—
C901H	The size of the request data to the external device or response data from the external device exceeds the range supported for communications.	Correct the size of the request data or response data to within 1500 bytes.	—
C902H	Communication was interrupted because no response was returned from the external device.	Execute the communication test, and if the test was completed with an error, take corrective action.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
C903H	Failed to send request to the external device.	• Correct the IP address of the external device. • Check if the subnet mask of the external device matches the master station. • Check if the communication speed matches the communication speed of the external device. • Check if the cables are properly connected and that there is no error.	—
CF40H	Incorrect frame was received.	• Check the operating status and connection status of the target device. • Check the connection of the Ethernet cable and switching hub. • Check the line status of Ethernet. • Reset the CPU module and target device, and retry the operation. If the above actions do not solve the problem, contact the manufacturer of the target device.	—
CF41H	Incorrect frame was received.	• Check the operating status and connection status of the target device. • Check the connection of the Ethernet cable and switching hub. • Check the line status of Ethernet. • Reset the CPU module and target device, and retry the operation. If the above actions do not solve the problem, contact the manufacturer of the target device.	—
CF42H	Incorrect frame was received.	• Check the operating status and connection status of the target device. • Check the connection of the Ethernet cable and switching hub. • Check the line status of Ethernet. • Reset the CPU module and target device, and retry the operation. If the above actions do not solve the problem, contact the manufacturer of the target device.	—
CF43H	An error has occurred.	• Check the operating status of the external device. • Check if there is any error in the line status. If the above actions do not solve the problem, contact the manufacturer of the target device.	—
CF44H	Incorrect frame was received.	• Check the operating status and connection status of the target device. • Check the connection of the Ethernet cable and switching hub. • Check the line status of Ethernet. • Reset the CPU module and target device, and retry the operation. If the above actions do not solve the problem, contact the manufacturer of the target device.	—
D03BH	Enabling the remote device test function failed because the operating status of the CPU module is not in STOP state (except for a stop error occurrence).	Enable the remote device test function after the operating status of the CPU module changes to STOP state (except for a stop error occurrence).	—
D03CH	The own station is not set as a master station and enabling remote device test function failed.	Enable the remote device test function in the master station.	—
D0A3H	Send processing of the transient transmission has failed.	• Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Correct the target station number of transient data, and retry the operation. • When the access destination is a module with a different network number, check if "Routing Setting" of "CPU Parameter" is correctly set.	—
D0B0H	Executed again while IP address setting or indicator display processing was in progress.	• Instruction execution is in progress, so try again after completion. • Check if there is any problem with the connection of the cables at the request source and the switching hub. • Check if the Ethernet cable is connected properly. • Check whether the function executed is supported by the target device. • Check the version of the target device. • After 30 seconds have elapsed, retry the operation to the target device. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D0B1H	The destination is incorrect or does not exist during IP address setting or indicator display processing.	• Check if there is any problem with the connection of the cables at the request source and the switching hub. • Check if the Ethernet cable is connected properly.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D0B2H	Unable to receive a response from the destination for IP address setting and indicator display processing.	• Check if there is any problem with the connection of the cables at the request source and the switching hub. • Check if the Ethernet cable is connected properly. • Check whether the function executed is supported by the target device. • Check the version of the target device.	—
D0B3H	The target device does not support the IP address setting function or indicator display function.	• Check whether the function executed is supported by the target device. • Check the version of the target device.	—
D0B4H	Transient transmission failed during IP address setting or indicator display processing.	• Reset the CPU module and target device, and retry the operation. • If the above actions do not solve the problem, contact the manufacturer of the target device.	—
D0B5H	Transient transmission failed during IP address setting or indicator display processing.	• Check if there is any problem with the connection of the cables at the request source and the switching hub. • Check if the Ethernet cable is connected properly. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D203H	The read data or write address of the transient transmission is incorrect.	Execute the instruction again after correcting the read data or write address at the transient request source.	—
D205H	The target station number of transient transmission is incorrect.	Execute the instruction again after correcting the target station number at the transient request source.	—
D20AH	The target station number of transient transmission is incorrect.	Execute the instruction again after correcting the target station number at the transient request source.	—
D20BH	There was no master station when the specified master station was specified for transient transmission.	Execute the instruction again after correcting the target station number at the transient request source.	—
D20CH	There was no master station when the current master station was specified for transient transmission.	Execute the instruction again after correcting the target station number at the transient request source.	—
D20DH	Data sending completion wait timeout has occurred in transient data transmission.	• Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Execute the instruction again after lower the transient transmission usage frequency. • Check if the switching hub and the Ethernet cables at the request source are connected properly.	—
D20EH	The header information of transient transmission is incorrect.	Execute the instruction again after correcting the header information at the transient request source.	—
D20FH	In transient transmission, the command which cannot be requested to all or a group of stations was executed with all stations specification or group specification.	Execute the instruction again after checking that the command can be requested to all or a group of stations at the transient request source.	—
D213H	• The command of transient transmission is incorrect. • The CC-Link IE TSN/CC-Link IE Field diagnostics was used for the network to which the relay receiving station belongs. • The module at the connection destination does not support this function.	• Execute the instruction again after correcting the request command at the transient request source. • Review the connection destination so that the CC-Link IE TSN/CC-Link IE Field diagnostics is used for the network to which the relay sending station belongs. • Check the manual for the module at the connection destination and check the status of support for this function. If not supported, update the firmware version to the one that supports this function.	—
D214H	The data length of transient transmission is incorrect.	Execute the instruction again after correcting the data length at the transient request source, and retry the operation.	—
D239H	SLMP transmission failed.	• Retry the operation after a while. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D240H	The network number specification of the dedicated instruction is incorrect.	• Execute the instruction again after correcting the network number at the request source of the dedicated instruction. • If the request source is on another network, check if "Routing Settings" of CPU parameters are set correctly, and take action.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D241H	The target station number of the dedicated instruction is incorrect.	• Execute the instruction again after correcting the target station number at the request source of the dedicated instruction. • If the request source is on another network, check if "Routing Settings" of CPU parameters are set correctly, and take action.	—
D242H	The command code of the dedicated instruction is incorrect.	• Execute the instruction again after correcting the command code at the request source of the dedicated instruction. • If the request source is on another network, check if "Routing Settings" of CPU parameters are set correctly, and take action.	—
D243H	The channel specified in the dedicated instruction is incorrect.	• Execute the instruction again after correcting the used channel within the allowable range at the request source of the dedicated instruction. • If the request source is on another network, check if "Routing Settings" of CPU parameters are set correctly, and take action.	—
D244H	The transient data is incorrect.	• Execute the instruction again after correcting the transient data at the transient request source. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D245H	The target station number of the dedicated instruction is incorrect.	• Execute the instruction again after correcting the target station number at the request source of the dedicated instruction. • If the request source is on another network, check if "Routing Settings" of CPU parameters are set correctly, and take action.	—
D247H	When the dedicated instruction was executed, response from the target station was received twice.	• Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. • Check if the switching hub and the Ethernet cables at the request source are connected properly. • If the request source is on another network, check if "Routing Settings" of CPU parameters are set correctly, and take action.	—
D249H	The target station CPU type of the dedicated instruction is incorrect.	• Execute the instruction again after correcting the CPU type of the target station at the request source of the dedicated instruction. • If the request source is on another network, check if "Routing Settings" of CPU parameters are set correctly, and take action.	—
D24AH	The arrival monitoring time specification of the dedicated instruction is incorrect.	• Execute the instruction again after correcting the arrival monitoring time at the request source of the dedicated instruction. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Execute the instruction again after lower the transient transmission usage frequency. • Check if the switching hub and the Ethernet cables at the request source are connected properly.	—
D24BH	The number of resends specified in the dedicated instruction is incorrect.	• Execute the instruction again after correcting the number of resends at the request source of the dedicated instruction. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Execute the instruction again after lower the transient transmission usage frequency. • Check if the switching hub and the Ethernet cables at the request source are connected properly.	—
D24CH	The network number specification of the dedicated instruction is incorrect.	• Execute the instruction again after correcting the network number at the request source of the dedicated instruction. • If the request source is on another network, check if "Routing Settings" of CPU parameters are set correctly, and take action.	—
D24DH	The channel specified in the dedicated instruction is incorrect.	• Set 1 to 8 for the target channel number in the control data when executing the SEND instruction. • Set 1 to 32 for the channel number when executing the REMFR/REMTO/REMFRD/REMTOD instruction. • Execute the instruction again after correcting the channel number used by own station in the control data.	—
D24EH	The target station setting in the dedicated instruction is incorrect.	• The value set for the control block of the dedicated instruction is out of range. Execute the instruction again after correcting the value. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D251H	• At execution of a dedicated instruction, or group specification or all stations specification of the target station, the execution type is set with arrival check. • For the REQ instruction, the specified request type is incorrect.	• Execute the dedicated instruction again after changing the execution type in the control data to no arrival check. • For the REQ instruction, execute it again after correcting request type. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D253H	A response timeout has occurred when the dedicated instruction was executed.	• Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. • For IP address specification, it is not possible to target stations beyond a relay station. Execute the dedicated instruction by specifying the network number/station number. • Execute the instruction again after increasing the number of resends at the request source of the dedicated instruction. • Execute the instruction again after lower the transient transmission usage frequency. • When "Dynamic Routing" in "Application Settings" is set to "Enable", check the 'Communication path determination status' (Un\G1260544 to Un\G1260559) and check if communication to the target network number is possible. • Execute the dedicated instruction for a target station that supports the executed dedicated instruction. • For the RECV instruction, execute it again after correcting the own station storage channel in the control data. • For the RECV instruction, check that 'RECV execution request flag CH1' (SB0030) to 'RECV execution request flag CH8' (SB0037) are on. • For the SLMPSND instruction, execute it again after checking if the destination port number set in the control data is the available port number using the manual of the external device. • Correct the network number and station number/IP address of the target station of the dedicated instruction. • Check if the Ethernet cable is connected properly. • For the REMFR/REMTO/REMFRD/REMTOD instruction, increase 'REMFR/REMTO instruction resend count' (SW001A) or 'REMFR/REMTO instruction response wait timer time' (SW001B) at the request source and try again. • If the request destination is on another network, check if the CPU module working as the relay station supports the routing setting, and take action. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D254H	A dedicated instruction which the target station does not support was executed.	• Change the target station at the station that executed the SEND instruction. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D255H	The target station number of the dedicated instruction is incorrect.	• Execute the instruction again after correcting the target station number in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D256H	The execution or error completion type of the dedicated instruction is incorrect.	• Execute the instruction again after correcting the execution or error completion type in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D257H	The request type of the REQ instruction is incorrect.	• Execute the instruction again after correcting the request type in the request data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D258H	The control station does not exist when the dedicated instruction was executed to the specified control station or current control station.	• Execute the instruction again after correcting the target station number in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D25AH	The dedicated instruction was executed specifying the channel in use.	• Retry the operation after a while. • Change the channels used by own station or the target station storage channel in the control data.	—
D25BH	The dedicated instruction was executed specifying the channel in use.	Change the channels used by own station or the target station storage channel in the control data.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D25DH	The transient data is incorrect.	• Execute the instruction again after correcting the transient data at the transient request source. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D25FH	The REMFR/REMTO/REMFRD/REMTOD/ REMFRIP/REMFRDIP/REMTOIP/ REMTODIP instruction was executed from a module with a station type that cannot execute it.	The REMFR/REMTO/REMFRD/REMTOD/REMFRIP/REMFRDIP/ REMTOIP/REMTODIP instruction can only be used for a master station. Modify the program so the REMFR/REMTO/REMFRD/REMTOD/REMFRIP/ REMFRDIP/REMTOIP/REMTODIP instructions are not used.	—
D260H	The REMFR/REMTO/REMFRD/REMTOD/ REMFRIP/REMFRDIP/REMTOIP/ REMTODIP instruction was executed from a module with a station type that cannot execute it.	The REMFR/REMTO/REMFRD/REMTOD/REMFRIP/REMFRDIP/ REMTOIP/REMTODIP instruction can only be used for a master station. Modify the program so the REMFR/REMTO/REMFRD/REMTOD/REMFRIP/ REMFRDIP/REMTOIP/REMTODIP instructions are not used.	—
D262H	The total number of device stations specified in the CCPASET/CCPASETR instruction is incorrect.	• Execute the instruction again after correcting the total number of device stations in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D263H	The constant link scan time setting of the CCPASET/CCPASETR instruction is incorrect.	• Execute the instruction again after correcting the constant link scan time in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D264H	The station number setting of the CCPASET/CCPASETR instruction is incorrect.	• Execute the instruction again after correcting the station number in the network configuration setting data so it is within 1 to 120. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D265H	The station number specified for the CCPASET/CCPASETR instruction is already in use.	• Execute the instruction again after correcting the station number in the network configuration setting data to a unique value. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D266H	The number of occupied stations specified in the CCPASET/CCPASETR instruction is incorrect.	• Execute the instruction again after correcting the number of occupied stations in the network configuration setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D267H	The station type of the CCPASET/ CCPASETR instruction is incorrect.	• Execute the instruction again after correcting the station type in the network configuration setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D268H	The link device range assignment specified for each station in the CCPASET/ CCPASETR instruction is incorrect.	• Execute the instruction again after correcting the offset or the number of link device points in the network configuration setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D269H	The station type of the REMFR/REMTO/ REMFRD/REMTOD/REMFRIP/ REMFRDIP/REMTOIP/REMTODIP instruction target station is not a remote station.	• Set the station type of the REMFR/REMTO/REMFRD/REMTOD/ REMFRIP/REMFRDIP/REMTOIP/REMTODIP instruction target station to a remote station. • Correct the network number and station number/IP address of the target station of the dedicated instruction.	—
D26AH	The target station of the REMFR/REMTO/ REMFRD/REMTOD/REMFRIP/ REMFRDIP/REMTOIP/REMTODIP instruction does not exist.	If the target station of the REMFR/REMTO/REMFRD/REMTOD/REMFRIP/ REMFRDIP/REMTOIP/REMTODIP instruction is disconnected, execute the dedicated instruction again after return of the target station.	—
D26BH	The network number setting of the CCPASET/CCPASETR instruction executing station is incorrect.	Set "Network No." under "Network No." of "Required Settings" to between 1 and 239.	—
D26CH	The station type and station number of the CCPASET/CCPASETR instruction executing station are incorrect.	Rewrite the module parameter using the engineering tool. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
D273H	The request data size of transient transmission is incorrect.	• Execute the instruction again after correcting the request command at the transient request source. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D275H	Other dedicated instructions are in execution, and the executed instruction cannot be processed.	• Execute the instruction again after a while. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D27CH	The network topology setting of the CCPASET/CCPASETR instruction is incorrect.	• Execute the instruction again after correcting the network topology setting in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2C0H	The network number setting of the CCPASETX instruction executing station is incorrect.	Set "Network No." under "Network No." of "Required Settings" to between 1 and 239.	—
D2C1H	The station type and station number of the CCPASETX instruction executing station are incorrect.	Rewrite the module parameter using the engineering tool. If the same error occurs again even after taking the above action, the possible cause is a hardware failure of the error module. Please consult your local Mitsubishi representative.	—
D2C5H	The IP address of the device station in the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting the IP address of the device station in the network configuration setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2C6H	The communication cycle setting for the device station of the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting the communication cycle setting of the device station in the network configuration setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2C7H	The number of occupied stations specified in the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting the number of occupied stations in the network configuration setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2C8H	The station type of the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting the station type in the network configuration setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2C9H	The station number setting of the CCPASETX instruction is incorrect.	• When "Station Type" in the network configuration setting data is set to "Master Station", correct "Station Number" to 0 and when "Station Type" is set to the type other than "Master Station", correct "Station Number" to a value within 1 to 120. Then, execute the instruction again. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2CAH	The total number of device stations specified in the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting the total number of device stations in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2CBH	The network topology setting of the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting the network topology setting in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2CCH	The disconnection detection setting of the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting the disconnection detection setting in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2CDH	The communication mode of the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting the communication mode in the control data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2CEH	The communication cycle setting of the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting "Setting in Units of 1μs", "Communication Period interval setting", "System Reservation time", "Cyclic Transmission time", "Normal-Speed", and "Low-Speed" in the communication cycle setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2D0H	The station number specified for the CCPASETX instruction is already in use.	• Execute the instruction again after correcting the station number in the network configuration setting data to a unique value. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D2D1H	The link device range assignment specified for each station in the CCPASETX instruction is incorrect.	• Execute the instruction again after correcting the offset or the number of link device points in the network configuration setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2D2H	The IP address/port number of the target station is incorrect.	• Execute again after correcting the port number of the target station in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D2D3H	Send processing of the transient transmission has failed.	• Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Execute the instruction again after correcting the target IP address of transient data. • If the access destination is a module with a different network number, correct the routing parameter setting.	—
D602H	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D605H	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D60BH	Parameter error (device overlap error (LB))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D60CH	Parameter error (device overlap error (LW))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D60DH	Parameter error (each station device range assignment error (LB))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D60EH	Parameter error (each station device range assignment error (LB))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D60FH	Parameter error (each station device range assignment error (LW))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D610H	Parameter error (each station device range assignment error (LW))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D611H	Parameter error (each station device range assignment error (RWw))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D612H	Parameter error (each station device range assignment error (RWw))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D613H	Parameter error (each station device range assignment error (RWr))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D614H	Parameter error (each station device range assignment error (RWr))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D615H	Parameter error (each station device range assignment error (RY))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D616H	Parameter error (each station device range assignment error (RY))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D617H	Parameter error (each station device range assignment error (RX))	• Write the network parameter to the CPU module again. • Execute again after correcting the size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D618H	Parameter error (each station device range assignment error (RX))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D619H	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D61AH	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D61BH	Parameter error (device overlap error (RWw))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D61CH	Parameter error (device overlap error (RWr))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D61DH	Parameter error (device overlap error (RY))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D61EH	Parameter error (device overlap error (RX))	• Write the network parameter to the CPU module again. • Execute again after correcting the offset or size of the device station link device in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D61FH	Parameter setting by the CCPASET/ CCPASETR instruction has failed.	• Execute the CCPASET/CCPASETR instruction again after setting "Setting Method of Basic/Application Settings" under "Parameter Setting Method" in "Required Settings" to "Program". • In a redundant system, execute the CCPASETR instruction instead of the CCPASET instruction.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D621H	Parameter error	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D622H	Parameter error (error in the total number of device stations)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the total number of device stations. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D625H	Parameter error (station-based block data assurance setting error)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the station-based block data assurance setting. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D628H	Parameter error (station type error)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the station type in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D629H	Parameter error (station number range error)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the station number in the setting data so it is within 1 to 120. • If the error occurs during a firmware update, place the modules according to the configuration displayed in the "Update Firmware" window, write to the CPU module, and then update again. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D62AH	Parameter error (data link faulty station setting error)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the data link faulty station setting. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D62BH	Parameter error (output setting error during CPU STOP)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the output settings during CPU STOP. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D630H	Parameter setting by the CCPASET/ CCPASETR instruction in a local station has failed.	Execute the CCPASET/CCPASETR instruction again after setting "Setting Method of Basic/Application Settings" under "Parameter Setting Method" in "Required Settings" to "Program".	—
D637H	• The UINI instruction was executed at a station where the station number/IP address has been already set by parameter. • The UINI instruction was executed on the RJ71GN11-EIP.	• Execute the instruction again after setting "Station No./IP Address Setting Method" under "Station No./IP Address Setting" in "Required Settings" to "Program". • The RJ71GN11-EIP cannot use the UINI instruction.	—
D641H	Parameter error (IP address error)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the IP address in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D642H	Parameter error (gateway address setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the gateway address setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D643H	Parameter error (communication cycle setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the communication cycle setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D644H	Parameter error (cyclic transmission time setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the cyclic transmission time in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D645H	Parameter error (transient transmission time setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the communication cycle setting or cyclic transmission time in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D646H	Parameter error (transmission path setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the transmission path setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D647H	Parameter error (time synchronization setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the time synchronization setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D649H	Parameter error (send timeslot setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the send timeslot setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D64AH	Parameter error (number of data link error detection)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the number of data link error detection in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D64BH	Parameter error (number of occupied stations)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the number of occupied stations in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D64DH	Parameter error (parameter automatic setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the parameter automatic setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D64EH	Parameter error (motion control station setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the motion control station setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D64FH	Parameter error (cyclic frame cycle setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the cyclic frame cycle setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D651H	Parameter error (number of modules)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the number of modules in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D652H	Parameter error (communication mode setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the communication mode setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D653H	Parameter error (transient transmission group setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the transient transmission group setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D654H	Parameter error (dynamic routing setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the dynamic routing setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D655H	Network addresses of the master station and device stations are incorrect.	Correct the IP address setting of the master station or device stations.	—
D656H	Parameter error (CANopen communications)	Update the version of the engineering tool that supports the CANopen communication function, then write parameters to the CPU module again.	—
D657H	Parameter error (station sub-ID)	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D658H	Parameter error (multidrop number)	• Write the network parameter to the CPU module again. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D659H	Parameter error (CANopen communication)	The CANopen communication function cannot be used. Clear the PDO mapping setting in the engineering tool, and write the parameter to the CPU module again.	—
D65AH	Parameter error (maximum number of connectable stations)	• Parameters are set over the maximum number of connectable stations. Correct the parameter so that the number of device stations is 120 or less, then write parameters to the CPU module again. Note that a PDO-mapped extension module (for example, a multi-axis servo amplifier) to which a station number is not set is counted as one station. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D65BH	Parameter error (CC-Link IE TSN Class setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting "CC-Link IE TSN Class Setting" in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D65CH	Parameter error (TSN hub setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the TSN hub setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D65DH	Parameter error (multiple period setting)	• Write the network parameter to the CPU module again. • Execute the instruction again after correcting the multiple period setting in the setting data. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D840H	Number of transient requests exceeded the upper limit of simultaneously processable requests.	• Execute the instruction again after pausing the transient transmission temporarily. • Execute the instruction again after lower the transient transmission usage frequency.	—
D841H	The request data size of memory read/ write command is out of range.	Execute the instruction again after correcting the read or write size specification at the transient request source.	—
D842H	• Routing information to the destination network number is not registered. • In transient transmission, the number of relays to other networks exceeded seven. • The communication path is being updated.	• Execute the instruction again after correcting the target network number at the transient request source. • Execute the instruction again after correcting the communication path from the transient request source to the destination. • When the dynamic routing is not used, or the module of the series other than MELSEC iQ-R is included, retry the operation after correcting the routing setting. • Change the system configuration so that the number of relay stations is seven or less. • Transient transmission cannot be performed while the communication path is being updated. Retry the operation.	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
D843H	The module operation mode is set to a mode in which transient transmission cannot be executed.	After completion of the module communication test, retry the transient transmission.	—
D844H	Incorrect frame was received. • Unsupported pre-conversion protocol • Unsupported frame type • Application header variable part • Application header HDS • Application header RTP • Read command not requiring response	Execute the instruction again after correcting the request data at the transient request source.	—
D902H	The online test data is incorrect.	• Correct the data at the station that started the online test, and retry the operation. • If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—
D903H	During execution of the communication test, the test was retried.	After completion of the communication test, retry the operation.	—
D905H	A communication monitoring timeout has occurred in communication test.	• Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. Then, retry the operation. • Check if "Routing Setting" of "CPU Parameter" is correctly set, and take action.	—
D906H	Data sending completion wait timeout has occurred in communication test.	• Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. Then, retry the operation. • Execute the instruction again after lower the transient transmission usage frequency. • Check if "Routing Setting" of "CPU Parameter" is correctly set, and take action.	—
D909H	The header information of transient transmission is incorrect.	Execute the instruction again after correcting the header information at the transient request source.	—
D90AH	During execution of the communication test, the test was retried.	Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. Then, retry the operation.	—
D90BH	The number of stations that communicate in the network is out of the specification range.	• Check the network status using the CC-Link IE TSN/CC-Link IE Field diagnostics of the engineering tool, and take action. • If the number of device stations per network is more than 120, reduce it to 120 or less.	—
D90CH	The communication destination specified for the communication test is incorrect.	• Correct "Target Station" of communication test, and retry the operation. • "Communication Test" cannot be executed for own station and relay sending station. Set "Target Station" to other than own station and relay transmission station. • The target station is mounted on the same base unit (main base unit and extension base unit) as the connected station (own station). Do not execute the communication test for station on the same base unit (main base unit and extension base unit) as the connected station (own station).	—
D90DH	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
D912H	Transient transmission sending failed.	• Execute the instruction again after lower the transient transmission usage frequency. • Check if the switching hub and the Ethernet cables are connected properly.	—
D913H to D917H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
D919H	No response from the target station of the communication test.	• Correct the network number, station number, or IP address for the target station of the communication test. • Check if the network configuration setting is correctly set in the master station within the same network as the target station of the communication test. • When "IP Address" is selected for "Communication Method", "Communication Test" cannot be executed for stations on networks different from that of the connected station (own station). Change "Communication Method" to "Network No./Station No.".	—

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
DA00H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
DA10H to DA17H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
DA19H	An error was detected in the network module.	Please consult your local Mitsubishi representative.	—
DA1AH	After parameters were set using the CCPASETX instruction/CCPASET instruction, the CCPASETX instruction/ CCPASET instruction were executed again.	Parameter setting with the CCPASETX/CCPASET instruction is limited to one time only. Execute the instruction again after resetting the CPU module.	—
DA1BH	A dedicated instruction which the target station does not support was executed.	• Change the target station at the station that executed the READ/SREAD/ WRITE/SWRITE/SEND/REQ instruction. • Correct the network number and station number/IP address of the target station of the dedicated instruction.	—
DA1CH	The target station of the READ/SREAD/ WRITE/SWRITE/SEND/REQ instruction does not exist.	If the target station of the READ/SREAD/WRITE/SWRITE/SEND/REQ instruction is disconnected, execute the dedicated instruction again after return of the target station.	—
DB00H	The station numbers of 121 stations or more are specified.	Check station numbers.	—
DC00H	The setting value is incorrect.	Write again after correcting the setting value.	—
DC01H	The setting value was not written correctly.	Write again. If the error occurs again even after taking the above action, please consult your local Mitsubishi representative.	—

Error codes when using EtherNet/IP communications

Error code	Error definition and causes	Action	Detailed information 1 Detailed information 2
19E0H	An error was detected in the data received during EtherNet/IP communications.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • 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.	—
31E0H	The parameters of this module are not set in the CPU.	• Set the parameters to the CPU module. • Write the module extension parameters to the CPU module regardless of whether EtherNet/IP communication is used. • Check the mounting position of the module.	■System configuration information 2 • I/O number Information category: 0x07 ■—
31E1H	An error was detected in the parameters set in "EtherNet/IP Configuration".	• Check the module's firmware version and EtherNet/IP configuration version, and check that the version of EtherNet/IP configuration is supported by the module. If an unsupported version of EtherNet/IP configuration is used, update the module firmware to the latest version. • Use "EtherNet/IP Configuration" to write the parameters to the module 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.	—
31E2H	An error was detected in the parameters set in "EtherNet/IP Configuration".	• Use "EtherNet/IP Configuration" to write the parameters to the module 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.	—
3E05H	An error was detected in the memory.	• Take measures to reduce noise. • Reset the CPU 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.	—
3E06H	A memory error was detected during EtherNet/IP communications.	• Take measures to reduce noise. • Reset the CPU 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.	—

19.2 Error Codes for I/O Signal Processing

Error codes when a PING test error occurs

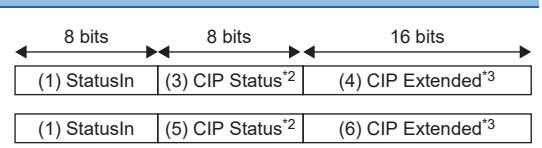
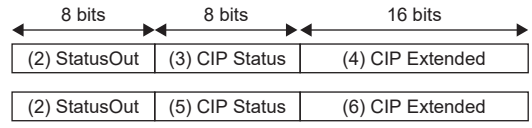
An error code when a PING test error occurs is stored in the error code area of 'PING test response area' (Un\G7340052 to Un\G7340064). (☞ Page 528 PING test response area)

Error code	Error definition and causes	Action
C0DBH	The IP address setting in the PING test request area is incorrect. A PING test is in progress.	• Set the IP address within the range between 1.0.0.1 and 126.255.255.255 or between 128.0.0.0 and 223.255.255.254. • The IP address of the own node cannot be set. Set the IP address of the external device. • Execute again after the PING test is completed.

19.3 Error Codes When a Connection Error Occurs

The error code when a connection error occurs during EtherNet/IP communications is stored in 'Class1 connection error status' (Un\G7734528 to Un\G7735551).

The following shows how error codes are stored.

Address[*1]		Connection destination		Storage method
Un\G7734528	Un\G7734529	Input	Connection No.1	
Un\G7734530	Un\G7734531		Connection No.2	
Un\G7734532	Un\G7734533		Connection No.3	
⋮			⋮	
Un\G7735036	Un\G7735037		Connection No.255	
Un\G7735038	Un\G7735039		Connection No.256	
Un\G7735040	Un\G7735041	Output	Connection No.1	
Un\G7735042	Un\G7735043		Connection No.2	
Un\G7735044	Un\G7735045		Connection No.3	
⋮			⋮	
Un\G7735548	Un\G7735549		Connection No.255	
Un\G7735550	Un\G7735551		Connection No.256	

*1 An error code is stored in 32 bits.
*2 When StatusIn is 41H or 51H, General Status Code received from the external device is stored.
*3 When StatusIn is 41H or 51H, Extended Status Code received from the external device is stored.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
40H (scanner)	10H	0000H	Connection disabled	The connection has been set to be disabled.	• Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module 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.
40H (scanner)	20H	0284H	Cyclic transmission stop	Cyclic transmission is stopped.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while.
40H (scanner)	20H	0000H	Cyclic transmission stop	Cyclic transmission is stopped.	• Check that a value other than 0 (start request) is set for 'EtherNet/IP communication start request' (Un\G7340096). • Check that 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823) is set to 0 (no cyclic pause request).
41H (scanner) 51H (adapter)	01H	0100H	CIP Extended error	The scanner requested Forward Open with the same settings as the currently ongoing communication connection.	• Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. • Close the connection of the external device and retry. • Retry after the connection of the external device has been timed out.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	0103H	CIP Extended error	The combination of the requested parameter transport class (Class1/ Class3 communication method) and transmission trigger (Cyclic/Application Trigger/Change of State) is not supported.	■If the CC-Link IE TSN Plus module is operating as a scanner • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • During Class3 communications, only 2 (Application Trigger) can be accepted as the Production Trigger (transmission trigger) value of Transport Type/Trigger of Forward Open requested by the scanner. Refer to documentation such as the manual of the external device, and correct the request.
41H (scanner) 51H (adapter)	01H	0106H	CIP Extended error	A mismatch in property rights has occurred.	When an Exclusive Owner is used, the adapter can receive only one communication for "Instance ID" set in "Output (O->T)" at a time. ■If the CC-Link IE TSN Plus module is operating as a scanner • When "Exclusive Owner" is set in "Application Type" as a parameter for connection settings (scanner) in the EtherNet/IP configuration, check whether the adapter device of the request destination already uses the value set for "Instance ID" in "Output (O->T)" for communication with a different scanner referring to documentation such as the manuals of the external device. • When communicating with multiple connections using an adapter device and exclusive owner, check whether the same instance ID is set for "Instance ID" in "Output (O->T)" for connections for which "Exclusive Owner" is set in "Application Type" as a parameter for connection settings (scanner) in the EtherNet/IP configuration. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • Check that the IP address specified by the scanner as the communication destination is correct. • Check whether the instance ID of the parameter requested by the scanner is correct. • Check whether the application type of the parameter requested by the scanner is correct. • Use documentation such as the manuals of the external device to check if communications using "Exclusive Owner" are newly requested for "Instance ID" of "Output O->T" of the connection already being communicated with "Exclusive Owner". • The CC-Link IE TSN Plus module does not use configuration (default parameters). Refer to documentation such as the manuals of the external device and correct the parameters so that the configuration is not set to parameters requested by the scanner.
41H (scanner) 51H (adapter)	01H	0107H	CIP Extended error	The external device cannot find the connection to close.	Check the following items, and then restart the EtherNet/IP communications. • Is the operating status of the external device normal? • Is the line status normal?

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	0112H	CIP Extended error	The requested packet interval (RPI) of the requested parameter has an unsupported value.	■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check that the "RPI" of "Output O->T" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is a value that can be accepted by the adapter. • Use documentation such as the manuals of the external device to check that the "RPI" of "Input T->O" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is a value that can be accepted by the adapter. ■If the CC-Link IE TSN Plus module is operating as an adapter • Set the RPI parameter requested by the scanner to the minimum value (0.5ms) or higher. • Set the RPI parameter requested by the scanner to the maximum value (60 seconds) or lower. • For multicast communication, match the RPI of T→O newly requested by the scanner with the RPI of T→O used in the currently active connection.
41H (scanner) 51H (adapter)	01H	0113H	CIP Extended error	The number of connections has reached the upper limit.	■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check whether the number of connections that can be connected to the external device has reached the upper limit. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • A new connection cannot be made because the 'Number of consumed connections (Port 2)' (Un\G8474724) has reached the upper limit (256 connections). Reduce the number of connections.
41H (scanner) 51H (adapter)	01H	0114H	CIP Extended error	The consistency check has failed due to a mismatch in the vendor code (vendor ID number) or product code (product ID number).	Refer to the following and perform troubleshooting. ☞ Page 283 If the consistency check fails
41H (scanner) 51H (adapter)	01H	0115H	CIP Extended error	The consistency check has failed due to product type (device type) mismatch.	Refer to the following and perform troubleshooting. ☞ Page 283 If the consistency check fails
41H (scanner) 51H (adapter)	01H	0116H	CIP Extended error	The consistency check has failed due to major revision or minor revision mismatch.	Refer to the following and perform troubleshooting. ☞ Page 283 If the consistency check fails
41H (scanner) 51H (adapter)	01H	0119H	CIP Extended error	No connection other than Listen Only is open.	• When Listen Only is used, a connection other than Listen Only must already be established on the adapter device. Correct the parameters. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	011BH	CIP Extended error	The requested Inhibit Time parameter is greater than the RPI.	■If the CC-Link IE TSN Plus module is operating as a scanner • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • Set the Inhibit Time parameter that is requested by the scanner to be smaller than the RPI of T→O. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	01H	011CH	CIP Extended error	The transport class (communication method such as Class1/Class3) of the requested parameters is not supported.	■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check whether the adapter device of the request destination supports the transport class (Class1/Class3 communication method) registered as a parameter in the connection settings (scanner) of the EtherNet/IP configuration. ■If the CC-Link IE TSN Plus module is operating as an adapter • Use documentation such as the manuals of the external device to check whether the transport class of the parameters requested by the scanner is Class1 communications or Class3 communications. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	01H	011DH	CIP Extended error	The transmission trigger (Cyclic/Application Trigger/ Change of State) of the requested parameters is not supported.	■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check whether the adapter device of the request destination supports the trigger type registered as a parameter in the connection settings (scanner) of the EtherNet/IP configuration. ■If the CC-Link IE TSN Plus module is operating as an adapter • An unsupported value has been set for Transport Type/Trigger of Forward Open requested by the scanner. Change the parameter to request referring to the manuals of the external device and EtherNet/IP specifications.
41H (scanner) 51H (adapter)	01H	011EH	CIP Extended error	The Direction (client/server) of the requested parameters is not supported.	■If the CC-Link IE TSN Plus module is operating as a scanner • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • An unsupported value has been set for Transport Type/Trigger of Forward Open requested by the scanner. Change the parameter to request referring to the manuals of the external device and EtherNet/IP specifications.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	011FH	CIP Extended error	O→T Fixed/Variable flag for the requested parameters is not supported.	■If the CC-Link IE TSN Plus module is operating as a scanner • When "Real Time Format" of "Output O->T" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is zero length data, use documentation such as the manuals of the external device to check whether the adapter device of the request destination supports Variable. • When "Real Time Format" of "Output O->T" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is modeless or 32-bit header, use documentation such as the manuals of the external device to check whether the adapter device of the request destination supports Fixed. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • If the CC-Link IE TSN Plus module operates as an adapter (server) during Class3 communications, only Variable can be accepted as the O→T network connection parameter of the parameters that are requested by the scanner. Check documentation such as the manuals of the external device to set the request to Variable.
41H (scanner) 51H (adapter)	01H	0120H	CIP Extended error	T→O Fixed/Variable flag for the requested parameters is not supported.	■If the CC-Link IE TSN Plus module is operating as a scanner • When "Real Time Format" of "Input T->O" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is zero length data, use documentation such as the manuals of the external device to check whether the adapter device of the request destination supports Variable. • When "Real Time Format" of "Input T->O" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is modeless or 32-bit header, use documentation such as the manuals of the external device to check whether the adapter device of the request destination supports Fixed. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • If the CC-Link IE TSN Plus module operates as an adapter (server) during Class3 communications, only Variable can be accepted as the T→O network connection parameter of the parameters that are requested by the scanner. Check documentation such as the manuals of the external device to set the request to Variable.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	0123H	CIP Extended error	The O→T Connection Type (output mode such as Point to Point/Multicast) for the requested parameters is not supported.	■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check that the "Output Mode" of "Output O->T" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is a value that can be accepted by the adapter. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • Use documentation such as the manuals of the external device to check whether the Connection Type of O→T of the parameters requested by the scanner is set to Point to Point.
41H (scanner) 51H (adapter)	01H	0124H	CIP Extended error	The T→O Connection Type (input mode such as Point to Point/Multicast) for the requested parameters is not supported.	■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check that the "Input Mode" of "Input T->O" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is a value that can be accepted by the adapter. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • Use documentation such as the manuals of the external device to check whether the Connection Type of T→O of the parameters requested by the scanner is set to Point to Point or Multicast.
41H (scanner) 51H (adapter)	01H	0125H	CIP Extended error	The Redundant Owner of the requested parameters is not supported.	■If the CC-Link IE TSN Plus module is operating as a scanner • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter • If the CC-Link IE TSN Plus module operates as an adapter (server) during Class3 communications, only clear (=0) is accepted for Redundant Owner as the T→O network connection parameter of the parameters that are requested by the scanner. Check documentation such as the manuals of the external device to set the request to clear (=0).
41H (scanner) 51H (adapter)	01H	0126H	CIP Extended error	The data size that was set in the configuration instance was an unacceptable value.	■If the CC-Link IE TSN Plus module is operating as a scanner • Please consult your local Mitsubishi representative. ■If the CC-Link IE TSN Plus module is operating as an adapter • The CC-Link IE TSN Plus module does not use configuration (default parameters). Refer to documentation such as the manuals of the external device and correct the parameters so that the configuration is not set to parameters requested by the scanner.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	0127H	CIP Extended error	The data size that was set in O→T of the requested parameters was an unacceptable value.	■If the CC-Link IE TSN Plus module is operating as a scanner • Check whether the IP address of the module specified as the communication destination in the EtherNet/IP configuration matches the IP address of the desired module. • Use documentation such as the manuals of the external device to check that the "Data Size" of "Output O->T" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is a value that can be accepted by the adapter. ■If the CC-Link IE TSN Plus module is operating as an adapter • Check that the IP address specified by the scanner as the communication destination is correct. • Check whether "Instance ID" and "Tag Name" of the connection registered in the connection settings (adapter) of the EtherNet/IP Configuration are set correctly for the instance ID and tag name of the parameter that is requested by the scanner. • When the application type of the parameter to be requested by the scanner is "Exclusive Owner", check that the data size of O->T of the parameters to be requested matches "Data Size" of "Input O->T" of the connection that was registered in the connection settings (adapter) of the EtherNet/IP Configuration. • When the application type of the parameter to be requested by the scanner is "Input Only", only 0 can be accepted for the data size of O->T of the parameter to be requested. Change the parameter to request referring to the manuals of the external device and EtherNet/IP specifications.
41H (scanner) 51H (adapter)	01H	0128H	CIP Extended error	The data size that was set in T→O of the requested parameters was an unacceptable value.	■If the CC-Link IE TSN Plus module is operating as a scanner • Check whether the IP address of the module specified as the communication destination in the EtherNet/IP configuration matches the IP address of the desired module. • Use documentation such as the manuals of the external device to check that "Data Size" of "Input T->O" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is a value that can be accepted by the adapter. ■If the CC-Link IE TSN Plus module is operating as an adapter • Check that the IP address specified by the scanner as the communication destination is correct. • Check whether "Instance ID" and "Tag Name" of the connection registered in the connection settings (adapter) of the EtherNet/IP configuration are set correctly for the instance ID and tag name of the parameter that was requested by the scanner. • Check that the data size of T→O of the parameters requested by the scanner matches "Data Size" of the connection that was registered in the connection settings (adapter) of the EtherNet/IP configuration.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	0129H	CIP Extended error	The configuration instance does not exist (incorrect configuration instance ID was specified).	■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check that the instance ID value that was set in "Configuration Instance" as a parameter of the connection settings (scanner) of the EtherNet/IP configuration is correct. ■If the CC-Link IE TSN Plus module is operating as an adapter The CC-Link IE TSN Plus module does not use configuration (default parameters). Refer to documentation such as the manuals of the external device and correct the parameters so that the configuration is not set to parameters requested by the scanner.
41H (scanner) 51H (adapter)	01H	012AH	CIP Extended error	An invalid Consumer application path (instance ID of O→T) or tag name was requested.	■If the CC-Link IE TSN Plus module is operating as a scanner • Check whether the IP address of the module specified as the communication destination in the EtherNet/IP configuration matches the IP address of the desired module. • Use documentation such as the manuals of the external device to check that the value set for "Instance ID" of "Output O->T" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is correct. • Use documentation such as the manuals of the external device to check that the value set in the "Tag Name" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP configuration is correct. • Use documentation such as the manuals of the external device to check whether the connection of the external device is in a state where communication is not possible due to a reserved station status or a cyclic stop status. ■If the CC-Link IE TSN Plus module is operating as an adapter • Check that the IP address specified by the scanner as the communication destination is correct. • Check whether the instance ID and tag name of O->T of the parameter requested by the scanner is registered in the connection settings (adapter) of the EtherNet/IP Configuration. • Check whether "Tag Name" of the connection registered in the connection settings (adapter) of the EtherNet/IP configuration is set correctly for the tag name of the parameter that was requested by the scanner. • When the application type of the parameter requested by the scanner is "Exclusive Owner", check that the instance ID of O->T of the parameters to be requested matches "Instance ID" of "Input O->T" of the connection that was registered in the connection settings (adapter) of the EtherNet/IP Configuration. • When the application type of the parameter requested by the scanner is "Input Only", check documentation such as the manuals of the external device, and correct the parameters so that the Real Time Format of Output O → T is set to Heartbeat and the instance ID is set to 198 (00C6H).

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	012BH	CIP Extended error	An invalid Producer application path (instance ID of T→O) was requested.	■If the CC-Link IE TSN Plus module is operating as a scanner • Check whether the IP address of the module specified as the communication destination in the EtherNet/IP configuration matches the IP address of the desired module. • Use documentation such as the manuals of the external device to check that the value set for "Instance ID" of "Input T->O" that was registered as a parameter in the connection settings (scanner) of the EtherNet/IP Configuration is correct. • Use documentation such as the manuals of the external device to check that the value set in the "Tag Name" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP configuration is correct. • Use documentation such as the manuals of the external device to check whether the connection of the external device is in a state where communication is not possible due to a reserved station state or a cyclic stop state. ■If the CC-Link IE TSN Plus module is operating as an adapter • Check that the IP address specified by the scanner as the communication destination is correct. • Check whether the instance ID of the parameter requested by the scanner is registered in the connection settings (adapter) of the EtherNet/IP configuration. • Check whether "Instance ID" of the connection registered in the connection settings (adapter) of the EtherNet/IP configuration is set correctly for the instance ID of the parameter that was requested by the scanner.
41H (scanner) 51H (adapter)	01H	0132H	CIP Extended error	The NULL FORWARD OPEN function is not supported.	The CC-Link IE TSN Plus module does not support the NULL FORWARD OPEN function. Change the parameter to prevent the scanner from using the NULL FORWARD OPEN function referring to the manuals of the external device and EtherNet/IP specifications.
41H (scanner) 51H (adapter)	01H	0135H	CIP Extended error	The Fixed/Variable flag of the requested parameters did not match the value that was set in the connection of the already ongoing multicast communication.	For new participation in the ongoing multicast communication, the Fixed/Variable flag must match the existing communication. ■If the CC-Link IE TSN Plus module is operating as a scanner • When "Real Time Format" of "Input T->O" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is zero length data, use documentation such as the manuals of the external device to check that multicast during communications is Variable. • When "Real Time Format" of "Input T->O" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP Configuration is modeless or 32-bit header, use documentation such as the manuals of the external device to check that multicast during communications is Fixed. ■If the CC-Link IE TSN Plus module is operating as an adapter • Use documentation such as the manuals of the external device to check that the O→T network connection parameter of the parameters requested by the scanner is Fixed.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	0136H	CIP Extended error	The Priority of the requested parameters did not match the value that was set in the connection of the already ongoing multicast communication.	For new participation in the ongoing multicast communication, the Priority must match the existing communication. ■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check that "Priority" of "Input T->O" that was registered as a parameter in the connection settings (scanner) of the EtherNet/IP Configuration matches the Priority that was set in the connection of already performing multicast communications. ■If the CC-Link IE TSN Plus module is operating as an adapter • Use documentation such as the manuals of the external device to check that the Priority that was requested by the external device matches the Priority that was set in the connection of the already ongoing multicast communication.
41H (scanner) 51H (adapter)	01H	0137H	CIP Extended error	The transport class (Class0/1) of the requested parameters did not match the value that was set in the connection of the already ongoing multicast communication.	For new participation in the ongoing multicast communication, the transport class (Class0/1) must match the existing communication. ■If the CC-Link IE TSN Plus module is operating as a scanner • The CC-Link IE TSN Plus module can only use Class1 communications. Change the transport class that was set in the connection of the already ongoing multicast communication to Class1. ■If the CC-Link IE TSN Plus module is operating as an adapter • The CC-Link IE TSN Plus module can only use Class1 communications. Refer to the manuals of the external device, and change the transport class to Class1.
41H (scanner) 51H (adapter)	01H	0138H	CIP Extended error	The transmission trigger (Cyclic/Application Trigger/Change of State) of the requested parameters did not match the value that was set in the connection of the already ongoing multicast communication.	For new participation in the ongoing multicast communication, the transmission trigger (Cyclic/Application Trigger/Change of State) must match the existing communication. ■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check that the transmission trigger set in "Trigger Type" that was registered as a parameter of the connection settings (scanner) of the EtherNet/IP configuration matches the transmission trigger that was set in the connection of the already ongoing multicast communication. ■If the CC-Link IE TSN Plus module is operating as an adapter • Use documentation such as the manuals of the external device to check that the transmission trigger that was requested by the external device matches the transmission trigger that was set in the connection of the already ongoing multicast communication.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	01H	0139H	CIP Extended error	The Inhibit Time of the requested parameters did not match the value that was set in the connection of the already ongoing multicast communication.	For new participation in the ongoing multicast communication, the Inhibit Time must match the existing communication. ■If the CC-Link IE TSN Plus module is operating as a scanner • Use documentation such as the manuals of the external device to check that the inhibit time set in "Inhibit Time" that was registered as a parameter in the connection settings (scanner) of the EtherNet/IP configuration matches the inhibit time that was set in the connection of the already ongoing multicast communication. ■If the CC-Link IE TSN Plus module is operating as an adapter • Check that the Inhibit time requested by the external device matches the Inhibit time set for the connection for the multicast communication already being performed by referring to documentation such as the manuals of the external device.
41H (scanner) 51H (adapter)	01H	0203H	CIP Extended error	Connection timeout	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	01H	0315H	CIP Extended error	The requested connection path (Connection Path that was set to Forward Open) was not acceptable.	■If the CC-Link IE TSN Plus module is operating as a scanner • Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. ■If the CC-Link IE TSN Plus module is operating as an adapter The connection path requested by the scanner could not be received for the following reasons. Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. • The format of the requested connection path is incorrect. • During Class1 communications, the class ID or instance ID of the connection path was not set. • During Class1 communications, a value other than the Assembly object (class ID: 4) was set as the class ID of the connection path. • During Class3 communications, a value other than the Message Router object (class ID: 2) was set as the class ID of the connection path. • During Class3 communications, a value other than 1 was set as the instance ID of the connection path. • During Class3 communications, a value other than 1 was set as the configuration instance ID of the connection path.
41H (scanner) 51H (adapter)	01H	031DH	CIP Extended error	An error notification has been received from the external device.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	02H	—	CIP Extended error	An error notification has been received from the external device.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
41H (scanner) 51H (adapter)	04H	—	CIP Extended error	An error notification has been received from the external device.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	09H	—	CIP Extended error	An error notification has been received from the external device.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	0CH	—	CIP Extended error	An error notification has been received from the external device.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	10H	—	CIP Extended error	An error notification has been received from the external device.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	13H	—	CIP Extended error	An error notification has been received from the external device.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	15H	—	CIP Extended error	An error notification has been received from the external device.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
41H (scanner) 51H (adapter)	Except for shown above	—	CIP Extended error	An error notification has been received from the external device.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take. • Stored value in (3) or (5): Value of General Status notified by the external device • Stored value in (4) or (6): Value of Extended Status notified by the external device
43H (scanner)	00H	0002H	Connection start error	Network path error	• Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module 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.
43H (scanner)	00H	02BCH	Connection start error	Memory error	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
43H (scanner)	00H	012EH	Connection start error	Specified connection instance ID duplication	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
43H (scanner)	00H	012FH	Connection start error	Invalid target IP address	• Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module 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.
43H (scanner)	00H	0130H	Connection start error	No TCP/IP interface object for the specified IP address	• Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module 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.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
43H (scanner)	00H	01C3H	Connection start error	EtherNet/IP configuration parameter error	• Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module 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.
44H (scanner)	00H	0002H	Connection error	The target device does not exist.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • The external device may not be able to transmit data at the specified RPI due to a high communication load, so specify a larger RPI and connect again.
44H (scanner)	01H	0002H	Connection error	The target device does not exist.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • The external device may not be able to transmit data at the specified RPI due to a high communication load, so specify a larger RPI and connect again.
44H (scanner)	00H	0003H	Connection error	A timeout occurred in the connection with the external device.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • The external device may not be able to transmit data at the specified RPI due to a high communication load, so specify a larger RPI and connect again.
44H (scanner)	00H	0005H	Connection error	A timeout occurred in the connection with the external device.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • The external device may not be able to transmit data at the specified RPI due to a high communication load, so specify a larger RPI and connect again.
44H (scanner)	02H	0005H	Connection error	A timeout occurred in the connection with the external device.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • The external device may not be able to transmit data at the specified RPI due to a high communication load, so specify a larger RPI and connect again.
44H (scanner)	00H	0280H	Connection error	Forward Close has been received from the external device.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • The external device may not be able to transmit data at the specified RPI due to a high communication load, so specify a larger RPI and connect again.
44H (scanner)	00H	0281H	Connection error	Connection stop failed	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
44H (scanner)	01H	0281H	Connection error	Connection stop failed	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
44H (scanner)	10H	02BCH	Connection error	Memory error	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
44H (scanner)	20H	02BCH	Connection error	Memory error	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
45H (scanner) 55H (adapter)	11H	0256H	Socket error	Socket generation has failed.	• Retry the operation after a while. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
45H (scanner) 55H (adapter)	11H	00CCH	Socket error	Failed to set the socket option (non-blocking).	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
45H (scanner) 55H (adapter)	11H	0264H	Socket error	Socket option setting error	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
45H (scanner) 55H (adapter)	11H	0266H	Socket error	Socket option setting error	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
45H (scanner) 55H (adapter)	11H	0267H	Socket error	Socket option setting error	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
45H (scanner) 55H (adapter)	11H	0257H	Socket error	Socket registration error	• Retry the operation after a while. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
45H (scanner) 55H (adapter)	11H	0262H	Socket error	Socket option setting error	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
45H (scanner) 55H (adapter)	11H	0263H	Socket error	Socket option setting error	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
45H (scanner) 55H (adapter)	11H	Socket error code	Socket error	IO data send error The error code obtained from the communication stack was set.	• Retry the operation after a while. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
46H (scanner)	00H	00CFH	Maximum number of connections	A connection cannot be created because the maximum number of connections has been reached.	• Check for errors in the line status. • The line may be busy, so retry the operation after a while. • Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module again.
46H (scanner)	10H	00D0H	Maximum number of requests	A request cannot be created because the maximum number of requests has been reached.	• Check for errors in the line status. • The line may be busy, so retry the operation after a while. • Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module again.
46H (scanner)	20H	00D0H	Maximum number of requests	A request cannot be created because the maximum number of requests has been reached.	• Check for errors in the line status. • The line may be busy, so retry the operation after a while. • Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module again.
50H (adapter)	10H	0000H	Connection disabled	The connection has been set to be disabled.	• Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module 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.
50H (adapter)	20H	0284H	Connection stop	The connection has stopped.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while.
53H (adapter)	00H	0136H	Instance registration error	Assembly instance size error	• Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module 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.
53H (adapter)	00H	0133H	Instance registration error	Registration failed because the maximum number of assembly objects has been reached.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
53H (adapter)	00H	0131H	Instance registration error	Invalid assembly instance	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.

Stored value in (1) or (2)	Stored value in (3) or (5)	Stored value in (4) or (6)	Classification	Error definition and causes	Action
53H (adapter)	00H	0132H	Instance registration error	Assembly instance duplication	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
53H (adapter)	00H	0135H	Instance registration error	The assembly buffer is full.	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
53H (adapter)	00H	0134H	Instance registration error	Assembly instance offset error	• Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module again. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
54H (adapter)	00H	0005H	Connection error	A timeout occurred in the connection with the external device.	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • The external device may not be able to transmit data at the specified RPI due to a high communication load, so specify a larger RPI and connect again.
54H (adapter)	00H	0280H	Connection error	Forward Close has been received from the external device. (Forward Close has been received from a different issuing source.)	• Check whether the operating status of the external device is normal. • Check for errors in the line status. • The line may be busy, so retry the operation after a while. • The external device may not be able to transmit data at the specified RPI due to a high communication load, so specify a larger RPI and connect again.
54H (adapter)	20H	02BCH	Connection error	Memory error	• Take measures to reduce noise. • Reset the CPU module, and run it again. If the same error occurs again even after taking the above measure, the possible cause is a hardware failure of the module. Please consult your local Mitsubishi representative.
56H (adapter)	00H	00CFH	Connection start error	A connection cannot be created because the maximum number of connections has been reached.	• Check for errors in the line status. • The line may be busy, so retry the operation after a while. • Check the parameter set in "EtherNet/IP Configuration" and write the parameter to the module again.

19.4 Error Codes for the Message Communication Function (Client)

Error codes for the message communication function (client) are stored in the following.

- 'Result storage area' (Un\G7752706) of the Class3/UCMM communication area (response area) (for the 1st code)
- o_uStatusId of each module function block (error code when a communication error)

Error code	Error definition and causes	Action
0001H	A value outside the range was set for the request area or the input argument of the module function block.	• Check the value set for the request area.*1 • Check the value set for the argument of the module function block.*2
0002H	The size of the received data exceeded 1414 bytes.	• Check the settings of the external device. • Check that there is no noise on the line.
0003H	The connection set for the Class3 reserved station was used.	Check the Class3 communication parameters and change the connection destination from the reserved station.
0004H	Class3 communications were performed using an area where Class3 communications parameters were not set.	• Check that the area used is correct. • Set Class3 communications parameters in the area used.
0005H	UCMM communications were performed using an area where Class3 communications parameters were set.	Perform UCMM communications using an area where Class3 communication parameters are not set.
0006H	Class3 communications failed.	• Check that the Ethernet cable is not disconnected. • Check by using PING or a similar method that a module with the request source IP address exists on the network.
0101H	A request for UCMM/Class3 communications failed to be sent.	• Check that the Ethernet cable is not disconnected. • Check by using PING or a similar method that a module with the request source IP address exists on the network. • When UCMM communications are requested, check that the external device supports UCMM communications. • When Class3 communications are requested, check that the external device supports Class3 communications. • Check that there is no noise on the line.
0102H	There was no response to a request for UCMM/Class3 communications.	• Check by using PING or a similar method that a module with the request source IP address exists on the network. • When UCMM communications are requested, check that the external device supports the UCMM communication server function. • When Class3 communications are requested, check that the external device supports the Class3 communication server function. • Refer to the manual for the external device and check that the external device is ready to receive a request. • Check that there is no noise on the line.
0103H	Connection establishment for Class3 communications failed.	• Check that the request destination IP address set in the Class3 communications parameters is correct. • Check that the external device supports the Class3 communication server function. • Check that there is no noise on the line.
0104H	There was no response to ForwardOpen for performing Class3 communications.	• Check that the external device supports the Class3 communication server function. • Refer to the manual for the external device and check that the external device is ready to receive a request. • Check that there is no noise on the line.
0165H	The number of simultaneous executions for UCMM communications has reached its upper limit.	• Reduce the number of UCMM communication connections executed simultaneously. • Execute again at a later time.
01FFH	An error was set to the CIP response code.	Refer to documentation such as the manuals of the external device and EtherNet/IP specifications to check the conditions for notifying of this error and the action to take.
F000H to F1F0H	The data size specified in UCMM communications exceeds the allowable setting range.	Take the following action according to the value set in FxxxH (xxx = 000 to 1F0). xxx = 000: The data size cannot be set to "0" for UCMM tag communications. Check the value set for the data size. Other than xxx = 000: A value has been set that exceeds the allowable data size value for UCMM message communications/UCMM tag communications. The maximum value that can be set for the data size is xxx. Please check the data size set value to ensure it is valid. For allowable data size settings for UCMM communications, refer to the following. ☞ Page 544 Data Size (Un\G7751708)

*1 For values that can be set in request areas, refer to the following.
☞ Page 539 Class3/UCMM communication area
*2 For values that can be set for arguments in module function blocks, refer to the following.
📖 MELSEC iQ-R EtherNet/IP Function Block Reference

19.5 Error Codes for the Tag Communication Function (Server)

The error codes for the tag communication function (server) are CIP response codes returned to the CC-Link IE TSN Plus module for read/write requests from the external device (originator).
For the error code check method, refer to the manual for the external device.

General Status	Extended Status	CIP Status Name	Error definition and causes	Action
00H	0000H	Success	Normal completion	—
05H	0000H	Path destination unknown	The target tag name does not exist.*1	Check the tag name specified by the external device (originator).
08H	0000H	Service not supported	There was a request for an unsupported service.	• If the external device (originator) is a CC-Link IE TSN Plus module, set the Path Segment specification to "0" (no assigned Path Segment).*2 • Confirm that the unconnected send service is not in use. • Confirm that the service code of the request sent from the external device (originator) is correct.
13H	0000H	Not enough data	Not all the parameters are set for Read/Write Tag Service.	• Check that the request sent from the external device (originator) is correct.*3 • Check that there is no noise on the line.
15H	0000H	Too much data	The request data size specified by Read/Write Tag Service exceeded the data size set to the tag.	• Increase the data size set in the Class3/UCMM tag of this product. • Reduce the request data size specified by the external device (originator). • Check that the request sent from the external device (originator) is correct.*3
1FH	0002H	Vendor specific error	There is a type mismatch between the Tag Type specified by Read/Write Tag Service and Tag Type set in the specified tag.	Match Tag Type set in the Class3/UCMM tag of the CC-Link IE TSN Plus module to Tag Type specified by the external device (originator).

*1 Requests for a tag set as a tag for Class1 communications cannot be accepted.
If such tag is specified, this error code is returned.

*2 For the CC-Link IE TSN Plus module Path Segment specification setting method, refer to the following.
☞ Page 540 Class3/UCMM communication area (No.1) (Un\G7751680 to Un\G7753727)

*3 When using Write Tag Service, check the size of the actual data to be actually written against the specified request size.
Check that the minimum service parameters required for using Read/Write Tag Service exist.

20 LIST OF PARAMETER NUMBERS

This section lists the parameter numbers displayed in the module diagnostics.
If there is an error in the parameter settings and the parameter number is displayed, the corresponding parameter can be identified.
It is displayed in "Detailed information" in the [Error Information] tab in the "Module Diagnostics" window of the CC-Link IE TSN Plus module. (☞ Page 395 Error Information)

System Parameter

Item		Parameter No.
Inter-module Synchronization Setting	Select Inter-module Synchronization Target Module	0101H
	Fixed Scan Interval Setting of Inter-module Synchronization	0101H

Module Parameter (CC-Link IE TSN)

Item					Parameter No.
Required Settings	Station Type		Station Type		7100H, 7700H
	Network No.		Network No.		7100H
	Station No./IP Address Setting	Station No./IP Address Setting Method			7100H
		Station No.	Station No.		7100H
		IP Address	IP Address		A012H
			Subnet Mask		A012H
			Default Gateway		A013H
	Parameter Setting Method		Setting Method of Basic/Application Settings		7100H
Basic Settings	Network Configuration Settings	Total number of stations			A100H
		Simple Display, Detailed Display	STA#		A104H
			Station Type		A104H
			RX Setting		A101H A10BH
			RY Setting		A101H A10BH
			RWr Setting		A101H A10BH
			RWw Setting		A101H A10BH
			LB Setting		A101H A10BH
			LW Setting		A101H A10BH
			Parameter Automatic Setting		A104H
			PDO Mapping Setting		A109H
			IP Address		A105H
			Subnet Mask		A105H
			Default Gateway		A105H
			Reserved/Error Invalid Station		A001H: Reserved Station A002H: Error Invalid Station
			Network Synchronous Communication		A045H
			Communication Period Setting		A108H
			Station Information	Alias	A011H
				Comment	A011H
				Station-specific mode setting	A106H
			CC-Link IE TSN Class		A104H
		Detailed Display	Motion Control Station		A104H
	Refresh Setting		Refresh Settings		7401H
	Network Topology		Network Topology		A100H

Item					Parameter No.
Basic Settings	Communication Period Setting	Basic Period Setting	Setting in Units of 1μs		A100H
			Communication Period Interval Setting (Do Not Set it in Units of 1μs)		A100H
			Communication Period Interval Setting (Set it in Units of 1μs)		A100H
			Cyclic Transmission Time		A100H
			Transient Transmission Time		A100H
		Multiple Period Setting	Normal-Speed		A108H
			Low-Speed		A108H
	Connection Device Information		CC-Link IE TSN Class Setting		A100H
			TSN HUB Setting		A100H
	Device Station Setting		Disconnection Detection Setting		A100H
	Ethernet Communication Setting		Opening Method		A030H
			External Device Configuration		A031H
Application Settings	Communication Speed	Communication Speed			7100H
	Supplementary Cyclic Settings	Station-based Block Data Assurance			A100H
		I/O Maintenance Settings	Output Hold/Clear Setting during CPU STOP		A110H
			Data Link Error Station Setting		A110H
			Output Mode upon CPU Error		7101H
	Transient Transmission Group No.		Transient Transmission Group No.		A010H
	Communication Mode		Communication Mode		A110H
	Parameter Name		Parameter Name		7310H, 7311H
	Dynamic Routing		Dynamic Routing		A110H
	Event Reception from Other Stations		Event Reception from Other Stations		A016H
	Module Operation Mode		Module Operation Mode		7100H
	Security	IP Filter Settings	IP Filter		A03AH
			IP Filter Settings	Deny/Allow	A03AH
				Range Setting	A03AH
				IP Address	A03AH
				IP Address Excluded from Range	A03AH
	Interlink Transmission Settings		Interlink Transmission Settings		7500H
	Timer Settings for Data Communication		Change/Set Timer Value		A038H
			TCP Resend Timer		A038H
			Destination Alive Check Start Interval Timer		A038H
			Destination Alive Check Interval Timer		A038H
			Destination Alive Check Resend Count		A038H
			Advanced Settings	Response Monitoring Timer	A038H
				TCP ULP Timer	A038H
				TCP End Timer	A038H
				TCP Zero Window Timer	A038H
				IP Assembly Timer	A038H
	Gateway Parameter Settings		Gateway Other Than Default Gateway		A013H
			Gateway Information	No.1 to No.8	A013H

Module Parameter (EtherNet/IP)

Item					Parameter No.
Basic Settings	IP Address		IP Address		A012H
			Subnet Mask		A012H
			Default Gateway		A013H
	Ethernet Communication Setting		Opening Method		A030H
			External Device Configuration		A031H
Application Settings	EtherNet/IP Auto-start Setting		EtherNet/IP Auto-start Setting		A120H
	Security	IP Filter Settings	IP Filter		A03AH
			IP Filter Settings	Access from IP address below	A03AH
				Range Setting	A03AH
				IP Address	A03AH
				IP Address Excluded from Range	A03AH
	Timer Settings for Data Communication		Change/Set Timer Value		A038H
			TCP Resend Timer		A038H
			Destination Alive Check Start Interval Timer		A038H
			Destination Alive Check Interval Timer		A038H
			Destination Alive Check Resend Count		A038H
			Advanced Settings	Response Monitoring Timer	A038H
				TCP ULP Timer	A038H
				TCP End Timer	A038H
				TCP Zero Window Timer	A038H
				IP Assembly Timer	A038H
	Gateway Parameter Settings		Gateway Other Than Default Gateway		A013H
			Gateway Information	No.1 to No.8	A013H

21 EVENT LIST

This chapter lists the events which occur in the CC-Link IE TSN Plus module. The three event types are system, security, and operation.

Click the [Event History] button in the [Error Information] tab in the "Module Diagnostics" window of the CC-Link IE TSN Plus module. (☞ Page 395 Error Information)

System

Event code	Overview	Cause
00100	Link-up	The system was linked up by connecting a device (such as an external device).
00141	CPU module time setting failure	Setting of the time to the CPU module failed.
00406	Device station time synchronization completion	The device station time synchronization has completed.
00407	Grandmaster selection (CC-Link IE TSN device)	The CC-Link IE TSN device was selected as the grandmaster.
00408	Grandmaster selection (general-purpose device)	The general-purpose device was selected as the grandmaster.
00409	Own station time synchronization completion	The own station time synchronization has completed.
00470	Stop of communications	EtherNet/IP communications were stopped.
00471	Start of communications	EtherNet/IP communications were started up.
00472	Connection establishment	A connection was established.
00500	Own station: Network entry	Own station enters the network.
00501	Another station: Network entry	Another station enters the network.
00502	Network entry in all stations	All stations enter the network.
0050A	Connection of a tool that supports the CC-Link IE TSN	A tool that supports the CC-Link IE TSN is connected.
0050B	Disconnection of a tool that supports the CC-Link IE TSN	A tool that supports the CC-Link IE TSN is disconnected.
00510	Own station: Data link restart (cyclic transmission start)	Own station data link restarted.
00511	Another station: Data link restart (cyclic transmission start)	Data link of another station restarted.
00512	All stations data link normalization (all-station cyclic transmission start)	Data link returned to normal status at all stations.
00535	Another station: Reserved station enable setting instruction execution	Reserved station enable setting was executed at another station.
00542	Own station: Receive frame error line status caution level	A receive frame error (line status: caution level) has occurred.
00800	Link-down	The system was linked down by removing a device (such as an external device).
00901	Data length error	The send/receive data length exceeds the allowable range.
00902	Initial processing error	Socket communications or communications using the fixed buffer were executed before the initial processing was completed.
00903	Specification IP address error	Broadcast address was specified to the IP address of the external device other than Unpassive.
00904	Socket communications send failure	Sending a message over socket communication failed.
00905	Not opened	• The open processing of the external device has not been completed. • The connection with the external device is closed.
00906	Alive check error	The alive status of an external device could not be checked.
00907	Divided messages receive timeout error	• Sufficient data for the data length could not be received. • The remaining part of the divided message could not be received.
00908	IP assembly timeout error	An IP assembly timeout error has occurred since the transient transmission load is high or transient transmission time is not enough. (The remaining part of the divided data could not be received and a timeout has occurred.)
00909	TCP specification port number error	The port number used in a connection already opened is set. (For TCP/IP)
0090A	UDP specification port number error	The port number used in a connection already opened is set. (For UDP/IP)
00C00	Own station: Disconnection from network	Own station was disconnected from the network.
00C01	Another station: Disconnection from network	Another station was disconnected from the network.

Event code	Overview	Cause
00C02	Abnormal access response of another station	• Abnormal response was returned from another station when accessing another station. • Abnormal response was returned to another station when accessed from another station.
00C10	Own station: Data link stop (cyclic transmission stop)	Own station data link was stopped.
00C11	Another station: Data link stop (cyclic transmission stop)	Data link of another station was stopped.
00C21	Another station: Error occurrence	An error has occurred in another station.
00C40	Device station parameter automatic setting interruption	An abnormal response was received from the device station, and device station parameter automatic setting processing was interrupted. For details on device station response codes, refer to the manual for the device station used.
00C41	Device station parameter automatic setting: Parameter update interruption	An abnormal response was received from the device station, and parameter update processing of device station parameter automatic setting was interrupted. For details on device station response codes, refer to the manual for the device station used.
00C42	Device station parameter automatic setting: System error	An error occurred while the device station parameter automatic setting was executing.
00C43	Device station parameter automatic setting: Transmission timeout	Transmission timed out while communicating with the device station parameter automatic setting.
00C44	Device station parameter automatic setting: Receive timeout	Receiving timed out while communicating with the device station parameter automatic setting.
00C46	Device station parameter automatic setting: SLMP transmission error	An error occurred while transmitting SLMP for the device station parameter automatic setting.
00C47	Device station parameter automatic setting: CPU module access failure	Access to the CPU module failed during device station parameter automatic setting.
00C48	Device station parameter automatic setting: No target station parameter	The device station parameter file targeted during device station parameter automatic setting was not stored in the CPU module. Or, the writing destination of the device station parameter is different from the setting of the memory card parameter.
00C50	Time synchronization loss	The time difference between the time notified from the grandmaster and the time of the own station exceeded the allowable value.
00C51	Time synchronization error	The time synchronization loss occurred more than a fixed number.
00C54	Initialization failure	A communication error occurred in the initialization processing when control communications started.
00C55	Message disposal	The request was discarded because there were too many requests to be processed.
00C56	Response timeout	There was no response from the external device and timeout occurred.
00C57	Message disposal	After response timeout, the response data from the external device was received.
00C58	SLMP response frame disposal	The SLMP response frame was disposed of due to any of the following causes. • The request source of the received SLMP response frame is not clear. • The received SLMP response frame has already returned an error response according to the monitoring timeout. • The SLMP communication load is high so that the received SLMP response frame cannot be transferred.
00C59	Specified port number error	There was a request for a port number not open from the external device.
00C5A	Specification IP address error	Sending was performed to a device while the "IP Address" setting of the device station set in "Network Configuration Settings" under "Basic Settings" of the master station was incorrect.
00C5B	Connection establishment failed	A connection could not be established in the open processing.
00C5C	TCP connection timeout	The external device does not send an ACK response in the TCP/IP communications.
00C5D	Send processing execution disabled	• The receive buffer or send buffer is not sufficient. • The window size of the external device is not sufficient.
00C5E	UDP/IP send failed	Data was not sent correctly with UDP/IP due to either of the following causes. • An error occurs in the external device. • A switching hub and Ethernet cable errors occur. • Congestion of packets on the line
00C5F	TCP/IP send failed	Data was not sent correctly via TCP/IP due to either of following causes. • An error occurs in the external device. • A switching hub and Ethernet cable errors occur. • Congestion of packets on the line
00C60	IP address of the external device acquisition error	Target IP address could not be acquired from the network number and station number.

Event code	Overview	Cause
00C61	Time synchronization loss	The time difference between the time notified from the grandmaster and the time of the own station exceeded the allowable value.
00C62	Time synchronization error	The time synchronization loss occurred more than a fixed number.
00C63	Grandmaster switching (CC-Link IE TSN device)	The device acting as the grandmaster station was disconnected, and then the CC-Link IE TSN device was newly selected as the grandmaster.
00C64	Grandmaster switching (general-purpose device)	The device acting as the grandmaster was disconnected, and then the general-purpose device was newly selected as the grandmaster.
00C65	Time synchronization receive processing failure	The receive processing for time synchronization failed.
00C70	CANopen initialization failure	A communication error occurs in CANopen initialization processing.
00C71	Initialization failure (parameter mismatch between master and device stations)	During initialization processing at the start of control communication, a parameter mismatch was detected between the master station and device stations.
00C72	Maximum response time mismatch for the time managed polling method	A maximum response time mismatch was detected for the time managed polling method. Update the version of the engineering tool and the device stations to the latest version.
00C73	Connection disconnection	The connection was cut.
00C80	Detection of device station that does not support the CC-Link IE TSN Protocol version 2.0	A device station that does not support the CC-Link IE TSN Protocol version 2.0 was detected.
00C81	CC-Link IE TSN Class setting mismatch	A mismatch was detected between the parameter of the master station and the CC-Link IE TSN Class of the device stations.

Security

Event code	Overview	Cause
10200	Remote password lock	The lock processing of the remote password was performed.
10201	Remote password unlock successful	The unlock processing of the remote password was succeeded.
10202	Remote password unlock failed	The unlock processing of the remote password has failed.
10300	Access from IP restricted with IP filter setting	Accessed from IP address restricted with the IP filter setting.

Operation

Event code	Overview	Cause
24100	Own station: Parameter change/new parameter reception	Parameter was changed. Or new parameter was received at power-on.
24300	Own station: Enabling remote device test function	Remote device test function was enabled.
24301	Own station: Failure in enabling remote device test function (Programmable controller CPU is not in STOP state (excluding a stop error))	The operating status of the programmable controller CPU is not in STOP state (excluding a stop error), and enabling remote device test function failed.
24302	Own station: Failure in enabling remote device test function (Own station is not set as a master station.)	The own station is not set as a master station and enabling remote device test function failed.
24303	Own station: Disabling remote device test function (SB0016 is turned off.)	Remote device test function was disabled because SB0016 (Remote device forced output request) has been turned off.
24304	Own station: Disabling remote device test function (Programmable controller CPU is in RUN or PAUSE state).	Remote device test function was disabled because operating status of the programmable controller CPU has been changed to RUN or PAUSE state.
24305	Own station: Disabling remote device test function (Programmable controller CPU indicates a stop error.)	Remote device test function was disabled because a stop error has occurred in the programmable controller CPU.
24F00	Another station: CPU operating status change detection	Operating status of the CPU module on another station was changed.

APPENDICES

Appendix 1 Module Label

The I/O signals and buffer memory of the CC-Link IE TSN Plus module can be set using the module label.

Structure of the module label

The module label name is defined with the following structure.

"Instance name"_"Module number"."Label name"

"Instance name"_"Module number"."Label name"_D

Ex.

GN11_SE_1.bSts_DataLinkError

■Instance name

The instance name of the CC-Link IE TSN Plus module is as shown below.

Module name	Instance name
RJ71GN11-EIP	GN11_SE

■Module number

A sequential number starting with "1" for identifying a module from the one with the same instance name.

■Label name

A label name unique to the module.

■_D

This symbol indicates that the module label is for direct access. If this symbol is not present, the label is for refreshing.

Refreshing and direct access differ as shown below.

Type	Description	Access timing
Refresh	The values read/written from/to the module labels are reflected to the module in batch at refresh. The execution time of the program can be shortened.	At refresh
Direct access	The values read/written from/to the module labels are reflected to the module immediately. The program execution time is longer than the refresh time, but the responsiveness increases.	At writing to or reading from the module label

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Appendix 2 I/O Signals

This section describes the I/O signals for the CPU module of the CC-Link IE TSN Plus module. The I/O signal assignment for when the start I/O number of the CC-Link IE TSN Plus module is "0" is listed below.

List of I/O signals

The following tables list I/O signals. The device X is an input signal from the CC-Link IE TSN Plus module to the CPU module. The device Y is an output signal from the CPU module to the CC-Link IE TSN Plus module.

Input signals

Device No.	Signal name
X0	Module failure
X1	Own Data Link
X2	Use prohibited
X3	Other Data Link (use prohibited in a local station)
X4 to XD	Use prohibited
XE	Own Error
XF	Module Ready
X10	EtherNet/IP communication in process
X11	Use prohibited
X12	PING test completion
X13 to X1E	Use prohibited
X1F	Communication Ready

Output signals

Device No.	Signal name
Y0 to YD	Use prohibited
YE	Module error clear request
YF	Use prohibited
Y10 to Y11	Use prohibited
Y12	PING test execution request
Y13 to Y1F	Use prohibited

Point

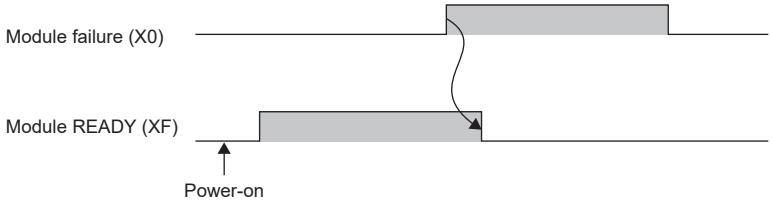
Do not use (turn on) any "use prohibited" signals as an input or output signal to the CPU module. Doing so may cause the programmable controller system to malfunction.

Details of input signals

Module failure (X0)

This signal is used to check the status of the CC-Link IE TSN Plus module.

- Off: Module normal
- On: Module failure



Own Data Link (X1)

This signal is used to check the data link status of the own station.

- Off: Data link stop
- On: Data link in progress

'Data link error status of own station' (SB0049) has the same signal, but when using it in a program, use either X1 or 'Data link error status of own station' (SB0049) only. Also note that the on/off conditions for X1 and SB0049 are reversed.

If an error occurs, the cause of the fault can be checked by CC-Link IE TSN/CC-Link IE Field diagnostics or 'Cause of data link stop' (SW0049).

Other Data Link (X3)

This signal is used to check the data link status of other stations.

- Off: All stations normal
- On: Faulty station exists

'Data link error status of each station' (SB00B0) has the same signal, but when using it in a program, use either X3 or 'Data link error status of each station' (SB00B0) only.

If an error occurs, the faulty station can be checked by CC-Link IE TSN/CC-Link IE Field diagnostics or with 'Data link status of each station' (SW00B0 to SW00B7).

Own error (XE)

This signal turns on or off depending on the occurrence status of the own station error.

- On: An error (minor error, moderate error, or major error) has occurred.
- Off: No error has occurred.

Module READY (XF)

This signal is used to check the status of module operation preparation.

- Off: Not available for module operation
- On: Available for module operation

For the module READY timing chart, refer to Module failure (X0). (☞ Page 493 Module failure (X0))

EtherNet/IP communication in process (X10)

This signal turns on or off depending on the start status of the EtherNet/IP communications. It is recommended to use this signal for interlocking the program.

- On: EtherNet/IP communication is starting.
- Off: EtherNet/IP communication is stopped.

For the timing chart, refer to the following.

☞ Page 529 EtherNet/IP communication start request (Un\G7340096)

PING test completion (X12)

This signal turns on or off depending on the execution status of the PING test.

- On: The PING test has completed.
- Off: The PING test has not completed.

For the timing chart, refer to the following.

☞ Page 495 PING test execution request (Y12)

Communication Ready (X1F)

This signal turns on when the communication preparation for the CC-Link IE TSN Plus module completes.

- On: Communication preparation has completed.
- Off: Communication preparation is in progress.

Details of output signals

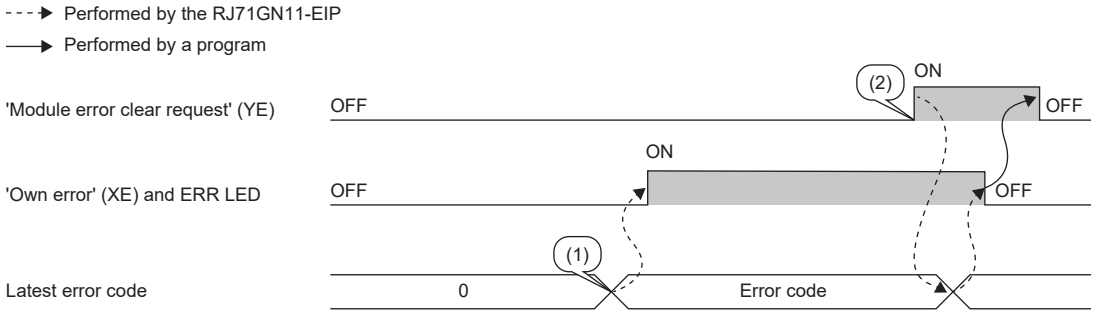
Module error clear request (YE)

This signal is used to clear the minor error that has occurred on the own station.

- On: Minor error clear request
- Off: —

If this signal turns on when an own station error has occurred, the following operations are executed.

- The latest error code is cleared.
- The ERR LED is turned off.
- 'Own Error' (XE) is turned off.



(1) Error occurrence
(2) Elimination of error cause

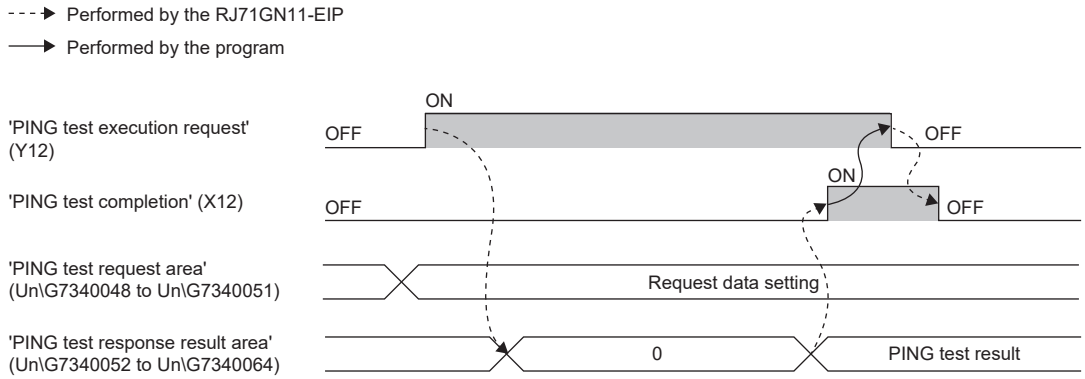
PING test execution request (Y12)

Turn this signal off and on to execute a PING test.

- Off to on: PING test execution request
- On to off: PING test completion request

Turning on 'PING test execution request' (Y12) clears 'PING test response area' (Un\G7340052 to Un\G7340064).

Turning off 'PING test execution request' (Y12) turns 'PING test completion' (X12) on and off.



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Appendix 3 Buffer Memory

The buffer memory is used to exchange data between the CC-Link IE TSN Plus module and the CPU module. Buffer memory values are reset to default when the CPU module is reset or the system is powered off.

List of buffer memory addresses

List of buffer memory addresses (CC-Link IE TSN)

The following table lists the buffer memory addresses related to CC-Link IE TSN.

Address (decimal)	Address (hexadecimal)	Name		Initial value	Read Write
0 to 57343	0 to DFFFH	System area			
57344 to 58367	E000H to E3FFH	Link device area	Remote input (RX)	0	Read
58368 to 59391	E400H to E7FFH		Remote output (RY)	0	Read, write
59392 to 67583	E800H to 107FFH		Remote register (RWw)	0	Read, write
67584 to 75775	10800H to 127FFH		Remote register (RWr)	0	Read
75776 to 92159	12800H to 167FFH		Link register (LW)	0	Read, write
92160 to 94207	16800H to 16FFFH		Link relay (LB)	0	Read, write
94208 to 94463	17000H to 170FFH		Link special relay (SB)	0	Read, write
94464 to 98559	17100H to 180FFH		Link special register (SW)	0	Read, write
98560 to 1245439	18100H to 1300FFH	System area			
1245440 to 1245441	130100H to 130101H	Timeslot 0 information	Cycle start offset (ns unit)	0	Read
1245442	130102H		Cycle start offset (s unit)	0	Read
1245443	130103H		System area		
1245444 to 1245445	130104H to 130105H		Cycle end offset (ns unit)	0	Read
1245446	130106H		Cycle end offset (s unit)	0	Read
1245447 to 1245451	130107H to 13010BH		System area		
1245452	13010CH		VID (VLAN Identifier)	0	Read
1245453	13010DH		PCP (Priority Code Point)	0	Read
1245454	13010EH		EtherType	0	Read
1245455	13010FH		System area		
1245456 to 1245567	130110H to 13017FH	Timeslot 1 to 7 information	Same as Timeslot 0 information	0	Read
1245568 to 1245695	130180H to 1301FFH	System area			
1245696 to 1245697	130200H to 130201H	RX offset/size information	Station No.0 RX offset	0	Read
1245698 to 1245699	130202H to 130203H		Station No.0 RX size	0	Read
⋮			⋮		
1246176 to 1246177	1303E0H to 1303E1H		Station No.120 RX offset	0	Read
1246178 to 1246179	1303E2H to 1303E3H		Station No.120 RX size	0	Read
1246180 to 1246719	1303E4H to 1305FFH		System area		
1246720 to 1246721	130600H to 130601H	RY offset/size information	Station No.0 RY offset	0	Read
1246722 to 1246723	130602H to 130603H		Station No.0 RY size	0	Read
⋮			⋮		
1247200 to 1247201	1307E0H to 1307E1H		Station No.120 RY offset	0	Read
1247202 to 1247203	1307E2H to 1307E3H		Station No.120 RY size	0	Read
1247204 to 1247743	1307E4H to 1309FFH		System area		

Address (decimal)	Address (hexadecimal)	Name		Initial value	Read Write
1247744 to 1247745	130A00H to 130A01H	RWw offset/size information	Station No.0 RWw offset	0	Read
1247746 to 1247747	130A02H to 130A03H		Station No.0 RWw size	0	Read
⋮			⋮		
1248224 to 1248225	130BE0H to 130BE1H		Station No.120 RWw offset	0	Read
1248226 to 1248227	130BE2H to 130BE3H		Station No.120 RWw size	0	Read
1248228 to 1248767	130BE4H to 130DFFH		System area		
1248768 to 1248769	130E00H to 130E01H	RWr offset/size information	Station No.0 RWr offset	0	Read
1248770 to 1248771	130E02H to 130E03H		Station No.0 RWr size	0	Read
⋮			⋮		
1249248 to 1249249	130FE0H to 130FE1H		Station No.120 RWr offset	0	Read
1249250 to 1249251	130FE2H to 130FE3H		Station No.120 RWr size	0	Read
1249252 to 1249791	130FE4H to 1311FFH		System area		
1249792 to 1249793	131200H to 131201H	LB offset/size information	Station No.0 LB offset	0	Read
1249794 to 1249795	131202H to 131203H		Station No.0 LB size	0	Read
⋮			⋮		
1250272 to 1250273	1313E0H to 1313E1H		Station No.120 LB offset	0	Read
1250274 to 1250275	1313E2H to 1313E3H		Station No.120 LB size	0	Read
1250276 to 1250815	1313E4H to 1315FFH		System area		
1250816 to 1250817	131600H to 131601H	LW offset/size information	Station No.0 LW offset	0	Read
1250818 to 1250819	131602H to 131603H		Station No.0 LW size	0	Read
⋮			⋮		
1251296 to 1251297	1317E0H to 1317E1H		Station No.120 LW offset	0	Read
1251298 to 1251299	1317E2H to 1317E3H		Station No.120 LW size	0	Read
1251300 to 1251839	1317E4H to 1319FFH		System area		
1251840 to 1252095	131A00H to 131AFFH	System area			
1252096	131B00H	Own station (network card) information	Manufacturer code	0	Read
1252097	131B01H		Model type	0	Read
1252098	131B02H		Model code (lower 2 bytes)	1*1	Read
1252099	131B03H		Model code (upper 2 bytes)		
1252100	131B04H		Version	1	Read
1252101 to 1252103	131B05H to 131B07H		MAC address	1	Read
1252104	131B08H	Own station (controller) information	Controller information valid/invalid flag	0	Read
1252105	131B09H		Manufacturer code	0	Read
1252106	131B0AH		Model type	0	Read
1252107	131B0BH		Model code (lower 2 bytes)	0	Read
1252108	131B0CH		Model code (upper 2 bytes)		
1252109	131B0DH		Version	0	Read
1252110 to 1252119	131B0EH to 131B17H		Model name string	0	Read
1252120 to 1252121	131B18H to 131B19H		Vendor-specific device information	0	Read
1252122 to 1252127	131B1AH to 131B1FH		System area		
1252128 to 1260543	131B20H to 133BFFH	System area			
1260544 to 1260559	133C00H to 133C0FH	Communication path determination status (network No.1 to 239)		0	Read
1260560 to 1275135	133C10H to 1374FFH	System area			
1275136	137500H	Time distribution interval setting of the CPU module		0	Read, write
1275137	137501H	Time reflection setting to the CPU module		0	Read, write
1275138 to 1275903	137502H to 1377FFH	System area			
1275904	137800H	Grandmaster information	Grandmaster	0	Read
1275905 to 1275906	137801H to 137802H		System area		
1275907 to 1275909	137803H to 137805H		Grandmaster MAC address	0	Read
1275910 to 1275932	137806H to 13781CH	System area			

Address (decimal)	Address (hexadecimal)	Name		Initial value	Read Write
1275933	13781DH	Time synchronization setting	PTP frame send source check enable/disable	0	Read, write
1275934	13781EH		PTP frame send source check result (P1)	0	Read
1275935	13781FH		PTP frame send source check result (P2)	0	Read
1275936 to 1277439	137820H to 137DFFH	System area			
1277440	137E00H	Communication cycle timing	Normal speed (1st/N cycle during N cycles)	0	Read
1277441	137E01H		Low speed (1st/N cycle during N cycles)	0	Read
1277442	137E02H	Information for ensuring cyclic data are sent/received	Multiple cycle setting (low speed)	0	Read
1277443	137E03H		Communication cycle interval (calculation value)	0	Read
1277444	137E04H	Communication cycle setting value (protocol version 2.0)	Communication cycle interval (calculation value)	0	Read
1277445	137E05H		Cyclic transmission time (calculation value)	0	Read
1277446	137E06H		Transient transmission time (calculation value)	0	Read
1277447 to 1277455	137E07H to 137E0FH	System area			
1277456	137E10H	CC-Link IE TSN Communication Software information (1st module)	Manufacturer code	0	Read
1277457	137E11H		Model type	0	Read
1277458	137E12H		Model code (lower 2 bytes)	0	Read
1277459	137E13H		Model code (upper 2 bytes)	0	Read
1277460	137E14H		Model code of extension module	0	Read
1277461	137E15H		Version	0	Read
1277462 to 1277464	137E16H to 137E18H		MAC address	0	Read
1277465 to 1277466	137E19H to 137E1AH		IP address (IPv4)	0	Read
1277467 to 1277474	137E1BH to 137E22H		IP address (IPv6)	0	Read
1277475 to 1277479	137E23H to 137E27H		System area		
1277480	137E28H	CC-Link IE TSN Communication Software information (2nd module)	Manufacturer code	0	Read
1277481	137E29H		Model type	0	Read
1277482	137E2AH		Model code (lower 2 bytes)	0	Read
1277483	137E2BH		Model code (upper 2 bytes)	0	Read
1277484	137E2CH		Model code of extension module	0	Read
1277485	137E2DH		Version	0	Read
1277486 to 1277488	137E2EH to 137E30H		MAC address	0	Read
1277489 to 1277490	137E31H to 137E32H		IP address (IPv4)	0	Read
1277491 to 1277498	137E33H to 137E3AH		IP address (IPv6)	0	Read
1277499 to 1277503	137E3BH to 137E3FH		System area		
1277504 to 1277647	137E40H to 137ECFH	System area			
1277648 to 1277649	137ED0H to 137ED1H	PDO information (Multidrop No.0 of the station No.1)	Start offset of link device using RPDO	0	Read
1277650 to 1277651	137ED2H to 137ED3H		RPDO size	0	Read
1277652 to 1277653	137ED4H to 137ED5H		Start offset of link device using TPDO	0	Read
1277654 to 1277655	137ED6H to 137ED7H		TPDO size	0	Read
1277656 to 1277703	137ED8H to 137F07H	⋮			
1277704 to 1277705	137F08H to 137F09H	PDO information (Multidrop No.7 of the station No.1)	Start offset of link device using RPDO	0	Read
1277706 to 1277707	137F0AH to 137F0BH		RPDO size	0	Read
1277708 to 1277709	137F0CH to 137F0DH		Start offset of link device using TPDO	0	Read
1277710 to 1277711	137F0EH to 137F0FH		TPDO size	0	Read
1277712 to 1285263	137F10H to 139C8FH	⋮			
1285264 to 1285265	139C90H to 139C91H	PDO information (Multidrop No.0 of the station No.120)	Start offset of link device using RPDO	0	Read
1285266 to 1285267	139C92H to 139C93H		RPDO size	0	Read
1285268 to 1285269	139C94H to 139C95H		Start offset of link device using TPDO	0	Read
1285270 to 1285271	139C96H to 139C97H		TPDO size	0	Read
1285272 to 1285319	139C98H to 139CC7H	⋮			

Address (decimal)	Address (hexadecimal)	Name		Initial value	Read Write
1285320 to 1285321	139CC8H to 139CC9H	PDO information (Multidrop No.7 of the station No.120)	Start offset of link device using RPDO	0	Read
1285322 to 1285323	139CCAH to 139CCBH		RPDO size	0	Read
1285324 to 1285325	139CCCH to 139CCDH		Start offset of link device using TPDO	0	Read
1285326 to 1285327	139CCEH to 139CCFH		TPDO size	0	Read
1285328 to 1294015	139CD0H to 13BEBFH	System area			
1294016	13BEC0H	Protocol information	Protocol operating status	0	Read
1294017	13BEC1H		Write request	0	Read, write
1294018	13BEC2H		Protocol setting	0	Read, write
1294019	13BEC3H		Write execution status	0	Read
1294020	13BEC4H		Setting result	0	Read
1294021	13BEC5H		Protocol setting status	0	Read
1294022 to 1294031	13BEC6H to 13BECFH		System area		
1264032 to 1294047	13BED0H to 13BEDFH	System area			
1294048	13BEE0H	Timeslot information for device station cyclic transmission	Timeslot for cyclic transmission (station No.1)	0	Read
⋮			⋮		
1294167	13BF57H		Timeslot for cyclic transmission (station No.120)	0	Read
1294168 to 1294303	13BF58H to 13BFDFH	System area			
1294304	13BFE0H	Information for device station cyclic transmission	Multiplier for CC-Link IE TSN Class A (low speed)	0	Read
1294305 to 2097151	13BFE1H to 1FFFFFH	System area			

*1 When used as a local station (multicast), the initial value is 5.

Point

- Do not write data to the system areas. Doing so may cause malfunction of the programmable controller system.
- If the value in an area of one word becomes equal to or higher than 65536, the count stops at 65535 (FFFFH).

A

List of buffer memory addresses (common information)

The following table lists the buffer memory addresses used in common with P1 and P2.

←: Same as the address of P1

P1		P2		Name		Initial value	Read Write
Address (decimal)	Address (hexadecimal)	Address (decimal)	Address (hexadecimal)				
2097152 to 2097155	200000H to 200003H	4194304 to 4194307	400000H to 400003H	System area			
2097156 to 2097157	200004H to 200005H	4194308 to 4194309	400004H to 400005H	Own node setting status storage area	Own node IP address	Setting value	Read
2097158 to 2097165	200006H to 20000DH	4194310 to 4194317	400006H to 40000DH		System area		
2097166 to 2097167	20000EH to 20000FH	4194318 to 4194319	40000EH to 40000FH		Subnet mask	Setting value	Read
2097168 to 2097169	200010H to 200011H	4194320 to 4194321	400010H to 400011H		System area		
2097170 to 2097171	200012H to 200013H	4194322 to 4194323	400012H to 400013H		Default gateway IP address	Setting value	Read
2097172 to 2097179	200014H to 20001BH	4194324 to 4194331	400014H to 40001BH		System area		
2097180 to 2097182	20001CH to 20001EH	4194332 to 4194334	40001CH to 40001EH		Own node MAC address	Setting value	Read
2097183	20001FH	4194335	40001FH	P1: Own node setting status storage area P2: System area	Own node network number	Setting value	Read
2097184	200020H	4194336	400020H		Station No.	Setting value	Read
2097185	200021H	4194337	400021H		Transient transmission group No.	Setting value	Read
2097186 to 2097188	200022H to 200024H	4194338 to 4194340	400022H to 400024H		System area		
2097189	200025H	4194341	400025H		Auto-open UDP port port number	1388H	Read
2097190	200026H	4194342	400026H		MELSOFT transmission port (TCP/IP) port number	138AH	Read
2097191	200027H	4194343	400027H		MELSOFT transmission port (UDP/IP) port number	1389H	Read
2097192	200028H	4194344	400028H		System area		
2097193	200029H	4194345	400029H		SLMP transmission port (TCP/IP) port number	1393H	Read
2097194	20002AH	4194346	40002AH		SLMP transmission port (UDP/IP) port number	1392H	Read
2097195 to 2097251	20002BH to 200063H	4194347 to 4194403	40002BH to 400063H	System area			

P1		P2		Name		Initial value	Read Write
Address (decimal)	Address (hexadecimal)	Address (decimal)	Address (hexadecimal)				
2097252	200064H	4194404	400064H	Connection status storage area	P1: Connection No.1 latest error code P2: Connection No.9 latest error code	0	Read
2097253	200065H	4194405	400065H		P1: Connection No.2 latest error code P2: Connection No.10 latest error code	0	Read
2097254	200066H	4194406	400066H		P1: Connection No.3 latest error code P2: Connection No.11 latest error code	0	Read
2097255	200067H	4194407	400067H		P1: Connection No.4 latest error code P2: Connection No.12 latest error code	0	Read
2097256	200068H	4194408	400068H		P1: Connection No.5 latest error code P2: Connection No.13 latest error code	0	Read
2097257	200069H	4194409	400069H		P1: Connection No.6 latest error code P2: Connection No.14 latest error code	0	Read
2097258	20006AH	4194410	40006AH		P1: Connection No.7 latest error code P2: Connection No.15 latest error code	0	Read
2097259	20006BH	4194411	40006BH		P1: Connection No.8 latest error code P2: Connection No.16 latest error code	0	Read
2097260 to 2097379	20006CH to 2000E3H	4194412 to 4194531	40006CH to 4000E3H		System area		
2097380 to 2097386	2000E4H to 2000EAH	4194532 to 4194538	4000E4H to 4000EAH	P1: Connection status storage area P2: System area	Latest error code after the 2nd connection of MELSOFT transmission port (TCP/IP)	0	Read
2097387 to 2097507	2000EBH to 200163H	4194539 to 4194659	4000EBH to 400163H		System area		
2097508 to 2097514	200164H to 20016AH	4194660 to 4194666	400164H to 40016AH		Latest error code after the 2nd connection of SLMP transmission port (TCP/IP)	0	Read
2097515 to 2098151	20016BH to 2003E7H	4194667 to 4195303	40016BH to 4003E7H		System area		

P1		P2		Name		Initial value	Read Write
Address (decimal)	Address (hexadecimal)	Address (decimal)	Address (hexadecimal)				
2098152 to 2098153	2003E8H to 2003E9H	4195304 to 4195305	4003E8H to 4003E9H	P1: System port latest error code storage area P2: System area	System area		
2098154	2003EAH	4195306	4003EAH		Auto-open UDP port latest error code	0	Read
2098155	2003EBH	4195307	4003EBH		MELSOFT transmission port (UDP/IP) latest error code	0	Read
2098156	2003ECH	4195308	4003ECH		MELSOFT transmission port (TCP/IP) latest error code	0	Read
2098157	2003EDH	4195309	4003EDH		SLMP transmission port (UDP/IP) latest error code	0	Read
2098158	2003EEH	4195310	4003EEH		SLMP transmission port (TCP/IP) latest error code	0	Read
2098159	2003EFH	4195311	4003EFH		SLMPSND instruction latest error code	0	Read
2098160 to 2102151	2003F0H to 201387H	4195312 to 4199303	4003F0H to 401387H	System area			
2102152 to 2102153	201388H to 201389H	4199304 to 4199305	401388H to 401389H	Status for each protocol (IP packet)	Received packet total count	0	Read
2102154 to 2102155	20138AH to 20138BH	4199306 to 4199307	40138AH to 40138BH		Received packet checksum error discard count	0	Read
2102156 to 2102157	20138CH to 20138DH	4199308 to 4199309	40138CH to 40138DH		Sent packet total count	0	Read
2102158 to 2012173	20138EH to 20139DH	4199310 to 4199325	40138EH to 40139DH		System area		
2102174 to 2102175	20139EH to 20139FH	4199326 to 4199327	40139EH to 40139FH		Simultaneous transmission error detection count (receive buffer full count)	0	Read
2102176 to 2102180	2013A0H to 2013A4H	4199328 to 4199332	4013A0H to 4013A4H		System area		
2102181	2013A5H	4199333	4013A5H		Receive abort count	0	Read
2102182 to 2102191	2013A6H to 2013AFH	4199334 to 4199343	4013A6H to 4013AFH		System area		
2102192 to 2102193	2013B0H to 2013B1H	4199344 to 4199345	4013B0H to 4013B1H	Status for each protocol (ICMP packet)	Received packet total count	0	Read
2102194 to 2102195	2013B2H to 2013B3H	4199346 to 4199347	4013B2H to 4013B3H		Received packet checksum error discard count	0	Read
2102196 to 2102197	2013B4H to 2013B5H	4199348 to 4199349	4013B4H to 4013B5H		Sent packet total count	0	Read
2102198 to 2102199	2013B6H to 2013B7H	4199350 to 4199351	4013B6H to 4013B7H		Received echo request total count	0	Read
2102200 to 2102201	2013B8H to 2013B9H	4199352 to 4199353	4013B8H to 4013B9H		Sent echo reply total count	0	Read
2102202 to 2102203	2013BAH to 2013BBH	4199354 to 4199355	4013BAH to 4013BBH		Sent echo request total count	0	Read
2102204 to 2102205	2013BCH to 2013BDH	4199356 to 4199357	4013BCH to 4013BDH		Received echo reply total count	0	Read
2102206 to 2102231	2013BEH to 2013D7H	4199358 to 4199383	4013BEH to 4013D7H		System area		

P1		P2		Name		Initial value	Read Write
Address (decimal)	Address (hexadecimal)	Address (decimal)	Address (hexadecimal)				
2102232 to 2102233	2013D8H to 2013D9H	4199384 to 4199385	4013D8H to 4013D9H	Status for each protocol (TCP packet)	Received packet total count	0	Read
2102234 to 2102235	2013DAH to 2013DBH	4199386 to 4199387	4013DAH to 4013DBH		Received packet checksum error discard count	0	Read
2102236 to 2102237	2013DCH to 2013DDH	4199388 to 4199389	4013DCH to 4013DDH		Sent packet total count	0	Read
2102238 to 2102271	2013DEH to 2013FFH	4199390 to 4199423	4013DEH to 4013FF		System area		
2102272 to 2102273	201400H to 201401H	4199424 to 4199425	401400H to 401401H	Status for each protocol (UDP packet)	Received packet total count	0	Read
2102274 to 2102275	201402H to 201403H	4199426 to 4199427	401402H to 401403H		Received packet checksum error discard count	0	Read
2102276 to 2102277	201404H to 201405H	4199428 to 4199429	401404H to 401405H		Sent packet total count	0	Read
2102278 to 2102291	201406H to 201413H	4199430 to 4199443	401406H to 401413H		System area		
2102292 to 2102340	201414H to 201444H	4199444 to 4199492	401414H to 401444H	System area			
2102341	201445H	4199493	401445H	P1: Own node operation status storage area (LED on/off status) P2: System area		0	Read
2102342	201446H	4199494	401446H	System area			
2102343	201447H	4199495	401447H	Own node operation status storage area (switching hub connection information area)	Communication mode	0	Read
2102344	201448H	4199496	401448H		Connection status	0	Read
2102345	201449H	4199497	401449H		Communication speed	0	Read
2102346	20144AH	4199498	40144AH		Disconnection count	0	Read
2102347 to 2102351	20144BH to 20144FH	4199499 to 4199503	40144BH to 40144FH	System area			
2102352	201450H	4199504	401450H	IP address duplication status storage area	IP address duplication flag	0	Read
2102353 to 2102355	201451H to 201453H	4199505 to 4199507	401451H to 401453H		MAC address of the station already connected to the network	FFFFFFFFFFFFH	Read
2102356 to 2102358	201454H to 201456H	4199508 to 4199510	401454H to 401456H		MAC address of the station with the IP address already used	FFFFFFFFFFFFH	Read
2102359 to 2102451	201457H to 2014B3H	4199511 to 4199603	401457H to 4014B3H	System area			
2102452	2014B4H	4199604	4014B4H	P1: Sending/ receiving instructions area P2: System area	System area		
2102453	2014B5H	4199605	4014B5H		RECV instruction execution request	0	Read
2102454 to 2102777	2014B6H to 2015F9H	4199606 to 4199929	4014B6H to 4015F9H	System area			
2102778 to 2102781	2015FAH to 2015FDH	4199930 to 4199933	4015FAH to 4015FDH	Remote password lock status storage area	System area		
2102782	2015FEH	4199934	4015FEH		Remote password lock status system port Initial value: Follow the remote password setting.	Refer to the left.	Read
2102783 to 2108735	2015FFH to 202D3FH	4199935 to 4205877	4015FFH to 402D3FH	System area			

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P1		P2		Name		Initial value	Read Write
Address (decimal)	Address (hexadecimal)	Address (decimal)	Address (hexadecimal)				
2108736 to 2108799	202D40H to 202D7FH	4205888 to 4205951	402D40H to 402D7FH	Remote password function monitoring area	System area		
2108800	202D80H	4205952	402D80H		Auto-open UDP port continuous unlock failure count	0	Read
2108801	202D81H	4205953	402D81H		MELSOFT transmission port (UDP/IP) continuous unlock failure count	0	Read
2108802	202D82H	4205954	402D82H		MELSOFT transmission port (TCP/IP) continuous unlock failure count	0	Read
2108803 to 2108804	202D83H to 202D84H	4205955 to 4205956	402D83H to 402D84H		System area		
2108805	202D85H	4205957	402D85H		SLMP transmission port (UDP/IP) continuous unlock failure count	0	Read
2108806	202D86H	4205958	402D86H		SLMP transmission port (TCP/IP) continuous unlock failure count	0	Read
2108807 to 2108821	202D87H to 202D95H	4205959 to 4205973	402D87H to 402D95H		System area		
2108822 to 2162686	202D96H to 20FFFEH	4205974 to 4259838	402D96H to 40FFFEH	System area			
2162687	20FFFFH	4259839	40FFFFH	Network type information area (Network type information)		0	Read
2162688 to 4194303	210000H to 3FFFFFH	4259840 to 6291455	410000H to 5FFFFFH	System area			
6291456	600000H	←		Ethernet P1/2 common information	Open completion signal	0	Read
6291457 to 6291463	6000001 to 600007H	←			System area		
6291464	600008H	←			Open request signal	0	Read
6291465 to 6291471	600009H to 60000FH	←			System area		
6291472	600010H	←			Socket reception status signal	0	Read
6291473 to 6291479	600011H to 600017H	←			System area		
6291480	600018H	←			Initial status	0	Read
6291481	600019H	←			Initial error code	0	Read
6291482 to 6291485	60001AH to 60001DH	←		System area			
6291486	60001EH	←		Receive buffer status storage area (Receive buffer status)		0	Read
6291487 to 6341487	60001FH to 60C36FH	←		System area			
6341488	60C370H	←		Discard received data at CPU STOP setting area (discard received data setting)		0	Read, write
6341489 to 7340031	60C371H to 6FFFFFH	←		System area			

Point

- Do not write data to the system areas. Doing so may cause malfunction of the programmable controller system.
- If the value in an area of one word becomes equal to or higher than 65536, the count stops at 65535 (FFFFH).

List of buffer memory addresses (EtherNet/IP)

The following table lists the buffer memory addresses related to EtherNet/IP.

Address (decimal)	Address (hexadecimal)	Name		Initial value	Read, write
7340032	700000H	System area			
7340033	700001H	Intelligent auto refresh status		Module parameter setting value	Read
7340034 to 7340047	700002H to 70000FH	System area			
7340048	700010H	PING test request area	Communication time check	0	Read, write
7340049	700011H		Transmission count	0	Read, write
7340050 to 7340051	700012H to 700013H		IP Address	0	Read, write
7340052	700014H	PING test response area	Total number of packet transmissions	0	Read
7340053	700015H		Receive count	0	Read
7340054	700016H		Loss count	0	Read
7340055 to 7340064	700017H to 700020H		Error code	0	Read
7340065 to 7340084	700021H to 700034H	System area			
7340085 to 7340087	700035H to 700037H	Ethernet address (MAC address)		Module-specific	Read
7340088 to 7340095	700038H to 70003FH	System area			
7340096	700040H	EtherNet/IP communication start request		0	Read, write
7340097	700041H	EtherNet/IP communication in-process status		0	Read
7340098 to 7340103	700042H to 700047H	System area			
7340104	700048H	EtherNet/IP communication continuation specification request		0	Read, write
7340105	700049H	EtherNet/IP communication continuation specification status		0	Read
7340106 to 7348223	70004AH to 701FFFH	System area			
7348224 to 7533055	702000H to 72F1FFH	Class1 Input Area		0	Read
7533056 to 7536639	72F200H to 72FFFFH	System area			
7536640 to 7721471	730000H to 75D1FFH	Class1 Output Area		0	Read, write
7721472 to 7729151	75D200H to 75EFFFH	System area			
7729152 to 7729407	75F000H to 75F0FFH	Class1 Input data length		0	Read
7729408 to 7729663	75F100H to 75F1FFH	Class1 Output data length		0	Read
7729664 to 7730175	75F200H to 75F3FFH	Class1 start offset address to the input/output data	Class1 start offset address to the input data	FFFFH	Read
7730176 to 7730687	75F400H to 75F5FFH		Class1 start offset address to the output data	FFFFH	Read
7730688 to 7734271	75F600H to 7603FFH	System area			
7734272 to 7734287	760400H to 76040FH	Class1 communication status	Class1 data link status	0	Read
7734288 to 7734303	760410H to 76041FH		Class1 error status	0	Read
7734304 to 7734319	760420H to 76042FH		Class1 reserved station	0	Read
7734320 to 7734527	760430H to 7604FFH	System area			
7734528 to 7735039	760500H to 7606FFH	Class1 connection error status	Input	0	Read
7735040 to 7735551	760700H to 7608FFH		Output	0	Read
7735552 to 7735807	760900H to 7609FFH	System area			
7735808 to 7735823	760A00H to 760A0FH	Class1 cyclic pause specification		0	Read, write
7735824 to 7735839	760A10H to 760A1FH	Class1 cyclic pause status		0	Read
7735840 to 7737343	760A20H to 760FFFH	System area			
7737344 to 7737363	761000H to 7623FFH	Connection information area		0	Read
7742464 to 7749631	762400H to 763FFFH	System area			

A

Address (decimal)	Address (hexadecimal)	Name		Initial value	Read, write
7749632 to 7749647	764000H to 76400FH	Class3/UCMM communication area	Class3/UCMM communication execution request	0	Read, write
7749648 to 7749663	764010H to 76401FH		Class3/UCMM communication execution request acceptance	0	Read
7749664 to 7749679	764020H to 76402FH		Class3/UCMM communication execution completion	0	Read
7749680 to 7751679	764030H to 7647FFH		System area		
7751680 to 7753727	764800H to 764FFFH		1	☞ Page 540 Class3/UCMM communication area (No.1) (Un\G7751680 to Un\G7753727)	
7753728 to 8275967	765000H to 7E47FFH		2 to 256		
8275968 to 8278015	7E4800H to 7E4FFFH	System area			
8278016 to 8462847	7E5000H to 8121FFH	Class3/UCMM data area (tag communications)		0	Read, write
8462848 to 8463103	812200H to 8122FFH	System area			
8463104 to 8463359	812300H to 8123FFH	Class3/UCMM data size (tag communications)		0	Read
8463360 to 8463615	812400H to 8124FFH	System area			
8463616 to 8464127	812500H to 8126FFH	Class3/UCMM start offset address to the data (tag communications)		FFFFH	Read
8464128 to 8464415	812700H to 81281FH	System area			
8464416 to 8464431	812820H to 81282FH	Class3/UCMM communication status	Class3 reserved station	0	Read
8464432 to 8474722	812830H to 815062H	System area			
8474723	815063H	Number of consumed connections	System area		
8474724	815064H		For PORT2	0	Read
8474725 to 8519679	815065H to 81FFFFH	System area			

Point

- Do not write data to the system areas. Doing so may cause malfunction of the programmable controller system.
- If the value in an area of one word becomes equal to or higher than 65536, the count stops at 65535 (FFFFH).

Details of buffer memory addresses

Link device area

The RX, RY, RWw, RWr, LB, LW, SB, and SW values are stored.

■Remote input (RX) (Un\G57344 to Un\G58367)

The RX value is stored. The RX start number and number of points for each station number can be checked by the 'RX offset/size information' (Un\G1245696 to Un\G1246179). (☞ Page 509 RX offset/size information)

Each bit corresponds to 1 bit of RX.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G57344	RX F	RX E	RX D	RX C	RX B	RX A	RX 9	RX 8	RX 7	RX 6	RX 5	RX 4	RX 3	RX 2	RX 1	RX 0
⋮																
Un\G58367	RX 3FFF	RX 3FFE	RX 3FFD	RX 3FFC	RX 3FFB	RX 3FFA	RX 3FF9	RX 3FF8	RX 3FF7	RX 3FF6	RX 3FF5	RX 3FF4	RX 3FF3	RX 3FF2	RX 3FF1	RX 3FF0

■Remote output (RY) (Un\G58368 to Un\G59391)

The RY value is stored. The RY start number and number of points for each station number can be checked by the 'RY offset/size information' (Un\G1246720 to Un\G1247203). (☞ Page 510 RY offset/size information)

Each bit corresponds to 1 bit of RY.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G58368	RY F	RY E	RY D	RY C	RY B	RY A	RY 9	RY 8	RY 7	RY 6	RY 5	RY 4	RY 3	RY 2	RY 1	RY 0
⋮																
Un\G59391	RY 3FFF	RY 3FFE	RY 3FFD	RY 3FFC	RY 3FFB	RY 3FFA	RY 3FF9	RY 3FF8	RY 3FF7	RY 3FF6	RY 3FF5	RY 3FF4	RY 3FF3	RY 3FF2	RY 3FF1	RY 3FF0

■Remote register (RWw) (Un\G59392 to Un\G67583)

The RWw value is stored. The RWw start number and number of points for each station number can be checked by the 'RWw offset/size information' (Un\G1247744 to Un\G1248227). (☞ Page 510 RWw offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G59392	RWw0															
Un\G59393	RWw1															
⋮																
Un\G67583	RWw1FFF															

■Remote register (RWr) (Un\G67584 to Un\G75775)

The RWr value is stored. The RWr start number and number of points for each station number can be checked by the 'RWr offset/size information' (Un\G1248768 to Un\G1249251). (☞ Page 510 RWr offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G67584	RWr0															
Un\G67585	RWr1															
⋮																
Un\G75775	RWr1FFF															

■Link register (LW) (Un\G75776 to Un\G92159)

The LW value is stored. The LW start number and number of points for each station number can be checked by the 'LW offset/size information' (Un\G1250816 to Un\G1251299). (☞ Page 511 LW offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G75776	LW0															
Un\G75777	LW1															
⋮																
Un\G92159	LW3FFF															

■Link relay (LB) (Un\G92160 to Un\G94207)

The LB value is stored. The LB start number and number of points for each station number can be checked by the 'LB offset/size information' (Un\G1249792 to Un\G1250275). (☞ Page 511 LB offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G92160	LBF	LBE	LBD	LBC	LBB	LBA	LB9	LB8	LB7	LB6	LB5	LB4	LB3	LB2	LB1	LB0
Un\G92161	LB1F	LB1E	LB1D	LB1C	LB1B	LB1A	LB19	LB18	LB17	LB16	LB15	LB14	LB13	LB12	LB11	LB10
⋮																
Un\G94207	LB7FFF	LB7FFE	LB7FFD	LB7FFC	LB7FFB	LB7FFA	LB7FF9	LB7FF8	LB7FF7	LB7FF6	LB7FF5	LB7FF4	LB7FF3	LB7FF2	LB7FF1	LB7FF0

■Link special relay (SB) (Un\G94208 to Un\G94463)

The SB value is stored.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G94208	SBF	SBE	SBD	SBC	SBB	SBA	SB9	SB8	SB7	SB6	SB5	SB4	SB3	SB2	SB1	SB0
⋮																
Un\G94463	SB1FF	SB1FE	SB1FD	SB1FC	SB1FB	SB1FA	SB1F9	SB1F8	SB1F7	SB1F6	SB1F5	SB1F4	SB1F3	SB1F2	SB1F1	SB1F0

Each bit corresponds to 1 bit of SB.

■Link special register (SW) (Un\G94464 to Un\G98559)

The SW value is stored.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G94464	SW0															
Un\G94465	SW1															
⋮																
Un\G98559	SW1FFF															

Timeslot information

■Timeslot 0 information (Un\G1245440 to Un\1245446)

Cycle start offset (ns, s unit) and cycle end offset (ns, s unit) of timeslot 0 are stored.

Address	Name	Description
Un\G1245440 to Un\G1245441	Cycle start offset (ns unit)	The ns digits of cycle start offset are stored. Stored range: 0 to 999999999 (ns)
Un\G1245442	Cycle start offset (s unit)	The s digits of cycle start offset are stored. Stored range: 0 to 65535 (s)
Un\G1245443	System area	
Un\G1245444 to Un\G1245445	Cycle end offset (ns unit)	The ns digits of cycle end offset are stored. Stored range: 0 to 999999999 (ns)
Un\1245446	Cycle end offset (s unit)	The s digits of cycle end offset are stored. Stored range: 0 to 65535 (s)
Un\G1245447 to Un\G1245451	System area	
Un\G1245452	VID (VLAN Identifier)	The VID of time slot 0 is stored. Stored range: 1 to 4094, 65535 (VID is not used, or frames to be relayed from VID are not determined)
Un\G1245453	PCP (Priority Code Point)	The PCP of time slot 0 is stored. Stored range: 0 to 7, 65535 (PCP is not used, or frames to be relayed from PCP are not determined)
Un\G1245454	EtherType	The EtherType of the frames to be relayed by time slot 0 is stored. Time slot 0 stores 65535. Stored range: EtherType value of the frames to be relayed, 65535 (frames to be relayed from EtherType are not determined)
Un\G1245455	System area	

■Timeslot 1 to 7 information (Un\G1245456 to Un\1245567)

Timeslot 1 to 7 information is stored in the same order as Timeslot 0 information.

RX offset/size information

■RX offset/size information (Un\G1245696 to Un\G1246179)

The start number and the number of points of RX for each station are stored.

Address	Description
Un\G1245696 to Un\G1245697	Station No.0 offset
Un\G1245698 to Un\G1245699	Station No.0 size (in units of words)
Un\G1245700 to Un\G1245701	Station No.1 offset
Un\G1245702 to Un\G1245703	Station No.1 size (in units of words)
⋮	
Un\G1246176 to Un\G1246177	Station No.120 offset
Un\G1246178 to Un\G1246179	Station No.120 size (in units of words)

The buffer memory address for the offset and size of each station number can be calculated using the following formulas:

- Offset buffer memory address = 1245696 + (station No.) × 4
- Size buffer memory address = 1245698 + (station No.) × 4

RY offset/size information

■RY offset/size information (Un\G1246720 to Un\G1247203)

The start number and the number of points of RY for each station are stored.

Address	Description
Un\G1246720 to Un\G1246721	Station No.0 offset
Un\G1246722 to Un\G1246723	Station No.0 size (in units of words)
Un\G1246724 to Un\G1246725	Station No.1 offset
Un\G1246726 to Un\G1246727	Station No.1 size (in units of words)
⋮	
Un\G1247200 to Un\G1247201	Station No.120 offset
Un\G1247202 to Un\G1247203	Station No.120 size (in units of words)

The buffer memory address for the offset and size of each station number can be calculated using the following formulas:

- Offset buffer memory address = 1246720 + (station No.) × 4
- Size buffer memory address = 1246722 + (station No.) × 4

RWw offset/size information

■RWw offset/size information (Un\G1247744 to Un\G1248227)

The start number and the number of points of RWw for each station are stored.

Address	Description
Un\G1247744 to Un\G1247745	Station No.0 offset
Un\G1247746 to Un\G1247747	Station No.0 size (in units of words)
Un\G1247748 to Un\G1247749	Station No.1 offset
Un\G1247750 to Un\G1247751	Station No.1 size (in units of words)
⋮	
Un\G1248224 to Un\G1248225	Station No.120 offset
Un\G1248226 to Un\G1248227	Station No.120 size (in units of words)

The buffer memory address for the offset and size of each station number can be calculated using the following formulas:

- Offset buffer memory address = 1247744 + (station No.) × 4
- Size buffer memory address = 1247746 + (station No.) × 4

RWr offset/size information

■RWr offset/size information (Un\G1248768 to Un\G1249251)

The start number and the number of points of RWr for each station are stored.

Address	Description
Un\G1248768 to Un\G1248769	Station No.0 offset
Un\G1248770 to Un\G1248771	Station No.0 size (in units of words)
Un\G1248772 to Un\G1248773	Station No.1 offset
Un\G1248774 to Un\G1248775	Station No.1 size (in units of words)
⋮	
Un\G1249248 to Un\G1249249	Station No.120 offset
Un\G1249250 to Un\G1249251	Station No.120 size (in units of words)

The buffer memory address for the offset and size of each station number can be calculated using the following formulas:

- Offset buffer memory address = 1248768 + (station No.) × 4
- Size buffer memory address = 1248770 + (station No.) × 4

LB offset/size information

■LB offset/size information (Un\G1249792 to Un\G1250275)

The start number and the number of points of LB for each station are stored.

Address	Description
Un\G1249792 to Un\G1249793	Station No.0 offset
Un\G1249794 to Un\G1249795	Station No.0 size (in units of words)
Un\G1249796 to Un\G1249797	Station No.1 offset
Un\G1249798 to Un\G1249799	Station No.1 size (in units of words)
⋮	
Un\G1250272 to Un\G1250273	Station No.120 offset
Un\G1250274 to Un\G1250275	Station No.120 size (in units of words)

The buffer memory address for the offset and size of each station number can be calculated using the following formulas:

- Offset buffer memory address = 1249792 + (station No.) × 4
- Size buffer memory address = 1249794 + (station No.) × 4

LW offset/size information

■LW offset/size information (Un\G1250816 to Un\G1251299)

The start number and the number of points of LW for each station are stored.

Address	Description
Un\G1250816 to Un\G1250817	Station No.0 offset
Un\G1250818 to Un\G1250819	Station No.0 size (in units of words)
Un\G1250820 to Un\G1250821	Station No.1 offset
Un\G1250822 to Un\G1250823	Station No.1 size (in units of words)
⋮	
Un\G1251296 to Un\G1251297	Station No.120 offset
Un\G1251298 to Un\G1251299	Station No.120 size (in units of words)

The buffer memory address for the offset and size of each station number can be calculated using the following formulas:

- Offset buffer memory address = 1250816 + (station No.) × 4
- Size buffer memory address = 1250818 + (station No.) × 4

Own station information

The information of the own station on the network is stored.

■Own station (network card) information (Un\G1252096 to Un\G1252103)

Address	Name	Description
Un\G1252096	Manufacturer code	The information of the CC-Link IE TSN Plus module for the own station is stored. (Also used in the CLPA conformance test.) Updated even if set as an error invalid station or a reserved station.
Un\G1252097	Model type	
Un\G1252098	Model code (lower 2 bytes)	
Un\G1252099	Model code (upper 2 bytes)	
Un\G1252100	Version	
Un\G1252101 to Un\G1252103	MAC address	The own station MAC address is stored. Un\G1252101: 5th byte, 6th byte of the MAC address Un\G1252102: 3rd byte, 4th byte of the MAC address Un\G1252103: 1st byte, 2nd byte of the MAC address

■Own station (controller) information (Un\G1252104 to Un\G1252121)

Address	Name	Description
Un\G1252104	Controller information valid/ invalid flag	Whether the value stored in the own station (controller) information is valid or invalid is stored. • 0: Invalid • 1: Valid
Un\G1252105	Manufacturer code	The information of the CC-Link IE TSN Plus module for the own station is stored.
Un\G1252106	Model type	
Un\G1252107	Model code (lower 2 bytes)	
Un\G1252108	Model code (upper 2 bytes)	
Un\G1252109	Version	
Un\G1252110 to Un\G1252119	Model name string	
Un\G1252120 to Un\G1252121	Vendor-specific device information	

Communication path determination status

■Communication path determination status (Un\G1260544 to Un\G1260559)

The determination information on the communication path for each network number of the destination station is stored.

- 0: Path undetermined
- 1: Path determined

The value of each bit indicates the connection number.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\1260544	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
⋮																
Un\1260558	Empty	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225
Un\1260559	Empty															

Time synchronization

■Time distribution interval setting of the CPU module (Un\G1275136)

The time distribution interval of the CPU module on the master station to device stations is set (CPU No.1 when the multiple CPU system is used). This setting is set to the buffer memory of the master station.

When the setting is changed, the new setting value is enabled after the interval of the distribution operating with the old setting value has elapsed. The setting value is distributed once after the distribution interval elapses. If the new setting value needs to be enabled immediately, stop the distribution and set the value.

- 0000H: 10s
- 0001H to FFFEH: Send using the set time interval (second)
- FFFFH: Distribution stop

(Default: 0000H)

■Time reflection setting to the CPU module (Un\G1275137)

Whether the time of the CPU module distributed from the master station is reflected to the CPU module in the local station is set (CPU No.1 when the multiple CPU system is used). This setting is set to the buffer memory of the local station.*1

- 0000H: Do not reflect the time to the CPU module.*2
- 0001H: Reflect the time to the CPU module.

(Default: 0000H)

*1 If 0001H is set to the buffer memory of the master station, the time distributed is not reflected to the CPU module in the local station (CPU No.1 when the multiple CPU system is used).

*2 The time that was set to the CPU module on the local station is used for operation.

Grandmaster information

The grandmaster status of the own station and MAC address are stored.

■Grandmaster (Un\G1275904)

When the own station is the grandmaster, "1" is stored.

- 1: Own station is the grandmaster
- 0: Another station is the grandmaster

■Grandmaster MAC address (Un\G1275907 to Un\G1275909)

The grandmaster MAC address is stored.

- Un\G1275907: 5th byte, 6th byte of the MAC address
- Un\G1275908: 3rd byte, 4th byte of the MAC address
- Un\G1275909: 1st byte, 2nd byte of the MAC address

Time synchronization setting

■PTP frame send source check enable/disable (Un\G1275933)

- 1: Check
- 0: Do not check

■PTP frame send source check result (P1) (Un\G1275934)

- 1: Two or more send sources
- 0: One send source

■PTP frame send source check result (P2) (Un\G1275935)

- 1: Two or more send sources
- 0: One send source

Communication cycle timing

The communication cycle timing is stored.

This area can be used by an inter-module synchronous interrupt program (I44). In unicast mode, this area cannot be used in a local station.

■Normal speed (1st/N cycle during N cycles) (Un\G1277440)

"1" is stored at the timing of the start (1st cycle during N cycles)/end (N cycle during N cycles) of the basic cycle intervals during normal speed cycles.

[b0]

- 1: Start (1st cycle during N cycles)
- 0: Other than the start

[bF]

- 1: End (N cycle during N cycles)
- 0: Other than the end

■Low speed (1st/N cycle during N cycles) (Un\G1277441)

"1" is stored at the timing of the start (1st cycle during N cycles)/end (N cycle during N cycles) of the basic cycle intervals during low speed cycles.

[b0]

- 1: Start (1st cycle during N cycles)
- 0: Other than the start

[bF]

- 1: End (N cycle during N cycles)
- 0: Other than the end

Information for ensuring cyclic data are sent/received

■Multiple cycle setting (low speed) (Un\G1277442)

The setting value of the multiple cycle setting (low speed) that ensures the cyclic data communications (send/receive) is stored.

This value is stored when all the following conditions are satisfied.

Condition*1
• In "Network Configuration Settings" in "Basic Settings", a device station for which "Communication Period Setting" is set to "Low-Speed" and "CC-Link IE TSN Class" is set to "CC-Link IE TSN Class A" exists. • Set 'Protocol setting' (Un\G1294018) of the master station to 0 (automatic setting) or 2 (protocol version 2.0 fixed).

*1 If modules selected in "Network Configuration Settings" in "Basic Settings" are all general CC-Link IE TSN modules, the values are not stored.

- 0: Not calculated
- 16, 32, 64, 128: Low speed cycle relative to basic cycle

■Communication cycle interval (calculation value) (Un\G1277443)

The setting value of the communication cycle interval that ensures the cyclic data communications (send/receive) is stored.

This value is stored when all the following conditions are satisfied.

Condition*1
• In "Network Configuration Settings" in "Basic Settings", a device station for which "Communication Period Setting" is set to "Low-Speed" and "CC-Link IE TSN Class" is set to "CC-Link IE TSN Class A" exists. • Set 'Protocol setting' (Un\G1294018) of the master station to 0 (automatic setting) or 2 (protocol version 2.0 fixed).

*1 If modules selected in "Network Configuration Settings" in "Basic Settings" are all general CC-Link IE TSN modules, the values are not stored.

- 0: Not calculated
- 125 to 4294967295: Communication cycle interval (unit: μs)

A

Communication cycle setting value (protocol version 2.0)

■Communication cycle interval (calculation value) (Un\G1277444)

The communication cycle interval that is calculated by the number of device stations and the number of link device points set in "Network Configuration Settings" under "Basic Settings" is stored.

The communication cycle interval for the module with the protocol version 2.0 is stored regardless of the setting value in 'Protocol setting' (Un\G1294018). When 'Protocol setting' (Un\G1294018) is set to '1: Protocol version 1.0 fixed', if devices supporting protocol version 1.0 and devices supporting protocol version 2.0 are mixed, refer to the value in this buffer memory, and set the appropriate value to "Communication Period Interval Setting" in "Communication Period Setting" under "Basic Settings".

- 125 or higher: Communication cycle interval (Unit: μs)

■Cyclic transmission time (calculation value) (Un\G1277445)

The cyclic transmission time that is calculated by the number of device stations and the number of link device points set in "Network Configuration Settings" under "Basic Settings" is stored.

The cyclic transmission time for the module with the protocol version 2.0 is stored regardless of the setting value in 'Protocol setting' (Un\G1294018). When 'Protocol setting' (Un\G1294018) is set to '1: Protocol version 1.0 fixed', if devices supporting protocol version 1.0 and devices supporting protocol version 2.0 are mixed, refer to the value in this buffer memory, and set the appropriate value to "Cyclic Transmission Time" in "Communication Period Setting" under "Basic Settings".

- 1 or higher: Cyclic transmission time (Unit: μs)

■Transient transmission time (calculation value) (Un\G1277446)

The transient transmission time that is calculated by the number of device stations and the number of link device points set in "Network Configuration Settings" under "Basic Settings" is stored.

The transient transmission time for the module with the protocol version 2.0 is stored regardless of the setting value in 'Protocol setting' (Un\G1294018). When 'Protocol setting' (Un\G1294018) is set to '1: Protocol version 1.0 fixed', if devices supporting protocol version 1.0 and devices supporting protocol version 2.0 are mixed, refer to the value in this buffer memory, and set the appropriate value to "Transient Transmission Time" in "Communication Period Setting" under "Basic Settings".

- 1 or higher: Transient transmission time (Unit: μs)

CC-Link IE TSN Communication Software information (1st module)

■CC-Link IE TSN Communication Software information (1st module) (Un\G1277456 to Un\G1277474)

Address	Description
Un\G1277456	Manufacturer code
Un\G1277457	Model type
Un\G1277458	Model code (lower 2 bytes)
Un\G1277459	Model code (upper 2 bytes)
Un\G1277460	Model code of extension module
Un\G1277461	Version
Un\G1277462 to Un\G1277464	MAC address
Un\G1277465 to Un\G1277466	IP address (IPv4)
Un\G1277467 to Un\G1277474	IP address (IPv6)

CC-Link IE TSN Communication Software information (2nd module)

■CC-Link IE TSN Communication Software information (2nd module) (Un\G1277480 to Un\G1277498)

Address	Description
Un\G1277480	Manufacturer code
Un\G1277481	Model type
Un\G1277482	Model code (lower 2 bytes)
Un\G1277483	Model code (upper 2 bytes)
Un\G1277484	Model code of extension module
Un\G1277485	Version
Un\G1277486 to Un\G1277488	MAC address
Un\G1277489 to Un\G1277490	IP address (IPv4)
Un\G1277491 to Un\G1277498	IP address (IPv6)

PDO information

■PDO information (Un\G1277648 to Un\G1285327)

Address	Name		Description
Un\G1277648 to Un\G1277649	Multidrop No.0 of the station No.1	Start offset of link device using RPDO	The link device start offset using RPDO is stored. (Master station: RWw, local station: RWr)
Un\G1277650 to Un\G1277651		RPDO size	The RPDO size is stored in units of words.
Un\G1277652 to Un\G1277653		Start offset of link device using TPDO	The link device start offset using TPDO is stored. (Master station: RWr, local station: RWw)
Un\G1277654 to Un\G1277655		TPDO size	The TPDO size is stored in units of words.
⋮			
Un\G1277704 to Un\G1277711	Multidrop No.7 of the station No.1		Same as the multidrop No.0 of the station No.1
⋮			
Un\G1285264 to Un\G1285271	Multidrop No.0 of the station No.120		Same as the multidrop No.0 of the station No.1
⋮			
Un\G1285320 to Un\G1285327	Multidrop No.7 of the station No.120		Same as the multidrop No.0 of the station No.1

Protocol information

■Protocol information (Un\G1294016 to Un\G1294031)

Address	Name	Description
Un\G1294016	Protocol operating status	The operating status of the protocol is stored. 0: Operating protocol not determined or CC-Link IE TSN Class settings set to CC-Link IE TSN Class B only 1: Operating with protocol version 1.0 2: Operating with protocol version 2.0
Un\G1294017	Write request	Write the protocol setting to the module. 0: Do not write 1: Write
Un\G1294018	Protocol setting	Set the operating protocol. 0: Automatic setting*1 1: Protocol version 1.0 fixed 2: Protocol version 2.0 fixed
Un\G1294019	Write execution status	The write execution status of writing to the module is stored. 0: Write not executed, or write execution in progress 1. Write execution complete
Un\G1294020	Setting result	The setting result is stored. 0: Completed successfully Other than 0: Completed with an error (error code)
Un\G1294021	Protocol setting status	The protocol setting held by the module is stored. 0: Automatic setting (factory default) 1: Protocol version 1.0 fixed 2: Protocol version 2.0 fixed
Un\G1294022 to Un\G1294031	System area	—

*1 The protocol version is automatically set according to the system configuration.
While the system is operating with the protocol version 2.0, if a device that supports protocol version 1.0 attempts to join, the joining station does not establish a data link.

CC-Link IE TSN Class A device connection		Operating protocol version
Protocol version 1.0	Protocol version 2.0	
Yes	—	1.0
None	—	2.0

Timeslot information for device station cyclic transmission

■Timeslot information for device station cyclic transmission (Un\G1294048 to Un\G1294167)

Address	Name	Description
Un\G1294048	Timeslot for cyclic transmission (station No.1)	The timeslot for cyclic transmission (station No.1) is stored. 0: Undetermined 1: Timeslot 1 3: Timeslot 3 4: Timeslot 4 5: Timeslot 5 6: Timeslot 6
⋮		
Un\G1294167	Timeslot for cyclic transmission (station No.120)	The timeslot for cyclic transmission (station No.120) is stored. 0: Undetermined 1: Timeslot 1 3: Timeslot 3 4: Timeslot 4 5: Timeslot 5 6: Timeslot 6

Information for device station cyclic transmission

■Multiplier for CC-Link IE TSN Class A (low speed) (Un\G1294304)

The multiplier n used for calculating the transmission delay time of a CC-Link IE TSN Class A device station for which "Communication Period Setting" is set to "Low-Speed" is stored.

- 0: There is no device station on the network configuration with CC-Link IE TSN Class A and "Communication Period Setting" set to "Low-Speed"
- 1 or higher: Value of n[*1]

*1 If 'Protocol operating status' (Un\G1294016) is '1: Operating with the protocol version 1.0', this is fixed to 1.

A

Own node setting status storage area

■Own node IP address (Un\G2097156 to Un\G2097157, Un\G4194308 to Un\G4194309)

The setting values of the IP address are stored.

Range: 1H to DFFFFFFEH

■Subnet mask (Un\G2097166 to Un\G2097167, Un\G4194318 to Un\G4194319)

The setting values of the subnet mask are stored.

Range: 1H to FFFFFFFFH

0: No setting

■Default gateway IP address (Un\G2097170 to Un\G2097171, Un\G4194322 to Un\G4194323)

The setting values of the default gateway are stored.

Range: 1H to DFFFFFFEH

0: No setting

■Own node MAC address (Un\G2097180 to Un\G2097182, Un\G4194332 to Un\G4194334)

The own node MAC addresses are stored.

- Un\G2097180: 5th byte, 6th byte of the MAC address
- Un\G2097181: 3rd byte, 4th byte of the MAC address
- Un\G2097182: 1st byte, 2nd byte of the MAC address

■Own node network number (Un\G2097183)

The setting value of the network number is stored.

Range: 1 to 239

0: Network number not set

■Station number (Un\G2097184)

The setting value of the station number is stored.

Range: 1 to 120, 125

1 to 120: Local station

125: Master station

■Transient transmission group No. (Un\G2097185)

The setting value of the transient transmission group number is stored.

Range: 1 to 32

0: No group specification

■Auto-open UDP port port number (Un\G2097189)

The port number used for the auto-open UDP port is stored.

■MELSOFT transmission port (TCP/IP) port number (Un\G2097190)

The port number used for the MELSOFT transmission port (TCP/IP) is stored.

■MELSOFT transmission port (UDP/IP) port number (Un\G2097191)

The port number for the MELSOFT transmission port (UDP/IP) is stored

■SLMP transmission port (TCP/IP) port number (Un\G2097193)

The port number used for the SLMP transmission port (TCP/IP) is stored.

■SLMP transmission port (UDP/IP) port number (Un\G2097194)

The port number used for the SLMP transmission port (UDP/IP) is stored.

Connection status storage area

■Latest error code connection No.1 to No.8 (Un\G2097252 to Un\G2097259)

The latest error codes of connection No.1 to No.8 for P1 are stored.

■Latest error codes of connection No.9 to No.16 (Un\G4194404 to Un\G4194412)

The latest error codes of connection No.9 to No.16 for P2 are stored.

■Latest error code after the 2nd connection of MELSOFT transmission port (TCP/IP) (Un\G2097380 to Un\G2097386)

The latest error code of the 2nd to 8th connection of the MELSOFT transmission port (TCP/IP) is stored.

■Latest error code after the 2nd connection of SLMP transmission port (TCP/IP) (Un\G2097508 to Un\G2097514)

The latest error code of the 2nd to 8th connection of the SLMP transmission port (TCP/IP) is stored.

System port latest error code storage area

■Auto-open UDP port latest error code (Un\G2098154)

The latest error code for the auto-open UDP port is stored.

■MELSOFT transmission port (UDP/IP) latest error code (Un\G2098155)

The latest error code of the MELSOFT transmission port (UDP/IP) is stored.

■MELSOFT transmission port (TCP/IP) latest error code (Un\G2098156)

The latest error code of the MELSOFT transmission port (TCP/IP) is stored.

■SLMP transmission port (UDP/IP) latest error code (Un\G2098157)

The latest error code of the SLMP transmission port (UDP/IP) is stored.

■SLMP transmission port (TCP/IP) latest error code (Un\G2098158)

The latest error code of the SLMP transmission port (TCP/IP) is stored.

■SLMPSND instruction latest error code (Un\G2098159)

The latest error code of the SLMPSND instruction is stored.

Status for each protocol (IP packet)

■Received packet total count (Un\G2102152 to Un\G2102153, Un\G4199304 to Un\G4199305)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Received packet checksum error discard count (Un\G2102154 to Un\G2102155, Un\G4199306 to Un\G4199307)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Sent packet total count (Un\G2102156 to Un\G2102157, Un\G4199308 to Un\G4199309)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Simultaneous transmission error detection count (receive buffer full count) (Un\G2102174 to Un\G2102175, Un\G4199326 to Un\G4199327)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Receive abort count (Un\G2102181, Un\G4199333)

The status is counted from 0 to 65535 (FFFFH).

Status for each protocol (ICMP packet)

■Received packet total count (Un\G2102192 to Un\G2102193, Un\G4199344 to Un\G4199345)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Received packet checksum error discard count (Un\G2102194 to Un\G2102195, Un\G4199346 to Un\G4199347)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Sent packet total count (Un\G2102196 to Un\G2102197, Un\G4199348 to Un\G4199349)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Received echo request total count (Un\G2102198 to Un\G2102199, Un\G4199350 to Un\G4199351)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Sent echo reply total count (Un\G2102200 to Un\G2102201, Un\G4199352 to Un\G4199353)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Sent echo request total count (Un\G2102202 to Un\G2102203, Un\G4199354 to Un\G4199355)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Received echo reply total count (Un\G2102204 to Un\G2102205, Un\G4199356 to Un\G4199357)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

Status for each protocol (TCP packet)

■Received packet total count (Un\G2102232 to Un\G2102233, Un\G4199384 to Un\G4199385)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Received packet checksum error discard count (Un\G2102234 to Un\G2102235, Un\G4199386 to Un\G4199387)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Sent packet total count (Un\G2102236 to Un\G2102237, Un\G4199388 to Un\G4199389)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

Status for each protocol (UDP packet)

■Received packet total count (Un\G2102272 to Un\G2102273, Un\G4199424 to Un\G4199425)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Received packet checksum error discard count (Un\G2102274 to Un\G2102275, Un\G4199426 to Un\G4199427)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

■Sent packet total count (Un\G2102276 to Un\G2102277, Un\G4199428 to Un\G4199429)

The status is counted from 0 to 4294967295 (FFFFFFFFH).

Own node operation status storage area (LED on/off status)

■Own node operation status storage area (LED on/off status) (Un\G2102341)

ERR LED (b0)

- 1: On/flashing
- 0: Off

Own node operation status storage area (switching hub connection information area)

■Communication mode (Un\G2102343, Un\G4199495)

- 0: Half-duplex
- 1: Full-duplex

■Connection status (Un\G2102344, Un\G4199496)

- 0: Switching hub not connected/disconnected
- 1: Switching hub connected

■Communication speed (Un\G2102345, Un\G4199497)

- 0: Operating at 10BASE-T
- 1: Operating at 100BASE-TX
- 2: Operating at 1000BASE-T

■The number of disconnection (Un\G2102346, Un\G4199498)

The number of times the cable was disconnected is stored.

IP address duplication status storage area

■IP address duplication flag (Un\G2102352, Un\G4199504)

- 0: IP address not duplicated
- 1: IP address duplicated

■MAC address of the station already connected to the network (Un\G2102353 to Un\G2102355, Un\G4199505 to Un\G4199507)

It is stored in the station with duplicated IP address.

■MAC address of the station with the IP address already used (Un\G2102356 to Un\G2102358, Un\G4199508 to Un\G4199510)

It is stored in the station that has been already connected to the network.

Area for sending/receiving instructions (RECV instruction execution request)

■Area for sending/receiving instructions (RECV instruction execution request) (Un\G2102453)

RECV instruction execution request

- 1: Requesting
- 0: No request

Channels 1 to 8 are displayed in units of bits.

Remote password lock status storage area

■Remote password lock status system port (Un\G2102782, Un\G4199934)

[b0]: Auto-open UDP port

[b1]: MELSOFT transmission port (UDP/IP)

[b2]: MELSOFT transmission port (TCP/IP)

[b5]: SLMP transmission port (UDP/IP)

[b6]: SLMP transmission port (TCP/IP)

- 0: Unlocked/remote password not set
- 1: Lock status

Remote password function monitoring area

■Auto-open UDP port continuous unlock failure count (Un\G2108800, Un\G4205952)

The mismatch count of remote password at unlock of the auto-open UDP port is stored. The count is cleared when the password matches.

Range: 0 to 65535 (Values of 65535 or more are not changed)

■MELSOFT transmission port (UDP/IP) continuous unlock failure count (Un\G2108801, Un\G4205953)

The mismatch count of remote password at unlock of the MELSOFT transmission port (UDP/IP) is stored. The count is cleared when the password matches.

Range: 0 to 65535 (Values of 65535 or more are not changed)

■MELSOFT transmission port (TCP/IP) continuous unlock failure count (Un\G2108802, Un\G4205954)

The mismatch count of remote password at unlock of the MELSOFT transmission port (TCP/IP) is stored. The count is cleared when the password matches.

Range: 0 to 65535 (Values of 65535 or more are not changed)

■SLMP transmission port (UDP/IP) continuous unlock failure count (Un\G2108805, Un\G4205957)

The mismatch count of remote password at unlock of the SLMP transmission port (UDP/IP) is stored. The count is cleared when the password matches.

Range: 0 to 65535 (Values of 65535 or more are not changed)

■SLMP transmission port (TCP/IP) continuous unlock failure count (Un\G2108806, Un\G4205958)

The mismatch count of remote password at unlock of the SLMP transmission port (TCP/IP) is stored. The count is cleared when the password matches.

Range: 0 to 65535 (Values of 65535 or more are not changed)

Network type information area (Network type information)

■Network type information area (Network type information) (Un\G2162687, Un\G4259839)

5: CC-Link IE TSN

6: EtherNet/IP

Ethernet P1/2 common information

■Open completion signal (Un\6291456)

Open statuses of connection No.1 to 16 (P1: 1 to 8, P2: 9 to 16) are stored.

- 0: Closed (open not completed)
- 1: Open completed

The value of each bit indicates the connection number.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G6291456	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

■Open request signal (Un\6291464)

Open statuses of connection No.1 to 16 (P1: 1 to 8, P2: 9 to 16) are stored.

- 0: No open request
- 1: Requesting open

The value of each bit indicates the connection number.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G6291464	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

■Socket reception status signal (Un\6291472)

Receive statuses of connection No.1 to 16 (P1: 1 to 8, P2: 9 to 16) are stored.

- 0: Data not received
- 1: Data reception completed

The value of each bit indicates the connection number.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G6291472	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

■Initial status (Un\G6291480)

The initial processing status of the CC-Link IE TSN Plus module Ethernet connection is stored.

[b0]: Initial normal completion status

- 1: Initialization normal completion
- 0: —

[b1]: Initial abnormal completion status

- 1: Initialization abnormal completion
- 0: —

[b2 to b15]: Not used (Use prohibited)

■Initial error code (Un\G6291481)

The information when the initial processing is completed with an error is stored.

- 1 or more: Initialization abnormal code
- 0: In initial processing or initial normal completion

A

Receive buffer status storage area (Receive buffer status)

■Receive buffer status storage area (Receive buffer status) (Un\G6291486)

The receive buffer status is stored.

- 0: Receive buffer not full
- 1: Receive buffer full

Discard received data at CPU STOP setting area (discard received data setting)

■Discard received data at CPU STOP setting area (discard received data) (Un\G6341488)

One of the following bit patterns for connection No.1 to 16 (P1: 1 to 8, P2: 9 to 16) is stored.

- 0: Disable (The receive data is not discarded during CPU STOP.)
- 1: Enable (The receive data is discarded during CPU STOP.)

The value of each bit indicates the connection number.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G6341488	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

Intelligent auto refresh status

■Intelligent auto refresh status (Un\G7340033)

The state of the setting for whether or not auto refresh applied to Class1 communications input or output data is stored as the initial value.

If auto refresh[*1] for input data and auto refresh[*2] for output data are set for even a single connection, the value will be other than 0.

*1 Data transferred from network module to CPU module

*2 Data transferred from CPU module to network module

- 0: Auto refresh is not set.
- 1: Auto refresh is set only for output data.
- 2: Auto refresh is set only for input data.
- 3: Auto refresh is set for input and output data.

For auto refresh settings, refer to the following.

☞ Page 116 Refresh Setting

PING test request area

■PING test request area (Un\G7340048 to Un\G7340051)

This area executes a PING test request.

Address	Item	Description
Un\G7340048	Communication time check	Specifies the PING test end waiting time. • 0: Operations are performed after one second. • 1 to 5: Operations are performed after the set value. (Unit: seconds) • 6 or higher: Operations are performed after five seconds.
Un\G7340049	Transmission count	Specifies the transmission count. • 0: One transmission is performed. • 1 to 10: Transmissions are performed for the specified number of transmissions. (Unit: times) • 11 or higher: 10 transmissions are performed.
Un\G7340050 to Un\G7340051	IP Address	Specifies the IP address of the PING test target device. • Un\G7340050: Lower-order word of IP address • Un\G7340051: Higher-order word of IP address ■Allowable IP address setting range • 1.0.0.1 to 126.255.255.255 • 128.0.0.0 to 223.255.255.254 Please note that the following IP addresses cannot be set. • Own station IP address • The network address of the network to which the own station belongs. (IP address where all bits indicating the host[*1] are 0.) • The broadcast address of the network to which the own station belongs. (IP address where all bits indicating the host[*1] are 1.) ■Example If the IP address of the own station is 192.168.3.4 and the subnet mask is 255.255.0.0, the following addresses cannot be set. • Own station IP address: 192.168.3.4 • Network address: 192.168.0.0 • Broadcast address: 192.168.255.255

*1 This refers to the bits where the subnet mask is 0. If the subnet mask is not set, the following subnet masks are applied depending on the own station IP address class.
Class A (IP address leading bit string is 0) → Subnet mask: 255.0.0.0
Class B (IP address leading bit string is 10) → Subnet mask: 255.255.0.0
Class C (IP address leading bit string is 110) → Subnet mask: 255.255.255.0

PING test response area

■PING test response area (Un\G7340052 to Un\G7340064)

This area stores the response result of the PING test.

Address	Item	Description
Un\G7340052	Total number of packet transmissions	Stores the total packet transmission count during PING test execution.
Un\G7340053	Receive count	Stores the receive count during PING test execution.
Un\G7340054	Loss count	Stores the loss count during PING test execution. The error code is not registered when a timeout loss occurs.
Un\G7340055 to Un\G7340064	Error code	Stores the error codes that occur during PING test execution in order of transmission. The PING test is ended if an error occurs. For details on the error codes, refer to the following. ☞ Page 464 Error Codes for I/O Signal Processing

Setting status

■Ethernet address of the own station (MAC address) (Un\G7340085 to Un\G7340087)

Stores the MAC address of P2.

The MAC address is stored starting with the lower-order word.

Ex.

For MAC address 08-00-70-00-1A-34

Address	Stored value	Description
Un\G7340085	1A34H	First lower-order word of MAC address
Un\G7340086	7000H	Second lower-order word of MAC address
Un\G7340087	0800H	Third lower-order word of MAC address

EtherNet/IP communication control

■EtherNet/IP communication start request (Un\G7340096)

Set a value other than 0 to make a request to start the EtherNet/IP communications.

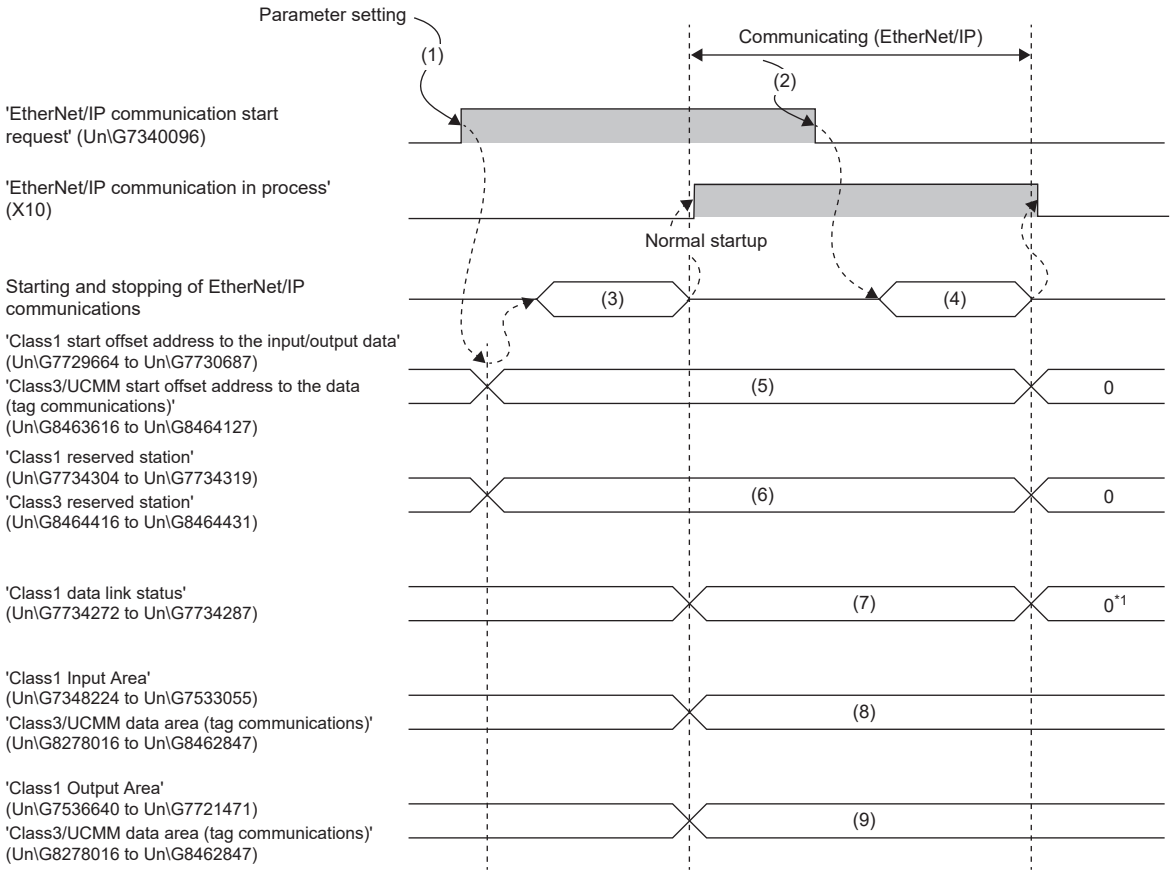
- Other than 0: EtherNet/IP communication start request
- 0: EtherNet/IP communication stop request

Point

To start EtherNet/IP communications by setting a value other than 0 for 'EtherNet/IP communication start request (Un\G7340096)', set all 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823) to 0. When 'Class1 cyclic pause specification' (Un\G7735808 to Un\G7735823) is not all set to 0, EtherNet/IP communications will not start even if a value other than 0 is set for 'EtherNet/IP communication start request' (Un\G7340096).
In this case, 2 (cannot start) is stored for 'EtherNet/IP communication start status' (Un\G7340097).

The following figure shows the timing chart for 'EtherNet/IP communication start request' (Un\G7340096).

- EtherNet/IP communication has started (normal)



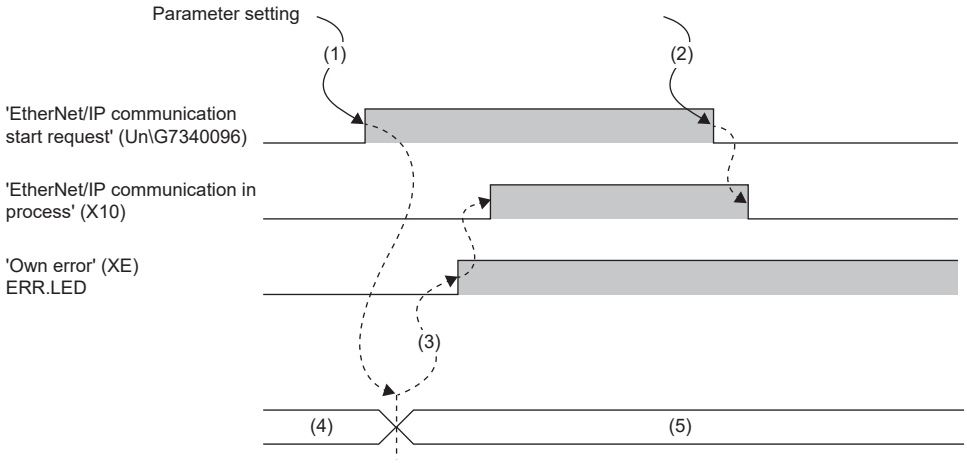
(1) A value other than 0 set for EtherNet/IP communication start request
(2) 0 set for EtherNet/IP communication start request
(3) EtherNet/IP communication started
(4) EtherNet/IP communication stopped
(5) Start offset address
(6) Reserved status
(7) Communication status
(8) Input data
(9) Output data

*1 If the own station is a scanner, the last value may not be retained if the cable is disconnected or the external device is removed. If the own station is an adapter, the last value will be retained.

• EtherNet/IP communication does not start (error)

→ Performed by a program

- - - -▶ Performed by the RJ71GN11-EIP

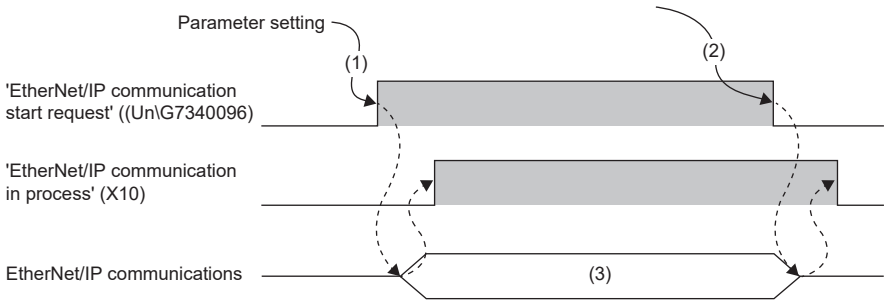


(1) A value other than 0 set for EtherNet/IP communication start request
(2) 0 set for EtherNet/IP communication start request
(3) Error occurred
(4) No error
(5) Error occurring

• A value other than 16 (Stop) is set for 'EtherNet/IP communication continuation specification status' (Un\G7340104).

→ Performed by a program

- - - -▶ Performed by the RJ71GN11-EIP

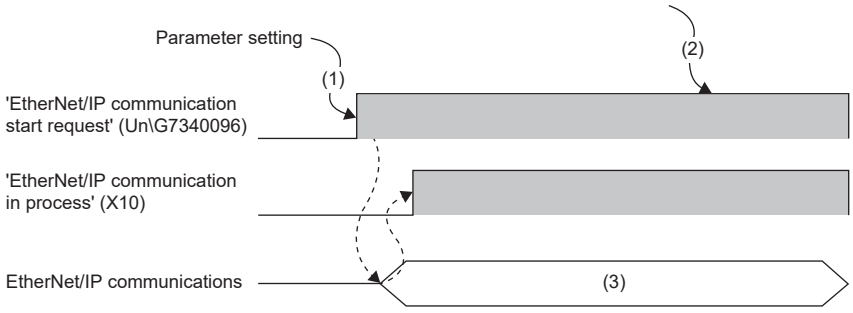


(1) A value other than 0 set for EtherNet/IP communication start request
(2) The operating status of the CPU module is changed from RUN to STOP, or a stop error has occurred to the CPU module.
(3) EtherNet/IP communications available

• 16 (Continue) is set for 'EtherNet/IP communication continuation specification status' (Un\G7340104).

→ Performed by a program

- - - -▶ Performed by the RJ71GN11-EIP



(1) A value other than 0 set for EtherNet/IP communication start request
(2) The operating status of the CPU module is changed from RUN to STOP, or a stop error has occurred to the CPU module.
(3) EtherNet/IP communications available

■EtherNet/IP communication start status (Un\G7340097)

This area stores the EtherNet/IP communication start status.

The same items as for 'EtherNet/IP communication in process' (X10) are stored, but 'EtherNet/IP communication in process' (X10) is recommended for program interlocking.

- 0: Stopped
- 1: Operating
- 2: Cannot start (If one of the bits in 'Class1 Cyclic Pause Request' (Un\G7735808 to Un\G7735823) is turned on, this becomes 2 (cannot start) when there is an EtherNet/IP communications start request.)

■EtherNet/IP communication continuation specification request (Un\G7340104)

This area is used to set this address to continue EtherNet/IP communications in situations such as when the CPU module changes from the RUN state to the STOP state and when a stop error occurs on the CPU module.

The status is reflected when a value other than 0 (EtherNet/IP communication start request) is set for 'EtherNet/IP communication start request' (Un\G7340096).

- A value other than 16: Stops EtherNet/IP communications.
- 16: Continues EtherNet/IP communications.

■EtherNet/IP communication continuation specification status (Un\G7340105)

This area stores the setting status of 'EtherNet/IP communication continuation specification request' (Un\G7340104).

The status is reflected when a value other than 0 is set for 'EtherNet/IP communication start request' (Un\G7340096).

- 0: 'EtherNet/IP communication continuation specification request' (Un\G7340104) setting has not been reflected.
- 1: Operation is in progress with the setting for continuing EtherNet/IP communications.
- 2: Operation is in progress with the setting for stopping EtherNet/IP communications.

Class1 I/O data area

■Class1 Input Area (Un\G7348224 to Un\G7533055)

This area stores the data received by the CC-Link IE TSN Plus module from the EtherNet/IP device during Class1 communications.

The storage area is reserved in the order of connection No.1 to No.256 from the top of this area. (A fixed amount of 1444 bytes is allocated per connection.)

■Class1 Output Area (Un\G7536640 to Un\G7721471)

This area stores the data sent from the CC-Link IE TSN Plus module to the EtherNet/IP device during Class1 communications.

The storage area is reserved in the order of connection No.1 to No.256 from the top of this area. (A fixed amount of 1444 bytes is allocated per connection.)

Class1 I/O data size

■Class1 input data length (Un\G7729152 to Un\G7729407)

This area stores the size of the data received by the CC-Link IE TSN Plus module from the EtherNet/IP device during Class1 communications. (Unit: words)

Address	Description
Un\G7729152	Stores the input data size of connection number 1.
Un\G7729153	Stores the input data size of connection number 2.
⋮	⋮
Un\G7729407	Stores the input data size of connection number 256.

■Class1 output data length (Un\G7729408 to Un\G7729663)

This area stores the size of the data sent from the CC-Link IE TSN Plus module to the EtherNet/IP device during Class1 communications. (Unit: words)

Address	Description
Un\G7729408	Stores the output data size of connection number 1.
Un\G7729409	Stores the output data size of connection number 2.
⋮	⋮
Un\G7729663	Stores the output data size of connection number 256.

Class1 start offset address to the input/output data

■Class1 start offset address to the input data (Un\G7729664 to Un\G7730175)

This area stores the offset address of the input data for each connection for the start address of 'Class1 Input Area' (Un\G7348224 to Un\G7533055).

- 0 to 184110: Offset address of each connection
- 4294967295: No offset address assignment

Address	Description
Un\G7729664 to Un\G7729665	Connection No.1 offset address
Un\G7729666 to Un\G7729667	Connection No.2 offset address
⋮	⋮
Un\G7730174 to Un\G7730175	Connection No.256 offset address

Ex.

Indicates the offset address stored in 'Class1 start offset address to the input data' (Un\G7729664 to Un\G7730175) for the input data stored in 'Class1 Input Area' (Un\G7348224 to Un\G7533055).

'Class1 Input Area' (Un\G7348224 to Un\G7533055)		'Class1 start offset address to the input data" (Un\G7729664 to Un\G7730175)	
Address	**Description**	**Address**	**Description**
Un\G7348224	Connection No.1 input data	Un\G7729664 to Un\G7729665	0
Un\G7348225	Connection No.2 input data	Un\G7729666 to Un\G7729667	1
Un\G7348226			
Un\G7348227			
Un\G7348228	Connection No.3 input data	Un\G7729668 to Un\G7729669	4
Un\G7348229			
Un\G7348230	Connection No.4 input data	Un\G7729670 to Un\G7729671	6

■Class1 start offset address to the output data (Un\G7730176 to Un\G7730687)

This area stores the offset address of the output data for each connection for the start address of 'Class1 Output Area' (Un\G7536640 to Un\G7721471).

- 0 to 184110: Offset address of each connection
- 4294967295: No offset address assignment

Address	Description
Un\G7730176 to Un\G7730177	Connection No.1 offset address
Un\G7730178 to Un\G7730179	Connection No.2 offset address
⋮	⋮
Un\G7730686 to Un\G7730687	Connection No.256 offset address

Ex.

Indicates the offset address stored in 'Class1 start offset address to the output data' (Un'\G7730176 to Un\G7730687) for the output data stored in 'Class1 Output Area' (Un\G7536640 to Un\G7721471).

'Class1 Output Area' (Un\G7536640 to Un\G7721471)		'Class1 start offset address to the output data' (Un\G7730176 to Un\G7730687)	
Address	**Description**	**Address**	**Description**
Un\G7536640	Connection No.1 output data	Un\G7730176 to Un\G7730177	0
Un\G7536641	Connection No.2 output data	Un\G7730178 to Un\G7730179	1
Un\G7536642			
Un\G7536643			
Un\G7536644	Connection No.3 output data	Un\G7730180 to Un\G7730181	4
Un\G7536645			
Un\G7536646	Connection No.4 output data	Un\G7730182 to Un\G7730183	6

A

Class1 communication status

■Class1 communication status (Un\G7734272 to Un\G7734319)

This area stores the communication status of Class1 communications for each connection number.

Address	Item	Description
Un\G7734272 to Un\G7734287	Class1 data link status	Stores the data link status of connection numbers 1 to 256. It automatically turns on when communication recovers from an error. • On: Establishing connection • Off: Error caused by no connection settings, establishing connection, connection timeout, and setting mismatch
Un\G7734288 to Un\G7734303	Class1 error status	Stores the error status of connection numbers 1 to 256. It automatically turns off when communication recovers from an error. • On: Connection timeout, error caused by setting mismatch, connection error, and external device error*1 • Off: No connection settings, establishing connection
Un\G7734304 to Un\G7734319	Class1 reserved station	Stores the setting status of the reserved station of connection numbers 1 to 256. • On: Reserved station • Off: Not set as reserved station

*1 For a Producer Tag during tag communications, it turns on only when communications with all the connected Consumer Tags are stopped.

Point

During tag communications, if one Producer Tag is connected to multiple Consumer Tags through multicast communications, 'Class1 data link status' (Un\G7734272 to Un\G7734287) turns on if even one communication operation is normal.
Note that if the connections with all Consumer Tags are not communicating or have a communication error, 'Class1 data link status' (Un\G7734272 to Un\G7734287) turns off.

The following table lists the assignments for each area.
The value of each bit indicates the connection number.

Address			Bit															
Class1 data link status	Class1 error status	Class1 reserved station	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G7734272	Un\G7734288	Un\G7734304	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G7734273	Un\G7734289	Un\G7734305	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G7734274	Un\G7734290	Un\G7734306	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G7734275	Un\G7734291	Un\G7734307	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
Un\G7734276	Un\G7734292	Un\G7734308	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
Un\G7734277	Un\G7734293	Un\G7734309	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
Un\G7734278	Un\G7734294	Un\G7734310	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
Un\G7734279	Un\G7734295	Un\G7734311	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113
Un\G7734280	Un\G7734296	Un\G7734312	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129
Un\G7734281	Un\G7734297	Un\G7734313	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145
Un\G7734282	Un\G7734298	Un\G7734314	176	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161
Un\G7734283	Un\G7734299	Un\G7734315	192	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177
Un\G7734284	Un\G7734300	Un\G7734316	208	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193
Un\G7734285	Un\G7734301	Un\G7734317	224	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209
Un\G7734286	Un\G7734302	Un\G7734318	240	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225
Un\G7734287	Un\G7734303	Un\G7734319	256	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241

Operating status

■Class1 connection error status (Un\G7734528 to Un\G7735551)

This area stores the error code of the error that occurred during Class1 communications for each connection number. (0 is stored when communications are normal.)

For details on the error codes, refer to the following. (Unit: Double word)

☞ Page 465 Error Codes When a Connection Error Occurs

Address	Input/output	Description
Un\G7734528 to Un\G7734529	Input	Error code for connection No.1 input side (when receiving)
Un\G7734530 to Un\G7734531	Input	Error code for connection No.2 input side (when receiving)
⋮	⋮	⋮
Un\G7735038 to Un\G7735039	Input	Error code for connection No.256 input side (when receiving)
Un\G7735040 to Un\G7735041	Output	Error code for No.1 output side (when sending)
Un\G7735042 to Un\G7735043	Output	Error code for No.2 output side (when sending)
⋮	⋮	⋮
Un\G7735550 to Un\G7735551	Output	Error code for No.256 output side (when sending)

Precautions

When reading the Class1 connection error status, note the following points to prevent data inconsistency in error codes.

- When reading the status using the BMOV/FROM instruction, specify an even number for the read size. Or, use the DMOV/DFROM instruction to read in double-word units.
- Specify an even number for the start address.

A

Class1 cyclic pause

■Class1 cyclic pause specification (Un\G7735808 to Un\G7735823)

This area specifies the connection to request cyclic pause among Class1 communication connections No.1 to No.256.

- 0: Cyclic pause not requested
- 1: Cyclic pause requested

The following table lists the assignments for each area.

The value of each bit indicates the connection number.

Address	Bit															
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G7735808	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G7735809	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G7735810	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G7735811	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
Un\G7735812	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
Un\G7735813	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
Un\G7735814	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
Un\G7735815	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113
Un\G7735816	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129
Un\G7735817	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145
Un\G7735818	176	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161
Un\G7735819	192	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177
Un\G7735820	208	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193
Un\G7735821	224	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209
Un\G7735822	240	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225
Un\G7735823	256	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241

■Class1 cyclic pause status (Un\G7735824 to Un\G7735839)

This area stores the results of the cyclic pause request among Class1 communication connections No.1 to No.256.

- 0: Cyclic executing
- 1: Cyclic paused

The following table lists the assignments for each area.

The value of each bit indicates the connection number.

Address	Bit															
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G7735824	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G7735825	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G7735826	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G7735827	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
Un\G7735828	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
Un\G7735829	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
Un\G7735830	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
Un\G7735831	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113
Un\G7735832	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129
Un\G7735833	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145
Un\G7735834	176	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161
Un\G7735835	192	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177
Un\G7735836	208	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193
Un\G7735837	224	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209
Un\G7735838	240	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225
Un\G7735839	256	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241

Connection information area

■Connection information area (Un\G7737344 to Un\G7737363)

This area stores the connection information among Class1 communication connections No.1 to No.256. (Unit: Double word)

Address	Name	Description
Un\G7737344 to Un\G7737345	Production Connection ID	Connection No.1 Stores the transmission connection ID for the destination of the requested connection.
Un\G7737346 to Un\G7737347	Consumption Connection ID	Connection No.1 Stores the receive connection ID for the destination of the requested connection.
Un\G7737348 to Un\G7737349	O->T API (μs)	Connection No.1 Stores the originator to target API (unit: μs) for the destination of the requested connection.
Un\G7737350 to Un\G7737351	T->O API (μs)	Connection No.1 Stores the target to originator API (unit: μs) for the destination of the requested connection.
Un\G7737352 to Un\G7737353	O->T RPI (μs)	Connection No.1 Stores the originator to target RPI (unit: μs) for the destination of the requested connection.
Un\G7737354 to Un\G7737355	T->O RPI (μs)	Connection No.1 Stores the target to originator RPI (unit: μs) for the destination of the requested connection.
Un\G7737356 to Un\G7737357	O->T Net Parameters	Connection No.1 Stores the originator to target network parameter for the destination of the requested connection.
Un\G7737358 to Un\G7737359	T->O Net Parameters	Connection No.1 Stores the target to originator network parameter for the destination of the requested connection.
Un\G7737360	Originator Connection Serial Number	Connection No.1 Stores the originator connection serial number.
Un\G7737361	Originator Vendor Id	Connection No.1 Stores the originator vendor ID.
Un\G7737362 to Un\G7737363	Originator Serial Number	Connection No.1 Stores the originator serial number.
Un\G7737364 to Un\G7737365	Production Connection ID	Connection No.2 Stores the transmission connection ID for the destination of the requested connection.
Un\G7737366 to Un\G7737367	Consumption Connection ID	Connection No.2 Stores the receive connection ID for the destination of the requested connection.
Un\G7737368 to Un\G7737369	O->T API (μs)	Connection No.2 Stores the originator to target API (unit: μs) for the destination of the requested connection.
Un\G7737370 to Un\G7737371	T->O API (μs)	Connection No.2 Stores the target to originator API (unit: μs) for the destination of the requested connection.
Un\G7737372 to Un\G7737373	O->T RPI (μs)	Connection No.2 Stores the originator to target RPI (unit: μs) for the destination of the requested connection.
Un\G7737374 to Un\G7737375	T->O RPI (μs)	Connection No.2 Stores the target to originator RPI (unit: μs) for the destination of the requested connection.
Un\G7737376 to Un\G7737377	O->T Net Parameters	Connection No.2 Stores the originator to target network parameter for the destination of the requested connection.
Un\G7737378 to Un\G7737379	T->O Net Parameters	Connection No.2 Stores the target to originator network parameter for the destination of the requested connection.
Un\G7737380	Originator Connection Serial Number	Connection No.2 Stores the originator connection serial number.
Un\G7737381	Originator Vendor Id	Connection No.2 Stores the originator vendor ID.

Address	Name	Description
Un\G7737382 to Un\G7737383	Originator Serial Number	Connection No.2 Stores the originator serial number.
⋮		
Un\G7742444 to Un\G7742445	Production Connection ID	Connection No.256 Stores the transmission connection ID for the destination of the requested connection.
Un\G7742446 to Un\G7742447	Consumption Connection ID	Connection No.256 Stores the receive connection ID for the destination of the requested connection.
Un\G7742448 to Un\G7742449	O->T API (μs)	Connection No.256 Stores the originator to target API (unit: μs) for the destination of the requested connection.
Un\G7742450 to Un\G7742451	T->O API (μs)	Connection No.256 Stores the target to originator API (unit: μs) for the destination of the requested connection.
Un\G7742452 to Un\G7742453	O->T RPI (μs)	Connection No.256 Stores the originator to target RPI (unit: μs) for the destination of the requested connection.
Un\G7742454 to Un\G7742455	T->O RPI (μs)	Connection No.256 Stores the target to originator RPI (unit: μs) for the destination of the requested connection.
Un\G7742456 to Un\G7742457	O->T Net Parameters	Connection No.256 Stores the originator to target network parameter for the destination of the requested connection.
Un\G7742458 to Un\G7742459	T->O Net Parameters	Connection No.256 Stores the target to originator network parameter for the destination of the requested connection.
Un\G7742460	Originator Connection Serial Number	Connection No.256 Stores the originator connection serial number.
Un\G7742461	Originator Vendor Id	Connection No.256 Stores the originator vendor ID.
Un\G7742462 to Un\G7742463	Originator Serial Number	Connection No.256 Stores the originator serial number.

Precautions

When reading the connection information area, note the following points to prevent data inconsistency in error codes.

- When reading the status using the BMOV/FROM instruction, specify an even number for the read size. Or, use the DMOV/DFROM instruction to read in double-word units.
- Specify an even number for the start address.

Class3/UCMM communication area

This area requests and checks communication during Class3/UCMM communications.

Address	Item	Description
Un\G7749632 to Un\G7749647	Class3/UCMM communication execution request	Requests execution to transmit the request command over UCMM and Class3 communications. • On: Request present • Off: Request not present
Un\G7749648 to Un\G7749663	Class3/UCMM communication execution request acceptance	Stores the acceptance status of the UCMM and Class3 communication execution request. • On: Accepted • Off: Not accepted
Un\G7749664 to Un\G7749679	Class3/UCMM communication execution completion	Stores the execution status of the UCMM and Class3 communications. • On: Completed • Off: Not completed or unexecuted

The following table lists the assignments for each area.

The value of each bit indicates the request command number. (No.1 to No.256)

Address			Bit															
Class3/ UCMM communication execution request	Class3/ UCMM communication execution request acceptance	Class3/ UCMM communication execution completion	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G7749632	Un\G7749648	Un\G7749664	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G7749633	Un\G7749649	Un\G7749665	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G7749634	Un\G7749650	Un\G7749666	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G7749635	Un\G7749651	Un\G7749667	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
Un\G7749636	Un\G7749652	Un\G7749668	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
Un\G7749637	Un\G7749653	Un\G7749669	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
Un\G7749638	Un\G7749654	Un\G7749670	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
Un\G7749639	Un\G7749655	Un\G7749671	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113
Un\G7749640	Un\G7749656	Un\G7749672	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129
Un\G7749641	Un\G7749657	Un\G7749673	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145
Un\G7749642	Un\G7749658	Un\G7749674	176	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161
Un\G7749643	Un\G7749659	Un\G7749675	192	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177
Un\G7749644	Un\G7749660	Un\G7749676	208	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193
Un\G7749645	Un\G7749661	Un\G7749677	224	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209
Un\G7749646	Un\G7749662	Un\G7749678	240	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225
Un\G7749647	Un\G7749663	Un\G7749679	256	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241

For the timing chart when executing the UCMM communication execution request, refer to the following.

☞ Page 309 Sending/receiving data for the message communication function (client)

■Class3/UCMM communication area (No.1) (Un\G7751680 to Un\G7753727)

This area stores communication requests and communication responses during Class3/UCMM communications.

○: Set, —: Do not set

■Request area						
Address	**Item**	**Class3**	**UCMM**	**Description**	**Initial value**	**Read, write**
Un\G7751680	Communication method specification	—[*1*2]	○	Specify the communication method. • 0001H: UCMM communications • 0002H: Class3 communications	• UCMM: 1 • Class3: 2	• Class3: Read • UCMM: Read
Un\G7751681	Communication method specification	—[*1]	○	Specify the communication method. • 0001H: Message communications • 0002H: Tag communications	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751682 to Un\G7751684	System area					
Un\G7751685	Service	—[*1]	○	■Message communications Specify the service code of the EtherNet/IP message communications. • Lower 8 bytes: Service code (0H to FFH) • Upper 8 bytes: System area Refer to the manuals of the EtherNet/IP device except for the following. • 000EH (Get_Attribute_Single): Obtains the set value of the specified Attribute. • 0010H (Set_Attribute_Single): Sets the value for the specified Attribute. ■Tag communications Specify the tag communication type. • 124CH: Class3/UCMM Read Originator • 124DH: Class3/UCMM Write Originator	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751686 to Un\G7751687	Target IP address	—[*1]	○	Set the IP address of the EtherNet/IP device to which the request data is sent during Class3/UCMM communications. Setting range: 0.0.0.1 to 223.255.255.254 Specify the IP address from the first octet to the 4th octet as follows. • Lower byte of the No.1 word: Fourth octet • Upper byte of the No.1 word: Third octet • Lower type of the No.2 word: Second octet • Upper byte of the No.2 word: First octet	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751688	RPI	○[*1]	○	Set Requested Packet Interval. ■0000H to 00C7H (0 to 199) (unit: ms) • Class3: Operates with parameter setting or the previous setting value. • UCMM: When the trigger specification is set to Cyclic, a response error occurs. ■00C8H to EA60H (200 to 60000) (unit: ms) • Class3: Operation is performed with the set value. • UCMM: When the trigger specification is set to Cyclic, operation is performed with the set value. ■EA61H to FFFFH (60001 to 65535) (unit: ms) • Class3: Operates with parameter setting or the previous setting value. • UCMM: When the trigger specification is set to Cyclic, a response error occurs.	• Class3: Parameter followed • UCMM: 0	• Class3: Read, write • UCMM: Read, write
Un\G7751689	TimeOutMultiplier	—[*1]	—	Set TimeOutMultiplier during Class3 communications. • 0000H: ×4 • 0001H: ×8 • 0002H: ×16 • 0003H: ×32 • 0004H: ×64 • 0005H: ×128 • 0006H: ×256 • 0007H: ×512 • For other than the above: Operates with the default value (×32).	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read

■Request area							
Address	**Item**		**Class3**	**UCMM**	**Description**	**Initial value**	**Read, write**
Un\G7751690	Trigger Type		—*1	○	Set a transmission trigger. • 0000H: Application Trigger • 0010H: Cyclic	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751691	Path Segment specification	Segment Size	—*1	○	Specify the size of the Path Segment to be assigned when connecting. Unit: Byte Range: 0 (No Path Segment assigned) 1 (Path Segment assigned)	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751692 to Un\G7751706		Path Segment	—*1	○	Specify the Path Segment data to be assigned when connecting. (Valid when 1 is set for Segment Size) • Lower 8 bytes of the No.1 word: Port number (1 to 14) • Upper 8 bytes of the No.1 word: Link address (slot number)	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751707	Data Type		—*1	○	■Message communications This area is not used. ■Tag communications Specify a data type for the request data. • 00C3H: INT (signed 16-bit data) • 00C4H: DINT (signed 32-bit data)	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751708	Data Size		—*1	○	Specify the request data size. ☞ Page 544 Data Size (Un\G7751708)	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751709	System area						
Un\G7751710	Class		—*1	○	■Message communications Refer to the manuals of the transmission destination EtherNet/IP device.	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751711	Instance		—*1	○	■Message communications Refer to the manuals of the transmission destination EtherNet/IP device.	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751712	Attribute		—*1	○	■Message communications Refer to the manuals of the transmission destination EtherNet/IP device.	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751713 to Un\G7751715	System area						
Un\G7751716 to Un\G7751843	Tag Name		—*1	○	■Tag communications Set the tag name of the destination. • Minimum number of characters: 1 ASCII code character • Maximum number of characters: 255 ASCII code characters	• Class3: Parameter followed • UCMM: 0	• Class3: Read • UCMM: Read, write
Un\G7751844 to Un\G7751845	System area						
Un\G7751846 to Un\G7752552	Request data		○	○	■Message communications Set the necessary value for each service code. However, this area is not used for a service that obtains values from the transmission destination device. Refer to the manuals of transmission destination EtherNet/IP device except for the following. • Get_Attribute_Single: No setting • Set_Attribute_Single: Value set for the specified Attribute ■Tag communications When the Service is Class3/UCMM Write Originator, specify the data to be written in the destination tag. When the Service is Class3/UCMM Read Originator, this area is not used.	• Class3: 0 • UCMM: 0	• Class3: Read, write • UCMM: Read, write
Un\G7752553 to Un\G7752703	System area						

■Response area							
Address	**Item**		**Class3**	**UCMM**	**Description**	**Initial value**	**Read, write**
Un\G7752704	Communication method specification		—	—	The request area value is stored.	0	Read
Un\G7752705	Communication method specification		—	—	The request area value is stored.	0	Read
Un\G7752706	Result storage area		—	—	The request area processing result is stored. • 0: Completed successfully • Other than 0: Completed with an error (error code) For details on the error codes, refer to the following. ☞ Page 481 Error Codes for the Message Communication Function (Client)	0	Read
Un\G7752707 to Un\G7752708	CIP response code		—	—	The request area processing result is stored with a CIP response code.	0	Read
Un\G7752709	Service		—	—	The request area value is stored.	0	Read
Un\G7752710 to Un\G7752711	Target IP address		—	—	The request area value is stored.	0	Read
Un\G7752712	RPI		—	—	The request area value is stored.	0	Read
Un\G7752713	TimeOutMultiplier		—	—	The request area value is stored.	0	Read
Un\G7752714	Trigger Type		—	—	The request area value is stored.	0	Read
Un\G7752715	Path Segment specification	Segment Size	—	—	The request area value is stored.	0	Read
Un\G7752716 to Un\G7752730		Path Segment	—	—	The request area value is stored.	0	Read
Un\G7752731	Data Type		—	—	■Message communications This area is not used. ■Tag communications When the Service is Class3 Read Originator, the type of the response data from the EtherNet/IP device is stored. When the Service is Class3 Write Originator, the request area value is stored.	0	Read
Un\G7752732	Data Size		—	—	■Message communications The received data size of the response command is stored in units of bytes. For the response data size, refer to the manuals of the response command transmission source EtherNet/IP device and the EtherNet/IP specifications. ■Tag communications • When the service is Class3/UCMM Read Originator, the response data size from the transmission source EtherNet/IP device is stored as the number of data type elements. • When the service is Class3/UCMM Write Originator, "0" is stored.	0	Read
Un\G7752733	System area						
Un\G7752734	Class		—	—	Refer to the manuals of the response command transmission source EtherNet/IP device and the EtherNet/IP specifications.	0	Read
Un\G7752735	Instance		—	—	Refer to the manuals of the response command transmission source EtherNet/IP device and the EtherNet/IP specifications.	0	Read
Un\G7752736	Attribute		—	—	Refer to the manuals of the response command transmission source EtherNet/IP device and the EtherNet/IP specifications.	0	Read
Un\G7752737 to Un\G7752739	System area						
Un\G7752740 to Un\G7752867	Tag Name		—	—	The request area value is stored.	0	Read

■Response area						
Address	**Item**	**Class3**	**UCMM**	**Description**	**Initial value**	**Read, write**
Un\G7752868 to Un\G7752869	Execution completed count	—	—	The execution completion count of the Class3/UCMM communications is stored.	0	Read
Un\G7752870 to Un\G7753576	Response data	—	—	■Message communications The response data from the EtherNet/IP device that sent the response command is stored. However, this area is not used for a service that sets values for the transmission destination device. For details, refer to the manuals of the transmission destination EtherNet/IP device. ■Tag communications When the Service is Class3/UCMM Read Originator, the response data from the transmission destination EtherNet/IP device is stored. When the Service is Class3/UCMM Write Originator, this area is not used.	0	Read
Un\G7753577 to Un\G7753727	System area					

*1 The value set in the parameter is stored when the module starts. The items marked with "-" except for the communication method are ignored even if the setting is changed.

*2 If UCMM communications are set for the communication method for the area set for Class3 in the parameter, a response error occurs.

• Path Segment specification

In this area, Port Segment can be specified. Set Port Segment when accessing a device with tag data on the CPU module side via an EtherNet/IP device.

Point

- The Path Segment specification usually does not need to be changed from the default value. Specify Path Segment for devices that require the Connection Path specification.
- When the external device is RJ71GN11-EIP or RJ71EIP91, specify the default (0: No Path Segment assigned).
- For the Connection Path specification, refer to the EtherNet/IP specifications.
- Set the Path Segment specification according to the specifications of the external device. If a Path Segment that is not supported by the external device is specified, a response error may be received.

A

■Data Size (Un\G7751708)

The size available for Class3/UCMM communications varies depending on the parameters used.

When performing Class3 communications, settings need to be made in "EtherNet/IP Configuration", including Data Size (Un\G7751708).

Or, when Path Segment is assigned, this means that the following setting has been done.

- Segment Size (Un\G7751691) is 1: Path Segment assigned.
- The port number for the Path Segment (Un\G7751692 to Un\G7751706) is 1 to 14.

UCMM message communications

When 0001H: UCMM communications is set for the communication method specification (Un\G7751680) and 0001H: Message communications is set for the communication method specification (Un\G7751681), or when UCMM message communications are performed, the range of the Data Size (Un\G7751708) that can be requested is as follows.

- Minimum size: 0 (unit: byte)
- Maximum size: 496 - additional header size[*1] (unit: byte)

*1 When the following parameters are set, 2 (unit: type) is added as an additional header size.

- The Class setting value (Un\G7751710) is 0100H to FFFFH. (When the setting value is 0000H to 00FFH, no additional header size is required.)
- The instance setting value (Un\G7751711) is 0100H to FFFFH. (When the setting value is 0000H to 00FFH, no additional header size is required.)
- The attribute setting value (Un\G7751712) is 0100H to FFFFH. (When the setting value is 0000H to 00FFH, no additional header size is required.)

When the Path Segment is assigned, 14 (unit: type) is added as an additional header size.

Class setting value	Instance setting value	Attribute setting value	Presence/absence of Path Segment	Maximum data size
00FFH or less	00FFH or less	00FFH or less	Absent	496
			Present	482
		0100H or more	Absent	494
			Present	480
	0100H or more	00FFH or less	Absent	494
			Present	480
		0100H or more	Absent	492
			Present	478
0100H or more	00FFH or less	00FFH or less	Absent	494
			Present	480
		0100H or more	Absent	492
			Present	478
	0100H or more	00FFH or less	Absent	492
			Present	478
		0100H or more	Absent	490
			Present	476

UCMM tag communications

When 0001H: UCMM communications is set for the communication method specification (Un\G7751680) and 0002H: Tag communications is set for the communication method specification (Un\G7751681), or when UCMM tag communications are performed, the range of the Data Size (Un\G7751708) that can be requested is as follows.

Service setting value	Data Type setting value	Presence/absence of Path Segment	Data Size setting range
124CH (Class3/UCMM Read Originator)	00C3H (INT)	—	1 to 249
	00C4H (DINT)		1 to 124
124DH (Class3/UCMM Write Originator)	00C3H (INT)	Absent	1 to (494 - (number of tag name characters / 2 (round up to the nearest integer)))
		Present	1 to (480 - (number of tag name characters / 2 (round up to the nearest integer)))
	00C4H (DINT)	Absent	1 to (494 - (number of tag name characters / 4 (round up to the nearest integer)))
		Present	1 to (480 - (number of tag name characters / 4 (round up to the nearest integer)))

Class3 message communications

When Class3 message communications are performed, the range of the Data Size (Un\G7751708) that can be requested is as follows.*2

- Minimum size: 0 (unit: byte)
- Maximum size: 1404 (unit: byte)

*2 For connections configured to perform Class3 message communications, the following values are set as the initial values.

- Communication method specification (Un\G7751680) is set to 0002H: Class3 communications.
- Communication method specification (Un\G7751681) is set to 0001H: Message communications.
- For other than the above, the parameters set for "EtherNet/IP Configuration" are set.

Class3 tag communications

When Class3 tag communications are performed, the range of the Data Size (Un\G7751708) that can be requested is as follows.*3

*3 For connections configured to perform Class3 tag communications, the following values are set as the initial values.

- Communication method specification (Un\G7751680) is set to 0002H: Class3 communications.
- Communication method specification (Un\G7751681) is set to 0002H: Tag communications.
- For other than the above, the parameters set for "EtherNet/IP Configuration" are set.

Service setting value	Data Type setting value	Data Size setting range
124CH (Class3/UCMM Read Originator)	00C3H (INT)	1 to 248
	00C4H (DINT)	1 to 124
124DH (Class3/UCMM Write Originator)	00C3H (INT)	1 to (492 - (number of tag name characters / 2 (round up to the nearest integer)))
	00C4H (DINT)	1 to (492 - (number of tag name characters / 4 (round up to the nearest integer)))

■Class3/UCMM communication area (No.2 to No.256) (Un\G7753728 to Un\G8275967)

The No.2 to No.256 information is set and stored in the same order as in the Class3/UCMM communication area (No.1) (Un\G7751680 to Un\G7753727).

For each buffer memory address, 2048 × (No.n - 1) is added to the No.1 address value.

Class3/UCMM tag communication area

■Class3/UCMM data area (tag communications) (Un\G8278016 to Un\G8462847)

The data sent to and received from the EtherNet/IP device is stored during Class3/UCMM tag communications.
The storage area is reserved in the order of connection No.1 to 256 from the top of this area.

■Class3/UCMM data size (tag communications) (Un\G8463104 to Un\G8463359)

The size of the data (unit: words) sent to and received from the EtherNet/IP device during Class3/UCMM tag communications is stored in the order of connection No.1 to 256.

■Class3/UCMM start offset address to the data (tag communications) (Un\G8463616 to Un\G8464127)

The offset address of "Class3/UCMM data area (tag communications)" (Un\G8278016 to Un\G8462847), where the data to be sent to and received from the EtherNet/IP device during Class3/UCMM tag communications is stored, is stored in double-word units in the order of connection No.1 to 256.

- 0 to 184831 (0H to 2D1FFH): The address is stored as an offset address.
- 4294967295 (FFFFFFFFH): No address is assigned as an offset address.

Class3/UCMM communication status

■Class3 reserved station (Un\G8464416 to Un\G8464431)

Stores the setting status of the reserved station of connection numbers 1 to 256.

- On: Reserved station
- Off: Not set as reserved station

The following table lists the assignments for each area.
The value of each bit indicates the connection number.

Address	Bit															
Class3 reserved station	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G8464416	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Un\G8464417	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Un\G8464418	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Un\G8464419	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
Un\G8464420	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
Un\G8464421	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
Un\G8464422	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
Un\G8464423	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113
Un\G8464424	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129
Un\G8464425	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145
Un\G8464426	176	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161
Un\G8464427	192	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177
Un\G8464428	208	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193
Un\G8464429	224	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209
Un\G8464430	240	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225
Un\G8464431	256	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241

Number of consumed connections

■Number of consumed connections (For port 2) (Un\G8474724)

This displays the current number of consumed connections.

The number of consumed connections is the total number of the following connections with a maximum value of 256.

- Connections[*1][*2] set in "EtherNet/IP Configuration" as the Class1 communications (instance/tag) originator
- Connections[*1][*2] set in "EtherNet/IP Configuration" as the Class3 communications (message/tag) client
- Active connections[*3][*4] as a Class1 communications (instance/tag) target
- Connections[*4][*5] that are communicating with another EtherNet/IP device as a Class3 communications (message/tag) server

*1 Connections set for reserved stations are not included in the set number of connections.

*2 Even if communication has not started, these are counted as consumed connections.

*3 When a request from an originator is received, it is counted as a consumed connection once communication starts. If multiple originators connect to connections set as targets using multicast, the number of connected originators will be added to the number of consumed connections.

*4 The connections are not added by only setting Class1 communication (instance/tag) targets in "EtherNet/IP Configuration" or setting Class3/UCMM tags. As a condition for adding to the number of consumed connections, the connection must be present from receiving the connection establishment request from the originator/client until the connection is released.

*5 The Class3 message communications server function allows it to operate as a server if requested by a client and accepts connection establishment requests even if there are no settings in "EtherNet/IP Configuration". In such cases, these are added to the number of connections.

Point

Connection will not be possible if the maximum value of 256 is exceeded. If an originator device that is actively communicating as a target for Class1 communications (instance/tag) has its communication interrupted due to a cable disconnection or communication error, the count is reduced.

A

Appendix 4 List of Link Special Relay (SB)

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

Application of link special relay (SB)

By using link special relay (SB), the status of CC-Link IE TSN can be checked from places other than the engineering tool also.

Refresh of link special relay (SB)

To use link special relay (SB), set them in "Refresh Setting" in "Basic Settings" so that they are refreshed to the devices or labels of the CPU module. (☞ Page 77 Refresh Setting)

Ranges turned on/off by users and by the system

The following ranges correspond to when the link special relay areas (SB) are assigned from SB0000 to SB0FFF.

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

List of link special relay (SB)

The following table lists the link special relay areas (SB) when they are assigned from SB0000 to SB0FFF.

Point

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

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SB0006	Clear communication error count	Clears the link special register areas related to communication errors (SW0074 to SW0077) to 0. Off: Clear not requested On: Clear requested (valid while on)	○	○	○
SB0014	Cyclic data receive status clear	Clears 'Cyclic data receive status' (SB0064). While SB0014 is on, 'Cyclic data receive status' (SB0064) does not turn on. Off: Clear not requested On: Clear requested (enabled while on)	○	×	×
SB0016	Remote device forced output request	Enables the remote device test function. Off: No request On: Request issued	○	×	×
SB0030	RECV execution request flag CH1	Stores the data reception status of own station channel 1. Off: No data received On: Data received	○	○	○
SB0031	RECV execution request flag CH2	Stores the data reception status of own station channel 2. Off: No data received On: Data received	○	○	○
SB0032	RECV execution request flag CH3	Stores the data reception status of own station channel 3. Off: No data received On: Data received	○	○	○
SB0033	RECV execution request flag CH4	Stores the data reception status of own station channel 4. Off: No data received On: Data received	○	○	○
SB0034	RECV execution request flag CH5	Stores the data reception status of own station channel 5. Off: No data received On: Data received	○	○	○
SB0035	RECV execution request flag CH6	Stores the data reception status of own station channel 6. Off: No data received On: Data received	○	○	○

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SB0036	RECV execution request flag CH7	Stores the data reception status of own station channel 7. Off: No data received On: Data received	○	○	○
SB0037	RECV execution request flag CH8	Stores the data reception status of own station channel 8. Off: No data received On: Data received	○	○	○
SB0040	Network type of own station	Stores the network type of the own station. On: CC-Link IE TSN	○	○	○
SB0043	Module operation mode of own station	Stores the module operation mode of the own station. Off: Online mode On: Other than online mode	○	○	○
SB0044	Station setting 1 of own station	Stores the station type of the own station. Off: Device station (other than the master station) On: Master station	○	○	○
SB0045	Station setting 2 of own station	Stores the communication mode of the own station. Off: Unicast mode On: Multicast mode	○	○	○*1
SB0046	Station number setting status of own station	Stores the station number setting status. Off: Station number set On: Station number not set (local station only) If parameters are set using the engineering tool, this relay is always off.	○	○	○
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. (Also used in the CLPA conformance test.) (Updated even if set as an error invalid station.)	○	○	○
SB004A	CPU minor error status of own station	Stores the minor error status of the CPU module on the own station. Off: No minor error On: Minor error	○	○	○
SB004B	CPU moderate/major error status of own station	Stores the moderate/major error status of the CPU module on the own station. Off: No moderate/major error On: Moderate/major error	○	○	○
SB004C	CPU operating status of own station	Stores the operating status of the CPU module on the own station. Off: RUN, PAUSE On: STOP or moderate/major error	○	○	○
SB004D	Received parameter error	Stores the status of received parameter. (For the master station, this relay stores the parameter status of the own station) Off: Normal On: Error	○	○	○
SB004F	Station number status of the operating station	Stores the station number setting method as follows when the station type of the own station is local station. Off: Set by parameters On: Set by program Stores the station number setting method as follows for a remote device station or intelligent device station. Off: Set by parameters On: Set by the CC-Link IE Field Network diagnostics (including cases with no parameter and when the parameter is default (empty))	×	○	○

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SB0064	Cyclic data receive status	Shows the receive status in the communication cycle in which the cyclic data from the device station is set using "Disconnection Detection Setting" in the master station. Off: Cyclic data received On: Cyclic data not received consecutively (Conditions) • Turns on when the cyclic data of one or more device stations is not received consecutively. • Reserved stations and stations that surpass the maximum station number are ignored. (Also used in the CLPA conformance test.) (Updated even if set as an error invalid station.) (Updated even if set as a reserved station.)	○	×	×
SB006A	PORT1 link-down status of own station	Stores the link-down status of the own station P1 side. Off: Link-up On: Link-down The time until link-up starts after power-on or Ethernet cable connection may vary. Normally link-up takes several seconds. Depending on device status on the line, link-up processing is repeated and may increase the time. (Also used in the CLPA conformance test.) (Updated even if set as an error invalid station.) (Updated even if set as a reserved station.)	○	○	○
SB0074	Reserved station specification status	Stores the status of reserved station specification by parameter. The station number of the station set as a reserved station can be checked with 'Reserved station setting status' (SW00C0 to SW00C7). Off: Not specified On: Specified	○	×	○*1
SB0075	Error invalid station setting status	Stores the status of error invalid station setting by parameter. The station number of the station set as an error invalid station can be checked with 'Error invalid station setting status' (SW00D0 to SW00D7). Off: Not specified On: Specified	○	×	○*1
SB0077	Parameter reception status	Stores the status of parameter reception from the master station. Off: Reception completed On: Reception not completed	×	○	○
SB007B	Input data status of data link faulty station	Stores the setting status of "Data Link Error Station Setting" under "I/O Maintenance Settings" in "Supplementary Cyclic Settings" of "Application Settings" for the own station. Off: Clear On: Hold	○	○	○
SB007D	Hold/clear status setting for CPU STOP	Stores the setting status of "Output Hold/Clear Setting during CPU STOP" under "I/O Maintenance Settings" in "Supplementary Cyclic Settings" of "Application Settings" for the own station. Off: Hold On: Clear	○	○	○
SB007E	Type of IP Address	Stores the type of IP address. Off: IPv4 On: IPv6	○	○	○
SB007F	IP address setting status	Stores the status of the IP address setting by parameter. Off: No setting On: Set For local stations, this relay stores the acceptance status of the IP address from the master station.	○	○	○
SB0086	Remote device forced output request accept	Stores the acceptance status of the remote device test function. Off: Not accepted On: Accepted	○	×	×
SB0087	Remote device forced output status	Stores the operating status of the remote device test function. Off: Not completed On: Completed	○	×	×

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SB00B0	Data link error status of each station	Stores the data link status of each station. Off: All stations normal On: Faulty station exists When this relay is turned on, the status of each station can be checked with 'Data link status of each station' (SW00B0 to SW00B7). Depending on the link refresh timing, the update of 'Data link status of each station' (SW00B0 to SW00B7) may be offset by one sequence scan. Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, "0: Data link normally operating station" is reflected to the CC-Link IE TSN Class A remote station. (Conditions) Reserved stations and stations that surpass the maximum station number are ignored.	○	×	○*1
SB00B1	Data link error status of master station	Stores the data link status of the master station. Off: Normal On: Error	○	×	○*1
SB00C0	Reserved station setting status	Stores whether a reserved station is set. Off: No setting On: Set When this relay is turned on, the status of each station can be checked with 'Reserved station setting status' (SW00C0 to SW00C7). Depending on the link refresh timing, the update of 'Reserved station setting status' (SW00C0 to SW00C7) may be offset by one sequence scan.	○	×	○*1
SB00D0	Error invalid station setting current status	Set whether an error invalid station is set. Off: No setting On: Set When this relay is turned on, the status of each station can be checked with 'Error invalid station setting status' (SW00D0 to SW00D7). Depending on the link refresh timing, the update of 'Error invalid station setting status' (SW00D0 to SW00D7) may be offset by one sequence scan.	○	×	○*1
SB00E8	Station type match status of each station	Stores the station type match status of each station. Off: Station type match in all stations On: Station type mismatch exists When this relay is turned on, the status of each station can be checked with 'Station type match status' (SW00E8 to SW00EF). Depending on the link refresh timing, the update of 'Station type match status' (SW00E8 to SW00EF) may be offset by one sequence scan.	○	×	○*1
SB00F0	CPU operating status of each station	Stores the operating status of the CPU module on each station. Off: All stations are at RUN or PAUSE state On: Station at STOP or station with a moderate/major error exists. When this relay is turned on, the status of each station can be checked with 'CPU operating status of each station' (SW00F0 to SW00F7). Depending on the link refresh timing, the update of 'CPU operating status of each station' (SW00F0 to SW00F7) may be offset by one sequence scan. Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, "0: RUN, PAUSE" is reflected to the CC-Link IE TSN Class A remote station.	○	×	○*1
SB00F1	CPU operating status of master station	Stores the operating status of the CPU module on the master station. Off: RUN, PAUSE On: STOP or moderate/major error	○	×	○*1
SB0100	CPU moderate/major error status of each station	Stores the moderate/major error occurrence status of each station. When the target station is RJ71GN11-EIP, the occurrence status on the CPU module is stored. Off: No station with a moderate/major error On: Station with a moderate/major error exists When this relay is turned on, the status of each station can be checked with 'CPU moderate/major error status of each station' (SW0100 to SW0107). Depending on the link refresh timing, the update of 'CPU moderate/major error status of each station' (SW0100 to SW0107) may be offset by one sequence scan. Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, "0: No moderate/major error" is reflected to the CC-Link IE TSN Class A remote station.	○	×	○*1

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SB0101	CPU moderate/major error status of master station	Stores the moderate/major error occurrence status of the CPU module on the master station. Off: No moderate/major error On: Moderate/major error	○	×	○*1
SB0110	CPU minor error status of each station	Stores the minor error occurrence status of each station. When the target station is RJ71GN11-EIP, the occurrence status on the CPU module is stored. Off: All stations normal or station with a moderate/major error exists On: Station with a minor error exists When this relay is turned on, the status of each station can be checked with 'CPU minor error status of each station' (SW0110 to SW0117). Depending on the link refresh timing, the update of 'CPU minor error status of each station' (SW0110 to SW0117) may be offset by one sequence scan. Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, "0: Normal, or a moderate or serious error occurring" is reflected to the CC-Link IE TSN Class A remote station.	○	×	○*1
SB0111	CPU minor error status of master station	Stores the minor error status of the CPU module on the master station. Off: No minor error or a moderate/major error On: Minor error	○	×	○*1
SB01E1	Setting status of CC-Link IE TSN Network synchronous communication function	Stores the setting status of the CC-Link IE TSN Network synchronous communication function. Off: No setting On: Set	○	×	×
SB01E9	Inter-module synchronization cycle over flag	Stores the cycle over occurrence status of the inter-module synchronization. This relay is turned on if output preparation processing (cyclic data transfer processing for network modules) is not completed within the inter-module synchronization cycle. After that, it remains turned on even if the processing is operated within the specified inter-module synchronization cycle. The status is cleared by powering off and on the system or by resetting the CPU module. Off: Processing time overflow has not occurred. On: Processing time overflow has occurred.	○	○	○

*1 If the station is communicating in multicast mode, this item is enabled when 'Data link error status of own station' (SB0049) is off.

Appendix 5 List of Link Special Register (SW)

The link special register (SW) stores the information during data link as a numerical value. Faulty areas and causes can be checked by using or monitoring the link special register (SW) in programs.

Application of link special register (SW)

By using link special register (SW), the status of CC-Link IE TSN can be checked from places other than the engineering tool also.

Refresh of link special register (SW)

To use link special register (SW), set them in "Refresh Settings" under "Basic Settings" so that they are refreshed to the devices or labels of the CPU module. (☞ Page 77 Refresh Setting)

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

The following ranges correspond to when the link special register areas (SW) are assigned from SW0000 to SW0FFF.

- Stored by users: SW0000 to SW001F
- Stored by the system: SW0020 to SW0FFF

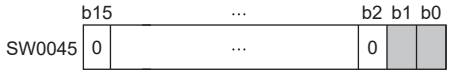
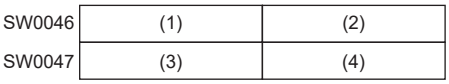
List of link special register (SW)

The following table lists the link special register areas (SW) when they are assigned from SW0000 to SW0FFF.

Point

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

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SW001A	REMFR/REMTO instruction resend count	Set the number of resends for the REMFR/REMTO/REMFRD/REMTOD instruction. 0: Not resent (default) Other than the above: Number of times that is set, 1 to 15 (times)	○	×	×
SW001B	REMFR/REMTO instruction response wait timer time	Set the response wait time for the REMFR/REMTO/REMFRD/REMTOD instruction. 0: 10 seconds (default) Other than the above: Number of seconds that is set, 1 to 32767 (seconds)	○	×	×
SW0030	Link dedicated instructions processing result CH1	Stores the processing results of the link dedicated instruction that used channel 1 of the own station. 0: Completed successfully 1 or greater: Completed with an error (Error code is stored.)	○	○	○
SW0031	Link dedicated instructions processing result CH2	Stores the processing results of the link dedicated instruction that used channel 2 of the own station. 0: Completed successfully 1 or greater: Completed with an error (Error code is stored.)	○	○	○
SW0040	Network number	Stores the network number of the own station. Range: 1 to 239	○	○	○
SW0042	Station No.	Stores the station number of the own station. Range: • Master station: 125 • Local station: 1 to 120, 255 (station number not set)	○	○	○
SW0043	Mode status of own station	Stores the module operation mode setting or communication mode of the own station. 0: Online mode/Unicast mode 1: Online mode/Multicast mode 2: Offline mode B: Module communication test mode	○	○	○*1

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SW0045	Module type	Stores the hardware status of the own station.  Model type 00: Module 01: Board 10: HMI (Human Machine Interface)	○	○	○
SW0046 to SW0047	IPv4 address	Indicates the IP address (IPv4) set in the own station.  (1): Third octet (2): Fourth octet (3): First octet (4): Second octet	○	○	○
SW0049	Cause of data link stop	Stores the cause which stopped the data link of the own station. 00H: At normal communication or power-on 02H: Monitoring time timeout 05H: No device station (master station only) 10H: Parameter not received (local station only) 11H: Outside the range of own station numbers 12H: Reserved station setting of own station (local station only) 14H: Master station duplication (master station only) 16H: Station number not set (local station only) 18H: Parameter error 19H: Parameter communication in progress 20H: CPU module moderate error, major error 60H: Illegal ring connection (master station only) (Also used in the CLPA conformance test.) (Updated even if set as an error invalid station.) (Updated even if set as a reserved station.)	○	○	○
SW004B	CPU status of own station	Stores the status of the CPU module on the own station. 00H: No CPU module mounted 01H: STOP (normal) 02H: STOP (moderate/major error) 03H: STOP (minor error) 04H: RUN (normal) 05H: RUN (minor error) 07H: PAUSE 0EH: Reset in progress 0FH: Initial processing in progress	○	○	○
SW004C	Parameter setting status	Stores the status of parameter settings. 0: Normal 1 or greater: Error definition (Error code is stored.) (Conditions) • This register is enabled when 'Received parameter error' (SB004D) is on.	○	○	○
SW0058	Total number of device stations setting value	Stores the total number of device stations that are set by the parameters. Range: 1 to 120	○	○	○
SW0059	Total number of device stations present value	Stores the total number of device stations that are actually connected by data link. Range: 1 to 120 (0 when own station is disconnected) Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, the CC-Link IE TSN Class A remote station is reflected as a station where the data link is normally performed.	○	×	○*1

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SW005B	Maximum data link station number	Stores the maximum station number of the station where the data link is normally performed. Range: 1 to 120 (0 when own station is disconnected) Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, the CC-Link IE TSN Class A remote station is reflected as a station where the data link is normally performed. • This register is enabled when 'Data link error status of own station' (SB0049) is off.	○	×	○*1
SW0060	Communication cycle intervals	Stores the setting value of the communication cycle intervals set with the module parameter of the master station. (Unit: μs)	○	○	○
SW0061	System reserved time	Stores the setting value of the system reserved time set with the module parameter of the master station. (Unit: μs)	○	○	○
SW0062	Cyclic transmission time	Stores the setting value of "Cyclic Transmission Time" of "Basic Settings". (Unit: μs)	○	○	○
SW0063	Transient transmission time	Stores the setting value of "Transient Transmission Time" of "Basic Settings". (Unit: μs)	○	○	○
SW0064	Multiple cycle setting (medium speed)	Stores the setting value of the multiple cycle setting (medium speed) set with the module parameter of the master station.	○	○	○
SW0065	Multiple cycle setting (low speed)	Stores the setting value of the multiple cycle setting (low speed) set with the module parameter of the master station.	○	○	○
SW0066	Connection status of own station	Stores the connection status of the own station. 01H: Normal (communication in progress on P1) 11H: Disconnected (cable disconnected on P1) 21H: Disconnected (establishing line on P1)	○	○	○
SW0072	Communication cycle intervals (Calculation value)	Stores the communication cycle intervals that are calculated by the number of device stations and the number of link device points set in "Network Configuration Settings" of "Basic Settings". (Unit: μs)	○	×	×
SW0073	Cyclic transmission time (Calculation value)	Stores the cyclic transmission time that is calculated by the number of device stations and the number of link device points set in "Network Configuration Settings" of "Basic Settings". (Unit: μs)	○	×	×
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 count 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 count is cleared. When FFFFH (maximum value 65535) is counted, counting stops.	○	○	○
SW0076	PORT1 total number 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 count is cleared. When FFFFFFFFH (maximum value 4294967295) is counted, counting stops.	○	○	○
SW0077	PORT1 total number of received data (upper 1 word)				
SW0078	Transient transmission time (Calculation value)	Stores the transient transmission time that is calculated by the number of device stations and the number of link device points set in "Network Configuration Settings" of "Basic Settings". (Unit: μs)	○	×	×

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<tr><th>Master station</th><th>Local station</th><th></th></tr>
<tr><th></th><th></th><th></th><th></th><th>Unicast mode</th><th>Multicast mode</th></tr>
<tr><td>SW0079</td><td>Watchdog counter processing time (calculation value)</td><td>Stores the processing time required for the watchdog counter to monitor cyclic communications. The processing time is calculated according to the settings of the device station actually connected. (Unit: μs)</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SW007A</td><td>Transient transmission additional time (calculation value)</td><td>Stores the additional time required for "Communication Period Interval Setting" and "Transient Transmission Time" of "Communication Period Setting" under "Basic Settings". (Unit: μs)</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SW0080 to SW009F</td><td>REMFR/REMTO instruction execution status</td><td>Stores the execution status of the REMFR/REMTO/REMFRD/REMTOD instruction for each channel.
SW0080 to SW009F: Channel 1 to Channel 32
0: Completed successfully
1 or greater: Completed with an error (Error code is stored.)</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SW00B0 to SW00B7</td><td>Data link status of each station</td><td>Stores the data link status of each station.
0: Data link normally operating station
1: Data link faulty station
• If multiple stations change from faulty to normal, because they are reconnected to the network one by one per cycle, the time until the status changes to "0: Data link normally operating station" may vary by several seconds.
• If no response is received for several cycles, the station is determined to be a data link faulty station.
• Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, "0: Data link normally operating station" is reflected to the CC-Link IE TSN Class A remote station.
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW00B0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00B1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00B2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00B3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00B4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00B5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00B6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00B7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
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<tr><td>SW00C0 to SW00C7</td><td>Reserved station setting status</td><td>Stores the reserved station setting status of each station.
0: Station other than a reserved station
1: Reserved station
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW00C0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00C1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00C2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00C3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00C4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00C5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00C6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00C7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
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<tr><td>SW00C8 to SW00CF</td><td>Parameter setting status</td><td>Stores the status of parameter settings.
0: Station not set in the parameter
1: Station set in the parameter

<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW00C0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00C1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00C2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00C3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00C4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00C5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00C6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00C7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>
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<tr><td>SW00D0 to SW00D7</td><td>Error invalid station setting status</td><td>Stores the error invalid station setting status of each station.
0: Station other than an error invalid station
1: Error invalid station

<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW00D0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00D1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00D2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00D3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00D4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00D5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00D6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00D7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>
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<tr><td>SW00E8 to SW00EF</td><td>Station type match status</td><td>Stores the match status between the station type set in the master station and that of the device station.
0: Station type match
1: Station type mismatch

<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW00E8</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00E9</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00EA</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00EB</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00EC</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00ED</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00EE</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00EF</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>
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<tr><th>Master station</th><th>Local station</th><th></th></tr>
<tr><td></td><td></td><td></td><td></td><td>Unicast mode</td><td>Multicast mode</td></tr>
<tr><td>SW00F0 to SW00F7</td><td>CPU operating status of each station</td><td>Stores the CPU operating status of each station.
0: RUN, PAUSE
1: STOP or moderate/major error
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW00F0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW00F1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW00F2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW00F3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW00F4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW00F5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW00F6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW00F7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
— is fixed to 0.
(Conditions)
• Reserved stations and stations that surpass the maximum station number are ignored.
• Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, "0: RUN, PAUSE" is reflected to the CC-Link IE TSN Class A remote station.</td><td>○</td><td>×</td><td>○*1</td></tr>
<tr><td>SW0100 to SW0107</td><td>CPU moderate/ major error status of each station</td><td>Stores the moderate/major error occurrence status of each station.
When the target station is RJ71GN11-EIP, the occurrence status on the CPU module is stored.
0: No moderate/major error
1: Moderate/major error occurring
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW0100</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW0101</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW0102</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW0103</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW0104</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW0105</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW0106</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW0107</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
— is fixed to 0.
(Conditions)
• If an error occurs, data prior to error is held.
• Reserved stations and stations that surpass the maximum station number are ignored.
• Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, "0: No moderate/major error" is reflected to the CC-Link IE TSN Class A remote station.</td><td>○</td><td>×</td><td>○*1</td></tr>
</table>

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SW0110 to SW0117	CPU minor error status of each station	Stores the minor error occurrence status of each station. When the target station is RJ71GN11-EIP, the occurrence status on the CPU module is stored. 0: Normal, or a moderate or serious error occurring 1: Minor error occurring b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SW0110: 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 SW0111: 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 SW0112: 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 SW0113: 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 SW0114: 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 SW0115: 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 SW0116: 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 SW0117: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to 0. (Conditions) • Reserved stations and stations that surpass the maximum station number are ignored. • Since a local station cannot obtain the station information of the CC-Link IE TSN Class A remote station when communicating in multicast mode, "0: Normal, or a moderate or serious error occurring" is reflected to the CC-Link IE TSN Class A remote station.	○	×	○*1
SW0160 to SW0167	Execution result of device station parameter automatic setting function	When the device station parameter automatic setting is completed with an error, the bit of the target station is turned on. Off: Completed successfully On: Completed with an error When completed with an error, the error code is stored in 'Detailed execution result of device station parameter automatic setting' (SW0194). When completed with an error caused by the master station, the bit is not turned on. b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SW0160: 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 SW0161: 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 SW0162: 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 SW0163: 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 SW0164: 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 SW0165: 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 SW0166: 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 SW0167: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to 0.	○	×	×
SW0194	Detailed execution result of device station parameter automatic setting	Stores an error code when the device station parameter automatic setting is completed with an error. When completed with an error caused by the device station, the bit of the target station of 'Execution result of device station parameter automatic setting function' (SW0160 to SW0167) is turned on.	○	×	×
SW0198	Link dedicated instructions processing result CH3	Stores the processing results of the link dedicated instruction that used channel 3 of the own station. 0: Completed successfully 1 or greater: Completed with an error (Error code is stored.)	○	○	○
SW0199	Link dedicated instructions processing result CH4	Stores the processing results of the link dedicated instruction that used channel 4 of the own station. 0: Completed successfully 1 or greater: Completed with an error (Error code is stored.)	○	○	○
SW019A	Link dedicated instructions processing result CH5	Stores the processing results of the link dedicated instruction that used channel 5 of the own station. 0: Completed successfully 1 or greater: Completed with an error (Error code is stored.)	○	○	○

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<tr><td></td><td></td><td></td><td></td><td>Unicast mode</td><td>Multicast mode</td></tr>
<tr><td>SW019B</td><td>Link dedicated instructions processing result CH6</td><td>Stores the processing results of the link dedicated instruction that used channel 6 of the own station.
0: Completed successfully
1 or greater: Completed with an error (Error code is stored.)</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SW019C</td><td>Link dedicated instructions processing result CH7</td><td>Stores the processing results of the link dedicated instruction that used channel 7 of the own station.
0: Completed successfully
1 or greater: Completed with an error (Error code is stored.)</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SW019D</td><td>Link dedicated instructions processing result CH8</td><td>Stores the processing results of the link dedicated instruction that used channel 8 of the own station.
0: Completed successfully
1 or greater: Completed with an error (Error code is stored.)</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SW01A0 to SW01A7</td><td>Station protocol version 2.0 support status</td><td>Stores the protocol version 2.0 support status for each station.
0: Not supported
1: Supported
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW01A0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW01A1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW01A2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW01A3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW01A4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW01A5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW01A6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW01A7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
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<tr><td>SW01C0 to SW01C7</td><td>Information of CC-Link IE TSN Network synchronous communication function of each station</td><td>Stores the information about support or non-support of the CC-Link IE TSN Network synchronous communication function for each station.
0: Not supported
1: Supported
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW01C0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW01C1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW01C2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW01C3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW01C4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW01C5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW01C6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW01C7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
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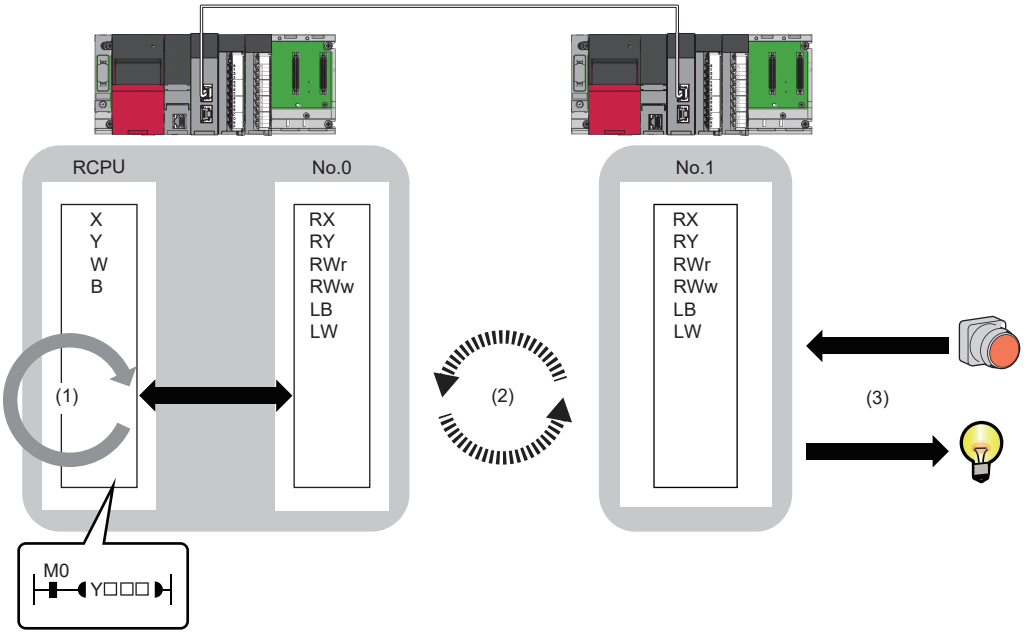
<tr><td>SW01C8 to SW01CF</td><td>Synchronous/ asynchronous operating status information of each station</td><td>Stores the information about operating status of the CC-Link IE TSN Network synchronous communication function for each station.
0: Asynchronous setting
1: Synchronous setting
Stations which are not executing an inter-module synchronous interrupt program because the CPU operating status is currently STOP or PAUSE (the status under which the program cannot be executed) are also treated as asynchronous setting (0).
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW01C8</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW01C9</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW01CA</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW01CB</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW01CC</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW01CD</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW01CE</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW01CF</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
— is fixed to 0.
(Conditions)
• Stations that surpass the maximum station number are ignored.</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SW01D0 to SW01D7</td><td>Watchdog counter operating status information for each station</td><td>Stores the watchdog counter operating status information for each station in CC-Link IE TSN network communications.
0: Not operating
1: Operating
Stations which are not performing data links are treated as "0: Not operating" because the information indicates that the communicating device stations have a watchdog counter.
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW01D0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW01D1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW01D2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW01D3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW01D4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW01D5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW01D6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW01D7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
— is fixed to 0.
(Conditions)
• Stations that surpass the maximum station number are ignored.</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SW01E9</td><td>Inter-module synchronization cycle over count</td><td>Indicates the number of times cyclic data transfer processing is not completed within the inter-module synchronization cycle. The status is cleared by powering off and on the system or by resetting the CPU module.
0: Cycle over not occurred
1 to 65535: Cumulative number of times
When FFFFH (maximum value 65535) is counted, counting stops.</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SW01EA to SW01EB</td><td>Inter-module synchronization cycle setting value</td><td>Stores the cycle setting value of the fixed interval synchronization of Inter-module synchronization. (Unit: μs)
0 is stored when the inter-module synchronization function is not used.</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SW025A</td><td>Remote device forced output request result</td><td>Stores the request result of 'Remote device forced output request' (SB0016).
0: Normal
1 or greater: Not completed
If not completed, an error code is stored.
When 'Remote device forced output request' (SB0016) is turned off, the stored error code is cleared.</td><td>○</td><td>×</td><td>×</td></tr>
</table>

<table>
<tr><th rowspan="2">No.</th><th rowspan="2">Name</th><th rowspan="2">Description</th><th colspan="3">Availability</th></tr>
<tr><th>Master station</th><th colspan="2">Local station</th></tr>
<tr><th></th><th></th><th></th><th></th><th>Unicast mode</th><th>Multicast mode</th></tr>
<tr><td>SW0470 to SW047F</td><td>NMT state machine</td><td>Stores the communication status of the device station that supports CANopen communications.
0: In the CANopen function initialization sequence, the NMT state machine is not yet in the Operational state or the device station is disconnected.
1: In the CANopen function initialization sequence, the NMT state machine is in the Operational state.
The value of the device station that does not support CANopen communications is fixed to 0.
This value is stored by each module number of the device stations set in the network configuration setting.</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SW04A0</td><td>Time synchronization method</td><td>Stores the time synchronization method.
0: IEEE1588
1: IEEE802.1AS</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SW04B0 to SW04B7</td><td>Station time synchronization status</td><td>Stores the time synchronization status for each station. (station No.1 to 120)
0: Time asynchronous station
1: Time synchronized station
For time synchronized stations, the time synchronization method can be found in 'Time synchronization method' (SW04A0).
<table><tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr><tr><td>SW04B0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>SW04B1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>SW04B2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr><tr><td>SW04B3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr><tr><td>SW04B4</td><td>80</td><td>79</td><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td>65</td></tr><tr><td>SW04B5</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td></tr><tr><td>SW04B6</td><td>112</td><td>111</td><td>110</td><td>109</td><td>108</td><td>107</td><td>106</td><td>105</td><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td></tr><tr><td>SW04B7</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>120</td><td>119</td><td>118</td><td>117</td><td>116</td><td>115</td><td>114</td><td>113</td></tr></table>Each number in the table represents a station number.
— is fixed to 0.
(Conditions)
• Stations that surpass the maximum station number are ignored.</td><td>○</td><td>×</td><td>×</td></tr>
</table>

*1 If the station is communicating in multicast mode, this item is enabled when 'Data link error status of own station' (SB0049) is off.

Appendix 6 CC-Link IE TSN Processing Time

The transmission delay time of CC-Link IE TSN consists of the time components below.
(1) Master station sequence scan time + (2) Communication cycle interval (cyclic data transfer processing time) + (3) Device station processing time



- Sequence scan time: MELSEC iQ-R CPU Module User's Manual (Application)
- Communication cycle interval (cyclic data transfer processing time): Page 568 Communication cycle intervals
- Device station processing time: Manual for the device station used

A

Cyclic transmission delay time

This section describes how to calculate the following cyclic transmission delay times.

- The time between the transmission source CPU module device turning on or off and the transmission destination CPU module device turning on or off
- The time between data setting in the transmission source CPU module device and the data being stored in the transmission destination CPU module device

In "Basic Settings" of the master station, when "Communication Period Setting" of the communication destination in "Network Configuration Settings" is set to an option other than "Basic Period", multiply the LS (communication cycle intervals) by the multiplier corresponding to the set option, which is specified in "Multiple Period Setting" under "Communication Period Setting".

In this case, the multiplier is determined according to "CC-Link IE TSN Class" in "Network Configuration Settings" and "Communication Period Setting" under "Basic Settings".

- For "CC-Link IE TSN Class B": The multiplier specified for "Multiple Period Setting" in "Basic Settings"
- For "CC-Link IE TSN Class A" when "Communication Period Setting" is "Normal-Speed": The multiplier specified for "Multiple Period Setting" in "Basic Settings"
- For "CC-Link IE TSN Class A" when "Communication Period Setting" is "Low-Speed": The multiplier specified for "Multiple Period Setting" in "Basic Settings" × n

The number n can be found in 'Information for device station cyclic transmission' (Un\G1294304).

Stations with "CC-Link IE TSN Class A" where "Communication Period Setting" is set to "Low-Speed" are grouped by the sizes of cyclic data sent from the master station to a device station or cyclic data which the master station receives from a device station. The number n is determined by the number of the groups.

The procedure for calculating n is shown below.

No.	Process	Branch		Loop 1	Loop 2	Detailed explanation
		Yes	No			
1	Start	—	—	—	—	Check the stations in "Network Configuration Settings" for the master station in the order of the station number column to assign stations with "CC-Link IE TSN Class A" whose "Communication Period Setting" is "Low-Speed" to groups.
2	Loop as many times as the number of stations. (i = 1; i ≤ the number of stations to set; i++)	—	—	No.2 to No.11	—	Check device stations with station numbers 1 to 120 in "Network Configuration Settings" for the master station one by one. (The processing of No.2 to No.11 is looped for the number of stations.)
3	Is "CC-Link IE TSN Class A" set, and is "Communication Period Setting" set to "Low-Speed"?	→No.4	→No.11		—	In "Network Configuration Settings" of the master station, check the "CC-Link IE TSN Class" and "Communication Period Setting" of the i-th station. If "CC-Link IE TSN Class A" and "Communication Period Setting" are set to "Low-Speed", perform the processing starting from No.4.
4	Calculate the values for cyclic data (DMsi) sent from the master station to a device station and cyclic data (DSsi) which the master station receives from a device station.	—	—		—	If DMsi and DSsi are defined as the sizes of cyclic data sent from the master station to a device station and cyclic data which the master station receives from a device station, they are calculated by the following formulas: DMsi = (HBL × n1i) + (16 × n2i) + ndmi DSsi = (HBL × n3i) + (20 × n4i) + ndsi

No.	Process	Branch		Loop 1	Loop 2	Detailed explanation
		Yes	No			
5	Loop for the maximum number of groups. (j = 1; j ≤ 120; j++)	—	—	No.2 to No.11	No.5 to No.10	Up to a total of 2K bytes can be assigned to a group, and determine which group number (1 to 120) is assigned to i-th station starting from 1. (The processing of No.5 to No.10 is looped for the number of stations.)
6	Does it satisfy GMsj+Dmsi≤2044?	→No.7	→No.10			If GMsj is defined as the total value of the data sizes of the cyclic data sent from the master station to device stations assigned to the jth group, determine whether the following condition is met. GMsj+DMsi≤2044
7	Does it satisfy GSsj+DSsi≤2044?	→No.8	→No.10			If GSsj is defined as the total value of the data sizes of the cyclic data which the master station receives from device stations assigned to the jth group, determine whether the following condition is met. GSsj+DSsi≤2044
8	Update the data sizes (GMsj and GSsj) of the assigned groups.	—	—			If the conditions of No.6 and No.7 are both met, update the values of GMsj and GSsj.
9	Assign the group number j to the i-th station.	—	—			When the conditions No.6 and No.7 are both satisfied, the group number j is assigned to the i-th station.
10	End of the No.5 loop	—	—			—
11	End of the No.2 loop	—	—		—	—
12	Determine the maximum value J of the group numbers.	—	—	—	—	After a group number has been assigned to all stations with "CC-Link IE TSN Class A" whose "Communication Period Setting" is "Low-Speed", determine the maximum value J of the group numbers.
13	Value of n = J ÷ 4 rounded up to the nearest integer	—	—	—	—	The following formula is used to determine the number n. Value of n = J ÷ 4 rounded up to the nearest integer
14	End	—	—	—	—	—

The following table shows the variables used in the algorithm.

Name of variable	Description
HBL	42
n1i	Round up the calculated value to the nearest integer of (ndmi + (16 × n2i)) ÷ 1484 When the calculation result of n1i is 2 or greater n2i + 1
n2i	A station set to "CC-Link IE TSN Class A" and "Low-Speed" in "Communication Period Setting" for the i-th station is a CANopen communication compatible device • n7i Other than the above • (RYbi+RWwbi) • RYbi: Round up the calculated value to the nearest integer of (The "RY Setting" number of points for the i-th station in which "CC-Link IE TSN Class A" and "Communication Period Setting" are set to "Low-Speed") ÷ 11744 • RWwbi: Round up the calculated value to the nearest integer of (The "RWw Setting" number of points for the i-th station in which "CC-Link IE TSN Class A" and "Communication Period Setting" are set to "Low-Speed") ÷ 734
ndmi	A station set to "CC-Link IE TSN Class A" and "Low-Speed" in "Communication Period Setting" for the i-th station is a CANopen communication compatible device • n5i × 2 Other than the above • (The "RY Setting" number of points for the i-th station in which "CC-Link IE TSN Class A" and "Communication Period Setting" are set to "Low-Speed") ÷ 8 + (The "RWw Setting" number of points for the i-th station in which "CC-Link IE TSN Class A" and "Communication Period Setting" are set to "Low-Speed") × 2
n3i	Round up the calculated value to the nearest integer of (ndsi+(20 × n4i)) ÷ 1484 When the calculation result of n3i is 2 or greater • n4i + 1
n4i	A station set to "CC-Link IE TSN Class A" and "Low-Speed" in "Communication Period Setting" for the i-th station is a CANopen communication compatible device • n7i Other than the above • (RXbi+RWrbi)+1 • RXbi: Round up the calculated value to the nearest integer of (The "RX Setting" number of points for the i-th station in which "CC-Link IE TSN Class A" and "Communication Period Setting" are set to "Low-Speed") ÷ 11712 • RWrbi: Round up the calculated value to the nearest integer of (The "RWr Setting" number of points for the i-th station in which "CC-Link IE TSN Class A" and "Communication Period Setting" are set to "Low-Speed") ÷ 732

Name of variable	Description
ndsi	A station set to "CC-Link IE TSN Class A" and "Low-Speed" in "Communication Period Setting" for the i-th station is a CANopen communication compatible device • n6i × 2 + 8 Other than the above • (The "RX Setting" number of points for the i-th station in which "CC-Link IE TSN Class A" and "Communication Period Setting" are set to "Low-Speed") ÷ 8 + (The "RWr Setting" number of points for the i-th station in which "CC-Link IE TSN Class A" and "Communication Period Setting" are set to "Low-Speed") × 2 + 8
n5i	A total number of device points for RPDO set in the PDO mapping setting whose stations are set to "CC-Link IE TSN Class A" and "Low-Speed" in "Communication Period Setting" for the i-th station
n6i	A total number of device points for TPDO set in the PDO mapping setting whose stations are set to "CC-Link IE TSN Class A" and "Low-Speed" in "Communication Period Setting" for the i-th station
n7i	A total number of the main modules and extension modules whose stations are set to "CC-Link IE TSN Class A" and "Low-Speed" in "Communication Period Setting" for the i-th station

Ex.

For the inverter FR-E800 (RX: 32 points, RY: 32 points, RWr: 32 points, and RWw: 32 points)

When 1 ≤ the number of inverters ≤ 44: n = 1

When 45 ≤ the number of inverters ≤ 88: n = 2

When 89 ≤ the number of inverters ≤ 120: n = 3

Master station ← remote station

When data is sent from a remote station (input) to the master station (RX/RWr).

Calculation value	Station-based block data assurance	No station-based block data assurance
Normal value	(SM × 1) + (LS × n1) + Rio	(SM × 1) + (LS × 1) + Rio
Maximum value	(SM × 1) + (LS × (n1 + 1)) + Rio	(SM × 1) + (LS × 2) + Rio

■Variable

Name of variable	Description	Unit
SM	Master station sequence scan time	μs
LS	Communication cycle intervals (can be checked in the SW0060)	μs
Rio	Processing time of the remote station	μs
n1	Round up the calculated value to the nearest integer of (SM ÷ LS)	—

Master station → remote station

When data is sent from the master station (RY/RWw) to a remote station (output).

Calculation value	Station-based block data assurance	No station-based block data assurance
Normal value	(SM × n2) + (LS × 1) + Rio	(SM × 1) + (LS × 1) + Rio
Maximum value	(SM × n2) + (LS × 2) + Rio	(SM × 2) + (LS × 2) + Rio

■Variable

Name of variable	Description	Unit
SM	Master station sequence scan time	μs
LS	Communication cycle intervals (can be checked in the SW0060)	μs
Rio	Processing time of the remote station	μs
n2	Round up the calculated value to the nearest integer of (LS ÷ SM)	—

Master station ← local station

When data is sent from a local station to the master station as follows:

- Master station (RX) ← local station (RY)
- Master station (RWr) ← local station (RWw)
- Master station (LB) ← local station (LB)
- Master station (LW) ← local station (LW)

Calculation value	Station-based block data assurance	No station-based block data assurance
Normal value	If LS < SL: (SM × 1) + (LS × (n1 + 1)) + (SL × 1)	(SM × 1) + (LS × 2) + (SL × 1)
	If LS ≥ SL: (SM × 1) + (LS × (n1 + 2))	
Maximum value	(SM × 2) + (LS × (n1 + 2)) + (SL × 1)	(SM × 2) + (LS × 3) + (SL × 1)

■Variable

Name of variable	Description	Unit
SM	Master station sequence scan time	μs
LS	Communication cycle intervals (can be checked in the SW0060)	μs
SL	Local station sequence scan time	μs
n1	Round up the calculated value to the nearest integer of (SM ÷ LS)	—

Master station → local station

When data is sent from the master station to a local station as follows:

- Master station (RY) → local station (RX)
- Master station (RWw) → local station (RWr)
- Master station (LB) → local station (LB)
- Master station (LW) → local station (LW)

Calculation value	Station-based block data assurance	No station-based block data assurance
Normal value	If LS < SM: (SM × 1) + (LS × (n3 + 1)) + (SL × 1)	(SM × 1) + (LS × 2) + (SL × 1)
	If LS ≥ SM: (LS × (n3 + 2)) + (SL × 1)	
Maximum value	(SM × 1) + (LS × (n3 + 2)) + (SL × 2)	(SM × 1) + (LS × 3) + (SL × 2)

■Variable

Name of variable	Description	Unit
SM	Master station sequence scan time	μs
LS	Communication cycle intervals (can be checked in the SW0060)	μs
SL	Local station sequence scan time	μs
n3	Round up the calculated value to the nearest integer of (SL ÷ LS)	—

Communication cycle intervals

The minimum value of the communication cycle interval (cyclic data transfer processing time) is calculated by the following calculation formula. The parts enclosed in double quotation marks (" ") in the table of Variable are the values set for "Network Configuration Settings" under "Basic Settings".

Communication mode	Master station communication speed	Calculation formula reference
Unicast mode	1Gbps	Page 570 Unicast mode (1Gbps)
	100Mbps	Page 573 Unicast mode (100Mbps)
Multicast mode	1Gbps	Page 576 Multicast mode (1Gbps)
	100Mbps	Page 580 Multicast mode (100Mbps)

Precautions

■When the calculation value is set and cyclic transmission is not performed

The minimum values for communication cycle interval and cyclic transmission time calculated by the formulas serve as a guide. If cyclic transmission is not performed while the calculation value is set, set a value obtained by the following formula: Minimum value for cyclic transmission time + Greatest value among the two values shown below.

- 10% of the calculated minimum cyclic transmission time
- When the communication speed of the master station is set to 1Gbps: Number of device stations × 2μs
- When the communication speed of the master station is set to 100Mbps: Number of device stations × 20μs

Each calculation value obtained from the calculation formulas mentioned above are stored in the following SW.

- SW0072: Communication cycle intervals (calculation value) [μs]
- SW0073: Cyclic transmission time (calculation value) [μs]
- SW0078: Transient transmission time (calculation value) [μs]

■When the calculation value is larger than the setting

If each calculation result is larger than the set value of "Basic Period Setting" under "Basic Settings" as follows, an error occurs.

When an error occurs, each calculation value is displayed in "Detailed information" in the [Error Information] tab of module diagnostics. Correct each set value of "Basic Period Setting" referring to the calculation value displayed so that the set value is equal to or larger than the calculation value.

- 3010H: When the communication cycle interval (calculation value) [μs] is larger than the set value of "Communication Period Interval Setting"
- 3011H: When the cyclic transmission time (calculation value) [μs] is larger than the set value of "Cyclic Transmission Time"
- 3013H: When the transient transmission time (calculation value) [μs] is larger than the displayed value of "Transient Transmission Time"

■When the general CC-Link IE TSN module is CC-Link IE TSN Class A

If "CC-Link IE TSN Class" of a general CC-Link IE TSN module added to the list of stations in the network configuration setting is "CC-Link IE TSN Class A" and the values of 'Communication cycle interval (calculation value)' (SW0072) and 'Cyclic transmission time (calculation value)' (SW0073) are set to "Communication Period Interval Setting" and "Cyclic Transmission Time", the cyclic transmission may not be performed. In that case, take either of the following actions.

- Select which device to actually use from "Module List" and add it to list of stations.
- Refer the manual of the device used to check the maximum response time for the time managed polling method, and calculate and set the communication cycle interval and cyclic transmission time.

Condition

The details of the calculation formula for the communication cycle interval are shown with the following conditions. (In the variable descriptions of the communication cycle interval calculation formula, the number of setting points when main modules and extension modules are not specified is the total value of main modules and extension modules.)

	No.	Model Name	STA#	Station Type	RX Setting Points	RY Setting Points	RWr Setting Points	RWw Setting Points	LB Setting Points	LW Setting Points
	0	Host Station	0	Master Station					16	16
	1	RJ71GN11-T2	1	Local Station	32	32	16	16	32	48
	2	General Remote Station	2	Remote Station	16	16	8	8		
	3	General Extension Module	-	-			8	8		
	4	MR-J5W3-G	3	Remote Station			24	20		
	5	MR-J5W3-G_BC_Axis	-	-			24	20		
	6	MR-J5W3-G_BC_Axis	-	-			24	20		
	7	MR-J5W3-G_BC_Axis	-	-			24	20		

Item	Station No.	Module quantity
Main module	No.1, No.2, No.4	3
Extension module	No.3, No.5, No.6, No.7	4
Local station	No.1	1
Remote station*1	No.2, No.4	2
Device station*1	No.1, No.2, No.4	3

*1 Extension modules not included.

A

Unicast mode (1Gbps)

■Calculation formula

Communication cycle interval [ns] = α_c + α_p or 125000, whichever is largerα Round up values of $_c$ and α_p that are less than 1μs.

Cyclic transmission time [ns] = α_c

- α_c: This value varies depending on whether a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists or not.

Item	Calculation formula
When a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle does not exist	(The largest value in items No.1 to No.4) + No.5
When a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists	(No.1 or No.2, whichever is larger) + (No.3 or No.4, whichever is larger) + No.5 + No.6

No.	Calculation formula*1	
1	A1 + A2	A1: {(50 × n1) + (16 × n2) + ndm} × 8 + (Sn-1) × 830 + 14000 + nh + nrp
		A2: {(50 × en1) + (16 × en2) + endm} × 8
2	B1 + B2	B1: {(30 × n1) + (16× n2) + ndm} × 4 + (1661 × n1) + (Sn-1) × 830 + 14300 + nh + nrp
		B2: {(30 × en1) + (16 × en2) + endm} × 4 + (1661 × en1)
3	C1 + C2	C1: {(50 × n3) + (20 × n4) + nds} × 8 + 14000 + nh + nrp
		C2: {(50 × en3) + (20 × en4) + ends} × 8
4	D1 + D2	D1: {(50 × n5) + (20 × n6) + ndl} × 8 + (Sn-1) × 830 + 14000 + nh + nrp
		D2: {(50 × en5) + (20 × en6) + endl} × 8
5	E × n7	E: (Sn-1) × 830 + 39102
6	The largest value among the maximum response times during the time-managed polling of the CC-Link IE TSN Class A device stations set to the basic cycle or normal speed cycle	

*1 The symbols in the table are as follows.
A1, B1, C1, D1: Main module calculation formula
A2, B2, C2, D2: Extension module calculation formula

Point

For the maximum response time for time-managed polling for the device stations, refer to the user's manual for the device station used.

Cyclic processing time [ns] = α_p

- α_p: p1 + p2 + p3 + kp + kuu

■Variable

For each variable to be used, round it up to one decimal point before assigning to the calculation formula.

Name of variable	Description
n1	(ndm + (16 × n2))/1488 or Sn, whichever is larger
n2	Sn × (RYb + RWwb) + Ln × (LBmb + LWmb) RYb: Value of (Total number of points of "RY Setting" of main modules)/(11776 × Sn) rounded up to the nearest integer RWwb: Value of (Total number of points of "RWw Setting" of main modules)/(736 × Sn) rounded up to the nearest integer LBmb: Value of (Number of points of "LB Setting" set in the master station)/11776 rounded up to the nearest integer LWmb: Value of (Number of points of "LW Setting" set in the master station)/736 rounded up to the nearest integer
ndm	((Total number of points of "RY Setting" of main modules)/8) + ((Total number of points of "RWw Setting" of main modules) × 2) + ((Number of points of "LB Setting" set in the master station)/8) × Ln + ((Number of points of "LW Setting" set in the master station) × 2) × Ln
Sn	Number of device stations
Ln	Number of local stations
nh	Switching hub delay time × Number of switching hubs connected to the network Switching hub delay time: 50000*1
nrp	When "Network Topology" under " Basic Settings" is set to " Line/Star": 0
n3	Sn × nhs nhs: Value of (nds + (20 × n4))/(1488 × Sn) rounded up to the nearest integer

Name of variable	Description
n4	Sn × (RXb + RWrb) + Ln × (LBxmb + LWxmb) + Sn RXb: Value of (Total number of points of "RX Setting" of main modules)/(11744 × Sn) rounded up to the nearest integer RWrb: Value of (Total number of points of "RWr Setting" of main modules)/(734 × Sn) rounded up to the nearest integer LBxmb: Value of (Total number of points of "LB Setting" excluding master station)/(11744 × Ln) rounded up to the nearest integer LWxmb: Value of (Total number of points of "LW Setting" excluding master station)/(734 × Ln) rounded up to the nearest integer
nds	((Total number of points of "RX Setting" of main modules)/8) + ((Total number of points of "RWr Setting" of main modules) × 2) + ((Total number of points of "LB Setting" excluding the master station)/8) + ((Total number of points of "LW Setting" excluding the master station) × 2) + 8 × Sn
n5	(ndl + 20 × n6)/1488
n6	(ndl-8)/1468 + 1
ndl	(RXl/8) + (RWrl × 2) + (LBl/8) + (LWl × 2) + 8 RXl: Number of points of "RX Setting" of main modules of the device station*2 to be used as the maximum number of link points RWrl: Number of points of "RWr Setting" of main modules of the device station*2 to be used as the maximum number of link points LBl: Number of points of "LB Setting" of the device station*2 to be used as the maximum number of link points LWl: Number of points of "LW Setting" of the device station*2 to be used as the maximum number of link points
n7	When "CC-Link IE TSN Class Setting" is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only" and "TSN HUB Setting" is set to "Not to Use TSN HUB": 4 Other than the above: 0
en1	$\sum_{i=1}^{120} en1_i$ $en1_i = ((endm_i + en2_i \times 16)/1488)^{*3}\text{-}k_i$ However, when $endm_i$ is 0, $en1_i$ is 0. When mf_i>16, k_i = 1, and when mf_i≤16, k_i = 0. mf_i = 1488-mod mod: Remainder of $\{((mRy_i + (mRy_i/1472)^{*3} \times 16) + (mRWw_i + (mRWw_i/1472)^{*3} \times 16))/1488\}$ However, the value is 0 when the calculation result of mf_i is 1488. i: Station number mRy_i: Number of points of "RY Setting" of main modules with station No.i/8 $mRWw_i$: Number of points of "RWw Setting" of main modules with station No.i × 2
en2	$\sum_{i=1}^{120} en2_i$ $en2_i = eRyn_i + eRWwn_i + ((endm_i + (eRyn_i + eRWwn_i) \times 16)/1488)^{*3}\text{-}1$ However, when $endm_i$ is 0, $en2_i$ is 0. i: Station number $eRyn_i$: 0 (fixed) $eRWwn_i$: Total number of extension modules with station No.i whose number of points of "RWw Setting" is more than 0
endm	$\sum_{i=1}^{120} endm_i$ $endm_i = eRyAll_i/8 + eRWwAll_i \times 2$ i: Station number $eRyAll_i$: 0 (fixed) $eRWwAll_i$: Total number of points of "RWw Setting" of extension modules with station No.i
en3	$\sum_{i=1}^{120} en3_i$ $en3_i = ((ends_i + en4_i \times 20)/1488)^{*3}\text{-}k_i$ However, when $ends_i$ is 0, $en3_i$ is 0. When sf_i>20, k_i = 1, and when sf_i≤20, k_i = 0. sf_i = 1488-mod mod: Remainder of $\{((mRx_i + (mRx_i/1468)^{*3} \times 20) + (mRWr_i + (mRWr_i/1468)^{*3} \times 20))/1488\}$ However, the value is 0 when the calculation result of sf_i is 1488. i: Station number mRx_i: Number of points of "RX Setting" of main modules with station No.i/8 $mRWr_i$: Number of points of "RWr Setting" of main modules with station No.i × 2

Name of variable	Description
en4	$\sum_{i=1}^{120} en4_i$ $en4_i = eRxn_i + eRWrn_i + ((ends_i + (eRxn_i + eRWrn_i) \times 20)/1488)^{*3}-1$ However, when $ends_i$ is 0, $en4_i$ is 0. i: Station number $eRxn_i$: 0 (fixed) $eRWrn_i$: Number of extension modules with station No.i whose number of points of "RWr Setting" is more than 0
ends	$\sum_{i=1}^{120} ends_i$ $ends_i = eRxAll_i/8 + eRWrAll_i \times 2$ i: Station number $eRxAll_i$: 0 (fixed) $eRWrAll_i$: Total number of points of "RWr Setting" of extension modules with station No.i
en5	$((endl + 20 \times en6)/1488)^{*3}-k_i$ However, when endl is 0, en5 is 0. When $sf_i>20$, $k_i = 1$, and when $sf_i \leq 20$, $k_i = 0$. $sf_i = 1488-mod$ mod: Remainder of $\{((mRx_i + (mRx_i/1468)^{*3} \times 20) + (mRWr_i + (mRWr_i/1468)^{*3} \times 20))/1488\}$ However, the value is 0 when the calculation result of sf_i is 1488. i: Station number of the device station*2 to be used as the maximum number of link points mRx_i: Number of points of "RX Setting" of main modules with station No.i/8 $mRWr_i$: Number of points of "RWr Setting" of main modules with station No.i × 2
en6	$eRxln_i + eRWrln_i + ((endl + (eRxln_i + eRWrln_i) \times 20)/1488)^{*3}-1$ However, when endl is 0, the value for en6 is 0. i: Station number of the device station*2 to be used as the maximum number of link points $eRxln_i$: 0 (fixed) $eRWrln_i$: Total number of extension modules with station No.i whose number of points of "RWr Setting" is more than 0
endl	$eRxlAll_i/8 + eRWrlAll_i \times 2$ i: Station number of the device station*2 to be used as the maximum number of link points $eRxlAll_i$: 0 (fixed) $eRWrlAll_i$: Total number of points of "RWr Setting" of extension modules of the device station*2 to be used as the maximum number of link points
p1: RX/RY/RWr/RWw processing time	{((Total number of points of "RX Setting") + (Total number of points of "RY Setting"))/8 + ((Total number of points of "RWr Setting") + (Total number of points of "RWw Setting")) × 2} × 5 + (Sn × 3300) However, if Total number of points of "RY Setting" = Total number of points of "RX Setting" = Total number of points of "RWr Setting" = Total number of points of "RWw Setting" = 0, then p1 = 0.
p2: LB/LW processing time	{((Total number of points of "LB Setting" excluding master station)/8) + ((Total number of points of "LW Setting" excluding master station) × 2) + ((Number of points of "LB Setting" set in the master station)/8) × Ln + ((Number of points of "LW Setting" set in the master station) × 2) × Ln} × 5 + (Sn × 6000) However, if Total number of points of "LB Setting" = Total number of points of "LW Setting" = 0, then p2 = 0.
p3: Diagnostic information processing time	Sn × 40
kp	78000
kuu: Inter-module synchronization processing time (unicast)	1800 × (Number of device stations) + 10000 However, if the inter-module synchronization is not performed in the master station*4, then kuu = 0.

*1 The switching hub delay time changes depending on the hub models and settings.

*2 This is the device station with the largest calculation value when, for each device station (including extension modules), (("RX Setting" + "LB Setting") / 8) + (("RWr Setting" + "LW Setting") × 2) is calculated.

*3 Calculate by rounding up each calculation result in brackets.

*4 In "Inter-module Synchronization Setting" under "System Parameter" of the master station, "Use Inter-module Synchronization Function in System" is set to "Not Use" or "Select Inter-module Synchronization Target Module" is set to "Do Not Synchronize".

Unicast mode (100Mbps)

■Calculation formula

Communication cycle interval [ns] = α_c + α_p.α Round up values of $_c$ and α_p that are less than 1μs.

Cyclic transmission time [ns] = α_c

- α_c: This value varies depending on whether a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists or not.

Item	Calculation formula
When a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle does not exist	The largest value in items No.1 to No.3 + No.4
When a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists	No.1 + (the value in No.2 or No.3, whichever is larger) + No.4 + No.5

No.	Calculation formula*1	
1	A1 + A2	A1: {(42 × n1) + (16 × n2) + ndm} × 80 + (Sn-1) × 5150 + 14000 + nh + nrp
		A2: {(42 × en1) + (16 × en2) + endm} × 80
2	B1 + B2	B1: {(42 × n3) + (20 × n4) + nds} × 80 + 14000 + nh + nrp
		B2: {(42 × en3) + (20 × en4) + ends} × 80
3	C1 + C2	C1: {(42 × n5) + (20 × n6) + ndl} × 80 + (Sn-1) × 5150 + 14000 + nh + nrp
		C2: {(42 × en5) + (20 × en6) + ndl} × 80
4	D × n7	D: (Sn-1) × 5150 + 187440
5	The largest value among the maximum response times during the time-managed polling of the CC-Link IE TSN Class A device stations set to the basic cycle or normal speed cycle	

*1 The symbols in the table are as follows.
A1, B1, C1: Main module calculation formula
A2, B2, C2: Extension module calculation formula

Point

For the maximum response time for time-managed polling for the device stations, refer to the user's manual for the device station used.

Cyclic processing time [ns] = α_p or 340000, whichever is larger.

- α_p: p1 + p2 + p3 + kp + kuu

■Variable

For each variable to be used, round it up to one decimal point before assigning to the calculation formula.

Name of variable	Description
n1	(ndm + (16 × n2))/1488 or Sn, whichever is larger
n2	Sn × (RYb + RWwb) + Ln × (LBmb + LWmb) RYb: Value of (Total number of points of "RY Setting" of main modules)/(11776 × Sn) rounded up to the nearest integer RWwb: Value of (Total number of points of "RWw Setting" of main modules)/(736 × Sn) rounded up to the nearest integer LBmb: Value of (Number of points of "LB Setting" set in the master station)/11776 rounded up to the nearest integer LWmb: Value of (Number of points of "LW Setting" set in the master station)/736 rounded up to the nearest integer
ndm	((Total number of points of "RY Setting" of main modules)/8) + ((Total number of points of "RWw Setting" of main modules) × 2) + ((Number of points of "LB Setting" set in the master station)/8) × Ln + ((Number of points of "LW Setting" set in the master station) × 2) × Ln
Sn	Number of device stations
Ln	Number of local stations
nh	Switching hub delay time × Number of switching hubs connected to the network Switching hub delay time: 160000*1
nrp	When "Network Topology" under " Basic Settings" is set to " Line/Star": 0
n3	Sn × nhs nhs: Value of (nds + (20 × n4))/(1488 × Sn) rounded up to the nearest integer
n4	Sn × (RXb + RWrb) + Ln × (LBxmb + LWxmb) + Sn RXb: Value of (Total number of points of "RX Setting" of main modules)/(11744 × Sn) rounded up to the nearest integer RWrb: Value of (Total number of points of "RWr Setting" of main modules)/(734 × Sn) rounded up to the nearest integer LBxmb: Value of (Total number of points of "LB Setting" excluding master station)/(11744 × Ln) rounded up to the nearest integer LWxmb: Value of (Total number of points of "LW Setting" excluding master station)/(734 × Ln) rounded up to the nearest integer

Name of variable	Description
nds	((Total number of points of "RX Setting" of main modules)/8) + ((Total number of points of "RWr Setting" of main modules) × 2) + ((Total number of points of "LB Setting" excluding the master station)/8) + ((Total number of points of "LW Setting" excluding the master station) × 2) + 8 × Sn
n5	(ndl + 20 × n6)/1488
n6	(ndl-8)/1468 + 1
ndl	(RXl/8) + (RWrl × 2) + (LBl/8) + (LWl × 2) + 8 RXl: Number of points of "RX Setting" of main modules of the device station*2 to be used as the maximum number of link points RWrl: Number of points of "RWr Setting" of main modules of the device station*2 to be used as the maximum number of link points LBl: Number of points of "LB Setting" of the device station*2 to be used as the maximum number of link points LWl: Number of points of "LW Setting" of the device station*2 to be used as the maximum number of link points
n7	When "CC-Link IE TSN Class Setting" is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only" and "TSN HUB Setting" is set to "Not to Use TSN HUB": 4 Other than the above: 0
en1	$\sum_{i=1}^{120} en1_i$ $en1_i = ((endm_i + en2_i \times 16)/1488)^{*3}\text{-}k_i$ However, when $endm_i$ is 0, $en1_i$ is 0. When mf_i>16, k_i = 1, and when mf_i≤16, k_i = 0. mf_i = 1488-mod mod: Remainder of $\{((mRy_i + (mRy_i/1472)^{*3} \times 16) + (mRWw_i + (mRWw_i/1472)^{*3} \times 16))/1488\}$ However, the value is 0 when the calculation result of mf_i is 1488. i: Station number mRy_i: Number of points of "RY Setting" of main modules with station No.i/8 $mRWw_i$: Number of points of "RWw Setting" of main modules with station No.i × 2
en2	$\sum_{i=1}^{120} en2_i$ $en2_i = eRyn_i + eRWwn_i + ((endm_i + (eRyn_i + eRWwn_i) \times 16)/1488)^{*3}\text{-}1$ However, when $endm_i$ is 0, $en2_i$ is 0. i: Station number $eRyn_i$: 0 (fixed) $eRWwn_i$: Total number of extension modules with station No.i whose number of points of "RWw Setting" is more than 0
endm	$\sum_{i=1}^{120} endm_i$ $endm_i = eRyAll_i/8 + eRWwAll_i \times 2$ i: Station number $eRyAll_i$: 0 (fixed) $eRWwAll_i$: Total number of points of "RWw Setting" of extension modules with station No.i
en3	$\sum_{i=1}^{120} en3_i$ $en3_i = ((ends_i + en4_i \times 20)/1488)^{*3}\text{-}k_i$ However, when $ends_i$ is 0, $en3_i$ is 0. When sf_i>20, k_i = 1, and when sf_i≤20, k_i = 0. sf_i = 1488-mod mod: Remainder of $\{((mRx_i + (mRx_i/1468)^{*3} \times 20) + (mRWr_i + (mRWr_i/1468)^{*3} \times 20))/1488\}$ However, the value is 0 when the calculation result of sf_i is 1488. i: Station number mRx_i: Number of points of "RX Setting" of main modules with station No.i/8 $mRWr_i$: Number of points of "RWr Setting" of main modules with station No.i × 2
en4	$\sum_{i=1}^{120} en4_i$ $en4_i = eRxn_i + eRWrn_i + ((ends_i + (eRxn_i + eRWrn_i) \times 20)/1488)^{*3}\text{-}1$ However, when $ends_i$ is 0, $en4_i$ is 0. i: Station number $eRxn_i$: 0 (fixed) $eRWrn_i$: Number of extension modules with station No.i whose number of points of "RWr Setting" is more than 0

Name of variable	Description
ends	$\sum_{i=1}^{120} ends_i$ $ends_i = eRxAll_i/8 + eRWrAll_i \times 2$ i: Station number $eRxAll_i$: 0 (fixed) $eRWrAll_i$: Total number of points of "RWr Setting" of extension modules with station No.i
en5	$((endl + 20 \times en6)/1488)^{*3}-k_i$ However, when endl is 0, en5 is 0. When $sf_i>20$, $k_i = 1$, and when $sf_i \leq 20$, $k_i = 0$. sf_i = 1488-mod mod: Remainder of $\{((mRx_i + (mRx_i/1468)^{*3} \times 20) + (mRWr_i + (mRWr_i/1468)^{*3} \times 20))/1488\}$ However, the value is 0 when the calculation result of sf_i is 1488. i: Station number of the device station*2 to be used as the maximum number of link points mRx_i: Number of points of "RX Setting" of main modules with station No.i/8 $mRWr_i$: Number of points of "RWr Setting" of main modules with station No.i × 2
en6	$eRxln_i + eRWrln_i + ((endl+(eRxln_i + eRWrln_i) \times 20)/1488)^{*3}-1$ However, when endl is 0, the value for en6 is 0. i: Station number of the device station*2 to be used as the maximum number of link points $eRxln_i$: 0 (fixed) $eRWrln_i$: Total number of extension modules with station No.i whose number of points of "RWr Setting" is more than 0
endl	$eRxlAll_i/8 + eRWrlAll_i \times 2$ i: Station number of the device station*2 to be used as the maximum number of link points $eRxlAll_i$: 0 (fixed) $eRWrlAll_i$: Total number of points of "RWr Setting" of extension modules of the device station*2 to be used as the maximum number of link points
p1: RX/RY/RWr/RWw processing time	{((Total number of points of "RX Setting") + (Total number of points of "RY Setting"))/8 + ((Total number of points of "RWr Setting") + (Total number of points of "RWw Setting")) × 2} × 5 + (Sn × 3300) However, if Total number of points of "RY Setting" = Total number of points of "RX Setting" = Total number of points of "RWr Setting" = Total number of points of "RWw Setting" = 0, then p1 = 0.
p2: LB/LW processing time	{((Total number of points of "LB Setting" excluding master station)/8) + ((Total number of points of "LW Setting" excluding master station) × 2) + ((Number of points of "LB Setting" set in the master station)/8) × Ln + ((Number of points of "LW Setting" set in the master station) × 2) × Ln} × 5 + (Sn × 6000) However, if Total number of points of "LB Setting" = Total number of points of "LW Setting" = 0, then p2 = 0.
p3: Diagnostic information processing time	Sn × 40
kp	78000
kuu: Inter-module synchronization processing time (unicast)	1800 × (Number of device stations) + 10000 However, if the inter-module synchronization is not performed in the master station*4, then kuu = 0.

*1 The switching hub delay time changes depending on the hub models and settings.

*2 This is the device station with the largest calculation value when, for each device station (including extension modules), (("RX Setting" + "LB Setting") / 8) + (("RWr Setting" + "LW Setting") × 2) is calculated.

*3 Calculate by rounding up each calculation result in brackets.

*4 In "Inter-module Synchronization Setting" under "System Parameter" of the master station, "Use Inter-module Synchronization Function in System" is set to "Not Use" or "Select Inter-module Synchronization Target Module" is set to "Do Not Synchronize".

Multicast mode (1Gbps)

■Calculation formula

Communication cycle interval [ns] = α_c + α_p or 125000, whichever is largerα Round up values of $_c$ and α_p that are less than 1μs.

Cyclic transmission time [ns] = α_c

- α_c: This value varies depending on whether a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists or not.

Item	Calculation formula
When a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle does not exist	(The value in No.1 or No.2 below, whichever is larger) + No.5.
When a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists	(The value in No.1 or No.2 below, whichever is larger) + No.5. + No.6

No.	Calculation formula*1	
1	A1 + A2 + (the value obtained by the calculation formula in No.3 or No.4, whichever is larger)	A1: {(50 × (n1r + n1l)) + (16 × (n2r + n2l)) + (ndmr + ndml)} × 8 + (Sn-1) × 830 + 14000 + nh + nrp
		A2: {(50 × en1r) + (16 × en2r) + endmr} × 8
2	B1 + B2 + (the value obtained by the calculation formula in No.3 or No.4, whichever is larger)	B1: {(30 × (n1r + n1l)) + (16× (n2r + n2l)) + (ndmr + ndml)} × 4 + (1661 × (n1r + n1l)) + (Sn-1) × 830 + 14300 + nh + nrp
		B2: {(30 × en1r) + (16 × en2r) + endmr} × 4+ (1661 × en1r)
3	C1 + C2	C1: {(50 × n3) + (20 × n4) + nds} × 8 + 14000 + nh
		C2: {(50 × en3) + (20 × en4) + ends} × 8
4	D1 + D2	D1: {(50 × n5) + (20 × n6) + ndl} × 8 + (Sn-1) × 830 + 14000 + nh
		D2: {(50 × en5) + (20 × en6) + endl} × 8
5	E × n7	E: (Sn-1) × 830 + 39102
6	The largest value among the maximum response times during the time-managed polling of the CC-Link IE TSN Class A device stations set to the basic cycle or normal speed cycle	

*1 The symbols in the table are as follows.
A1, B1, C1, D1: Main module calculation formula
A2, B2, C2, D2: Extension module calculation formula

Point

For the maximum response time for time-managed polling for the device stations, refer to the user's manual for the device station used.

Cyclic processing time [ns] = α_p

- α_p: p1 + p2 + p3 + kp + kum

■Variable

For each variable to be used, round it up to one decimal point before assigning to the calculation formula.

Name of variable	Description
n1r	(ndmr + (16 × n2r))/1488 or Rn, whichever is larger
n1l	Round up the calculated value to the nearest integer of (ndml + (16 × n2l))/1488
n2r	Rn × (RYrb + RWwrb) RYrb: Value of (Total number of points of "RY Setting" set in the remote station (main modules))/(11776 × Rn) rounded up to the nearest integer RWwrb: Value of (Total number of points of "RWw Setting" set in the remote station (main modules))/(736 × Rn) rounded up to the nearest integer
n2l	RYlb + RWwlb + LBmb + LWmb + 1 RYlb: Value of (Total number of points of "RY Setting"*2)/11776 rounded up to the nearest integer RWwlb: Value of (Total number of points of "RWw Setting"*2)/736 rounded up to the nearest integer LBmb: Value of (Number of points of "LB Setting" set in the master station)/11776 rounded up to the nearest integer LWmb: Value of (Number of points of "LW Setting" set in the master station)/736 rounded up to the nearest integer
ndmr	((Total number of points of "RY Setting" set in the remote station (main modules))/8) + ((Total number of points of "RWw Setting" set in the remote station (main modules)) × 2)
ndml	((Total number of points of "RY Setting"*2)/8) + ((Total number of points of "RWw Setting"*2) × 2) + ((Number of points of "LB Setting" set in the master station)/8) + ((Number of points of "LW Setting" set in the master station) × 2) + 24
Sn	Number of device stations

Name of variable	Description
Rn	Number of remote stations
Ln	Number of local stations
nh	Switching hub delay time × Number of switching hubs connected to the network Switching hub delay time: 50000[*1]
nrp	When "Network Topology" under " Basic Settings" is set to " Line/Star": 0
n3	Sn × nhs nhs: Value of (nds + (20 × n4))/(1488 × Sn) rounded up to the nearest integer
n4	Sn × (RXb + RWrb) + Ln × (LBxmb + LWxmb) + Sn RXb: Value of (Total number of points of "RX Setting" of main modules)/(11744 × Sn) rounded up to the nearest integer RWrb: Value of (Total number of points of "RWr Setting" of main modules)/(734 × Sn) rounded up to the nearest integer LBxmb: Value of (Total number of points of "LB Setting" excluding master station)/(11744 × Ln) rounded up to the nearest integer LWxmb: Value of (Total number of points of "LW Setting" excluding master station)/(734 × Ln) rounded up to the nearest integer
nds	((Total number of points of "RX Setting" of main modules)/8) + ((Total number of points of "RWr Setting" of main modules) × 2) + ((Total number of points of "LB Setting" excluding the master station)/8) + ((Total number of points of "LW Setting" excluding the master station) × 2) + 8 × Sn
n5	(ndl + 20 × n6)/1488
n6	(ndl-8)/1468 + 1
ndl	(RXl/8) + (RWrl × 2) + (LBl/8) + (LWl × 2) + 8 RXl: Number of points of "RX Setting" of main modules of the device station[*3] to be used as the maximum number of link points RWrl: Number of points of "RWr Setting" of main modules of the device station[*3] to be used as the maximum number of link points LBl: Number of points of "LB Setting" of the device station[*3] to be used as the maximum number of link points LWl: Number of points of "LW Setting" of the device station[*3] to be used as the maximum number of link points
n7	When "CC-Link IE TSN Class Setting" is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only" and "TSN HUB Setting" is set to "Not to Use TSN HUB": 4 Other than the above: 0
en1r	$\sum_{i=1}^{120} en1r_i$ $en1r_i = ((endmr_i + en2r_i \times 16)/1488)^{*4}\text{-}kr_i$ When station No.i represents a station other than a remote station, $en1r_i$ is 0. When $endmr_i$ is 0, $en1r_i$ is 0. When mfr_i>16, kr_i = 1, and when mfr_i≤16, kr_i = 0. mfr_i = 1488-mod mod: Remainder of $\{((mRyr_i + (mRyr_i/1472)^{*4} \times 16) + (mRWwr_i + (mRWwr_i/1472)^{*4} \times 16))/1488\}$ However, the value is 0 when the calculation result of mfr_i is 1488. i: Station number $mRyr_i$: Number of points of "RY Setting" of main modules with station No.i/8 $mRWwr_i$: Number of points of "RWw Setting" of main modules with station No.i × 2
en2r	$\sum_{i=1}^{120} en2r_i$ $en2r_i = eRyrn_i + eRWwrn_i + ((endmr_i + (eRyrn_i + eRWwrn_i) \times 16)/1488)^{*4}\text{-}1$ When station No.i represents a station other than a remote station, $en2r_i$ is 0. When $endmr_i$ is 0, $en2r_i$ is 0. i: Station number $eRyrn_i$: 0 (fixed) $eRWwrn_i$: Total number of extension modules with station No.i whose number of points of "RWw Setting" is more than 0
endmr	$\sum_{i=1}^{120} endmr_i$ $endmr_i = eRyrAll_i/8 + eRWwrAll_i \times 2$ When station No.i represents a station other than a remote station, $endmr_i$ is 0. i: Station number $eRyrAll_i$: 0 (fixed) $eRWwrAll_i$: Total number of points of "RWw Setting" of extension modules with station No.i

Name of variable	Description
en3	$\sum_{i=1}^{120} en3_i$ $en3_i=((ends_i+en4_i\times20)/1488)^{*4}-k_i$ However, when $ends_i$ is 0, $en3_i$ is 0. When $sf_i>20$, $k_i = 1$, and when $sf_i\leq20$, $k_i = 0$. sf_i = 1488-mod mod: Remainder of $\{((mRx_i + (mRx_i/1468)^{*4} \times20) + (mRWr_i + (mRWr_i/1468)^{*4} \times 20))/1488\}$ However, the value is 0 when the calculation result of sf_i is 1488. i: Station number mRx_i: Number of points of "RX Setting" of main modules with station No.i/8 $mRWr_i$: Number of points of "RWr Setting" of main modules with station No.i × 2
en4	$\sum_{i=1}^{120} en4_i$ $en4_i = eRxn_i + eRWrn_i + ((ends_i + (eRxn_i + eRWrn_i) \times 20)/1488)^{*4}-1$ However, when $ends_i$ is 0, $en4_i$ is 0. i: Station number $eRxn_i$: 0 (fixed) $eRWrn_i$: Number of extension modules with station No.i whose number of points of "RWr Setting" is more than 0
ends	$\sum_{i=1}^{120} ends_i$ $ends_i = eRxAll_i/8 + eRWrAll_i \times 2$ i: Station number $eRxAll_i$: 0 (fixed) $eRWrAll_i$: Total number of points of "RWr Setting" of extension modules with station No.i
en5	$((endl + 20 \times en6)/1488)^{*4}-k_i$ However, when endl is 0, en5 is 0. When $sf_i>20$, $k_i = 1$, and when $sf_i\leq20$, $k_i = 0$. sf_i = 1488-mod mod: Remainder of $\{((mRx_i + (mRx_i/1468)^{*4} \times20) + (mRWr_i + (mRWr_i/1468)^{*4} \times 20))/1488\}$ However, the value is 0 when the calculation result of sf_i is 1488. i: Station number of the device station[*3] to be used as the maximum number of link points mRx_i: Number of points of "RX Setting" of main modules with station No.i/8 $mRWr_i$: Number of points of "RWr Setting" of main modules with station No.i × 2
en6	$eRxln_i + eRWrln_i + ((endl + (eRxln_i + eRWrln_i) \times 20)/1488)^{*4}-1$ However, when endl is 0, the value for en6 is 0. i: Station number of the device station[*3] to be used as the maximum number of link points $eRxln_i$: 0 (fixed) $eRWrln_i$: Total number of extension modules with station No.i whose number of points of "RWr Setting" is more than 0
endl	$eRxlAll_i/8 + eRWrlAll_i \times 2$ i: Station number of the device station[*3] to be used as the maximum number of link points $eRxlAll_i$: 0 (fixed) $eRWrlAll_i$: Total number of points of "RWr Setting" of extension modules of the device station[*3] to be used as the maximum number of link points
p1: RX/RY/RWr/RWw processing time	{((Total number of points of "RX Setting") + (Total number of points of "RY Setting"[*2]))/8 + ((Total number of points of "RWr Setting") + (Total number of points of "RWw Setting"[*2])) × 2} × 5 + (Sn × 3300) However, if Total number of points of "RY Setting"[*2] = Total number of points of "RX Setting" = Total number of points of "RWr Setting" = Total number of points of "RWw Setting"[*2] = 0, then p1 = 0.
p2: LB/LW processing time	((Total number of points of "LB Setting" excluding master station)/8) + ((Total number of points of "LW Setting" excluding master station) × 2) + ((Number of points of "LB Setting" set in the master station)/8) + ((Number of points of "LW Setting" set in the master station) × 2) × 5 + (Sn × 6000) However, if Total number of points of "LB Setting" = Total number of points of "LW Setting" = 0, then p2 = 0.
p3: Diagnostic information processing time	Sn × 40
kp	78000
kum: Inter-module synchronous processing time (multicast)	2000 × (Number of device stations) + 18000 However, if the inter-module synchronization is not performed in the master station[*5], then kum = 0.

*1 The switching hub delay time changes depending on the hub models and settings.
*2 Total number of points is the smallest value set in "Start" to the largest value set in "End" of "Network Configuration Settings".
*3 This is the device station with the largest calculation value when, for each device station (including extension modules), (("RX Setting" + "LB Setting") / 8) + (("RWr Setting" + "LW Setting") × 2) is calculated.
*4 Calculate by rounding up each calculation result in brackets.
*5 In "Inter-module Synchronization Setting" under "System Parameter" of the master station, "Use Inter-module Synchronization Function in System" is set to "Not Use" or "Select Inter-module Synchronization Target Module" is set to "Do Not Synchronize".

Multicast mode (100Mbps)

■Calculation formula

Communication cycle interval [ns] = α_c + α_p.α Round up values of $_c$ and α_p that are less than 1μs.

Cyclic transmission time [ns] = α_c

- α_c: This value varies depending on whether a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists or not.

Item	Calculation formula
When a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle does not exist	No.1 + No.4
When a CC-Link IE TSN Class A device station with the basic cycle or normal speed cycle exists	No.1 + No.4 + No.5

No.	Calculation formula*1	
1	A1 + A2 + (the value obtained by the calculation formula in No.2 or No.3, whichever is larger)	A1: {(42 × (n1r + n1l)) + (16 × (n2r + n2l)) + (ndmr + ndml)} × 80 + (Sn-1) × 5150 + 14000 + nh + nrp
		A2: {(42 × en1r) + (16 × en2r) + endmr} × 80
2	B1 + B2	B1: {(42 × n3) + (20 × n4) + nds} × 80 + 14000 + nh
		B2: {(42 × en3) + (20 × en4) + ends} × 80
3	C1 + C2	C1: {(42 × n5) + (20 × n6) + ndl} × 80 +(Sn-1) × 5150 + 14000 + nh
		C2: {(42 × en5) + (20 × en6) + endl} × 80
4	D × n7	D: (Sn-1) × 5150 + 187440
5	The largest value among the maximum response times during the time-managed polling of the CC-Link IE TSN Class A device stations set to the basic cycle or normal speed cycle	

*1 The symbols in the table are as follows.
A1, B1, C1: Main module calculation formula
A2, B2, C2: Extension module calculation formula

Point

For the maximum response time for time-managed polling for the device stations, refer to the user's manual for the device station used.

Cyclic processing time [ns] = α_p or 340000, whichever is larger.

- α_p: p1 + p2 + p3 + kp + kum

■Variable

For each variable to be used, round it up to one decimal point before assigning to the calculation formula.

Name of variable	Description
n1r	(ndmr + (16 × n2r))/1488 or Rn, whichever is larger
n1l	Round up the calculated value to the nearest integer of (ndml + (16 × n2l))/1488
n2r	Rn × (RYrb + RWwrb) RYrb: Value of (Total number of points of "RY Setting" set in the remote station (main modules))/(11776 × Rn) rounded up to the nearest integer RWwrb: Value of (Total number of points of "RWw Setting" set in the remote station (main modules))/(736 × Rn) rounded up to the nearest integer
n2l	RYlb + RWwlb + LBmb + LWmb + 1 RYlb: Value of (Total number of points of "RY Setting"*2)/11776 rounded up to the nearest integer RWwlb: Value of (Total number of points of "RWw Setting"*2)/736 rounded up to the nearest integer LBmb: Value of (Number of points of "LB Setting" set in the master station)/11776 rounded up to the nearest integer LWmb: Value of (Number of points of "LW Setting" set in the master station)/736 rounded up to the nearest integer
ndmr	((Total number of points of "RY Setting" set in the remote station (main modules))/8) + ((Total number of points of "RWw Setting" set in the remote station (main modules)) × 2)
ndml	((Total number of points of "RY Setting"*2)/8) + ((Total number of points of "RWw Setting"*2) × 2) + ((Number of points of "LB Setting" set in the master station)/8) + ((Number of points of "LW Setting" set in the master station) × 2) + 24
Sn	Number of device stations
Rn	Number of remote stations
Ln	Number of local stations
nh	Switching hub delay time × Number of switching hubs connected to the network Switching hub delay time: 160000*1
nrp	When "Network Topology" under " Basic Settings" is set to " Line/Star": 0

Name of variable	Description
n3	Sn × nhs nhs: Value of (nds + (20 × n4))/(1488 × Sn) rounded up to the nearest integer
n4	Sn × (RXb + RWrb) + Ln × (LBxmb + LWxmb) + Sn RXb: Value of (Total number of points of "RX Setting" of main modules)/(11744 × Sn) rounded up to the nearest integer RWrb: Value of (Total number of points of "RWr Setting" of main modules)/(734 × Sn) rounded up to the nearest integer LBxmb: Value of (Total number of points of "LB Setting" excluding master station)/(11744 × Ln) rounded up to the nearest integer LWxmb: Value of (Total number of points of "LW Setting" excluding master station)/(734 × Ln) rounded up to the nearest integer
nds	((Total number of points of "RX Setting" of main modules)/8) + ((Total number of points of "RWr Setting" of main modules) × 2) + ((Total number of points of "LB Setting" excluding the master station)/8) + ((Total number of points of "LW Setting" excluding the master station) × 2) + 8 × Sn
n5	(ndl + 20 × n6)/1488
n6	(ndl-8)/1468 + 1
ndl	(RXl/8) + (RWrl × 2) + (LBl/8) + (LWl × 2) + 8 RXl: Number of points of "RX Setting" of main modules of the device station*3 to be used as the maximum number of link points RWrl: Number of points of "RWr Setting" of main modules of the device station*3 to be used as the maximum number of link points LBl: Number of points of "LB Setting" of the device station*3 to be used as the maximum number of link points LWl: Number of points of "LW Setting" of the device station*3 to be used as the maximum number of link points
n7	When "CC-Link IE TSN Class Setting" is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only" and "TSN HUB Setting" is set to "Not to Use TSN HUB": 4 Other than the above: 0
en1r	$\sum_{i=1}^{120} en1r_i$ $en1r_i = ((endmr_i + en2r_i \times 16)/1488)^{*4}\text{-}kr_i$ When station No.i represents a station other than a remote station, $en1r_i$ is 0. When $endmr_i$ is 0, $en1r_i$ is 0. When mfr_i>16, kr_i = 1, and when mfr_i≤16, kr_i = 0. mfr_i = 1488-mod mod: Remainder of $\{((mRyr_i + (mRyr_i/1472)^{*4} \times 16) + (mRWwr_i + (mRWwr_i/1472)^{*4} \times 16))/1488\}$ However, the value is 0 when the calculation result of mfr_i is 1488. i: Station number $mRyr_i$: Number of points of "RY Setting" of main modules with station No.i/8 $mRWwr_i$: Number of points of "RWw Setting" of main modules with station No.i × 2
en2r	$\sum_{i=1}^{120} en2r_i$ $en2r_i = eRyrn_i + eRWwrn_i + ((endmr_i + (eRyrn_i + eRWwrn_i) \times 16)/1488)^{*4}\text{-}1$ When station No.i represents a station other than a remote station, $en2r_i$ is 0. When $endmr_i$ is 0, $en2r_i$ is 0. i: Station number $eRyrn_i$: 0 (fixed) $eRWwrn_i$: Total number of extension modules with station No.i whose number of points of "RWw Setting" is more than 0
endmr	$\sum_{i=1}^{120} en2r_i$ $endmr_i = eRyrAll_i/8 + eRWwrAll_i \times 2$ When station No.i represents a station other than a remote station, $endmr_i$ is 0. i: Station number $eRyrAll_i$: 0 (fixed) $eRWwrAll_i$: Total number of points of "RWw Setting" of extension modules with station No.i
en3	$\sum_{i=1}^{120} en3_i$ $en3_i = ((ends_i + en4_i \times 20)/1488)^{*4}\text{-}k_i$ However, when $ends_i$ is 0, $en3_i$ is 0. When sf_i>20, k_i = 1, and when sf_i≤20, k_i = 0. sf_i = 1488-mod mod: Remainder of $\{((mRx_i + (mRx_i/1468)^{*4} \times 20) + (mRWr_i + (mRWr_i/1468)^{*4} \times 20))/1488\}$ However, the value is 0 when the calculation result of sf_i is 1488. i: Station number mRx_i: Number of points of "RX Setting" of main modules with station No.i/8 $mRWr_i$: Number of points of "RWr Setting" of main modules with station No.i × 2

Name of variable	Description
en4	$\sum_{i=1}^{120} en4_i$ $en4_i = eRxn_i + eRWrn_i + ((ends_i + (eRxn_i + eRWrn_i) \times 20)/1488)^{*4}\text{-}1$ However, when $ends_i$ is 0, $en4_i$ is 0. i: Station number $eRxn_i$: 0 (fixed) $eRWrn_i$: Number of extension modules with station No.i whose number of points of "RWr Setting" is more than 0
ends	$\sum_{i=1}^{120} ends_i$ $ends_i = eRxAll_i/8 + eRWrAll_i \times 2$ i: Station number $eRxAll_i$: 0 (fixed) $eRWrAll_i$: Total number of points of "RWr Setting" of extension modules with station No.i
en5	$((endl + 20 \times en6)/1488)^{*4}\text{-}k_i$ However, when endl is 0, en5 is 0. When $sf_i>20$, $k_i = 1$, and when $sf_i \leq 20$, $k_i = 0$. sf_i = 1488-mod mod: Remainder of $\{((mRx_i + (mRx_i/1468)^{*4} \times 20) + (mRWr_i + (mRWr_i/1468)^{*4} \times 20))/1488\}$ However, the value is 0 when the calculation result of sf_i is 1488. i: Station number of the device station[*3] to be used as the maximum number of link points mRx_i: Number of points of "RX Setting" of main modules with station No.i/8 $mRWr_i$: Number of points of "RWr Setting" of main modules with station No.i × 2
en6	$eRxln_i + eRWrln_i + ((endl + (eRxln_i + eRWrln_i) \times 20)/1488)^{*4}\text{-}1$ However, when endl is 0, the value for en6 is 0. i: Station number of the device station[*3] to be used as the maximum number of link points $eRxln_i$: 0 (fixed) $eRWrln_i$: Total number of extension modules with station No.i whose number of points of "RWr Setting" is more than 0
endl	$eRxlAll_i/8 + eRWrlAll_i \times 2$ i: Station number of the device station[*3] to be used as the maximum number of link points $eRxlAll_i$: 0 (fixed) $eRWrlAll_i$: Total number of points of "RWr Setting" of extension modules of the device station[*3] to be used as the maximum number of link points
p1: RX/RY/RWr/RWw processing time	{((Total number of points of "RX Setting") + (Total number of points of "RY Setting"[*2]))/8 + ((Total number of points of "RWr Setting") + (Total number of points of "RWw Setting"[*2])) × 2} × 5 + (Sn × 3300) However, if Total number of points of "RY Setting"[*2] = Total number of points of "RX Setting" = Total number of points of "RWr Setting" = Total number of points of "RWw Setting"[*2] = 0, then p1 = 0.
p2: LB/LW processing time	((Total number of points of "LB Setting" excluding master station)/8) + ((Total number of points of "LW Setting" excluding master station) × 2) + ((Number of points of "LB Setting" set in the master station)/8) + ((Number of points of "LW Setting" set in the master station) × 2) × 5 + (Sn × 6000) However, if Total number of points of "LB Setting" = Total number of points of "LW Setting" = 0, then p2 = 0.
p3: Diagnostic information processing time	Sn × 40
kp	78000
kum: Inter-module synchronous processing time (multicast)	2000 × (Number of device stations) + 18000 However, if the inter-module synchronization is not performed in the master station[*5], then kum = 0.

*1 The switching hub delay time changes depending on the hub models and settings.

*2 Total number of points is the smallest value set in "Start" to the largest value set in "End" of "Network Configuration Settings".

*3 This is the device station with the largest calculation value when, for each device station (including extension modules), (("RX Setting" + "LB Setting") / 8) + (("RWr Setting" + "LW Setting") × 2) is calculated.

*4 Calculate by rounding up each calculation result in brackets.

*5 In "Inter-module Synchronization Setting" under "System Parameter" of the master station, "Use Inter-module Synchronization Function in System" is set to "Not Use" or "Select Inter-module Synchronization Target Module" is set to "Do Not Synchronize".

Values to be added to the communication cycle interval when the watchdog counter is used

If a value has been stored in 'Transient transmission additional time (calculation value)' (SW007A), set the value by adding 'Transient transmission additional time (calculation value)' (SW007A) to "Communication Period Interval Setting" and "Transient transmission time" of "Communication Period Setting" under "Basic Settings".

For details on the watchdog counter, refer to the following.

☞ Page 221 Cyclic transmission assurance by watchdog counter

Interlink transmission time

The following is the formula to calculate the time required for interlink transmission. Interlink transmission does not affect the sequence scan time.

Interlink transmission time to completely transmit all set points

α_{DL} = KM4 × ((RX + RY) ÷ 16 + RWr + RWw) [ms]

α_{DL}: Interlink transmission time

RX: Total number of source "RX/RY" or "RX/LB" points set in "Interlink Transmission Settings" of "Application Settings".

RY: Total number of source "LB/RY" or "LB/LB" points set in "Interlink Transmission Settings" of "Application Settings".

RWr: Total number of source "RWr/RWw" or "RWr/LW" points set in "Interlink Transmission Settings" of "Application Settings".

RWw: Total number of source "LW/RWw" or "LW/LW" points set in "Interlink Transmission Settings" of "Application Settings".

- Constant (KM4)

Base unit to which the network module is mounted		KM4($\times 10^{-3}$)
Source	Destination	
Main base unit	Main base unit	0.175
Main base unit	Extension base unit	0.202
Extension base unit	Main base unit	0.242
Extension base unit	Extension base unit	0.271

Precautions

The interlink transmission time may become longer due to the following causes.

- Communication with the engineering tool (such as CC-Link IE TSN/CC-Link IE Field diagnostics, module diagnostics)
- Execution of a link dedicated instruction
- Link refresh
- Interlink transmission between other modules

Appendix 7 Processing Time of EtherNet/IP

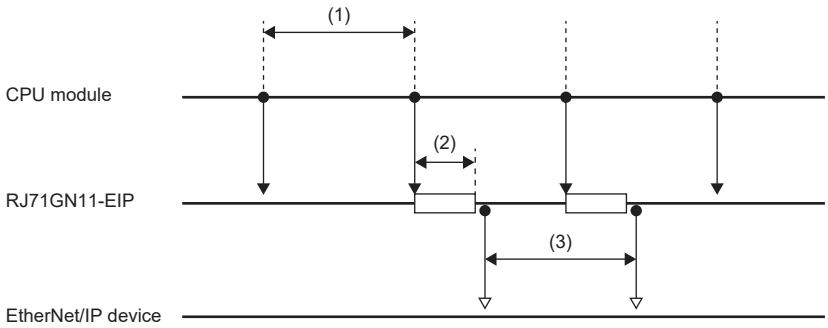
Transmission delay time

The following describes the formulas used to calculate the transmission delay time of EtherNet/IP communications.
Note that the processing time may be prolonged depending on the load ratio of the network (degree of line congestion), the processing performance of controllers, and the system configuration.

Class1 communication transmission delay time

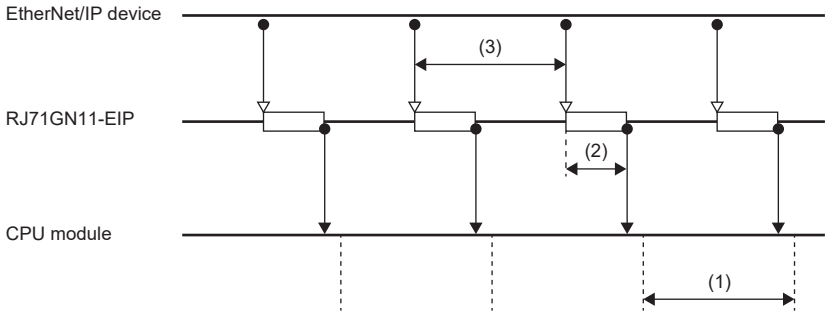
The following describes the concept and the calculation formula of the transmission delay time of Class1 communications. (It does not include the refresh processing time.)

■Concept of transmission delay time



No.	Item name	Description
(1)	Sequence scan	Time required from setting the transmitted data in a program to refreshing the buffer memory on the CC-Link IE TSN Plus module
(2)	Module processing time	Time required for transferring transmitted data from the buffer memory on the CC-Link IE TSN Plus module to the send buffer
(3)	RPI	RPI setting value (transmission interval time)

■Concept of receive delay time



No.	Item name	Description
(1)	Sequence scan	Time required for refreshing the receive data from the buffer memory on the CC-Link IE TSN Plus module to a program
(2)	Module processing time	Time required for transferring receive data from the receive buffer to the buffer memory on the CC-Link IE TSN Plus module
(3)	RPI	RPI setting value (transmission interval time)

Calculation formula of transmission delay time

■When the firmware version of the CC-Link IE TSN Plus module is "02" or earlier

Calculation value	Calculation formula (Unit: ms)
Normal value	0.573 + (sequence scan ÷ 2) + module processing time[*1] + RPI
Maximum value	0.725 + sequence scan + module processing time[*1] + (RPI × 1.5)

*1 Calculate the module processing time using the following formula.
Module processing time [ms] = 0.0006 × Total data size [byte] + 0.007 × number of connections

■When the firmware version of the CC-Link IE TSN Plus module is "03" or later

Calculation value	Calculation formula (Unit: ms)
Normal value	0.573 + (sequence scan ÷ 2) + module processing time[*1] + (RPI ÷ 2)
Maximum value	0.725 + sequence scan + module processing time[*1] + RPI

*1 Calculate the module processing time using the following formula.
Module processing time [ms] = 0.0001 × Total data size [byte] + 0.007 × number of connections

Appendix 8 TCP/IP Communications, UDP/IP Communications

This chapter describes the communication flow and procedure of TCP/IP communications and UDP/IP communications.

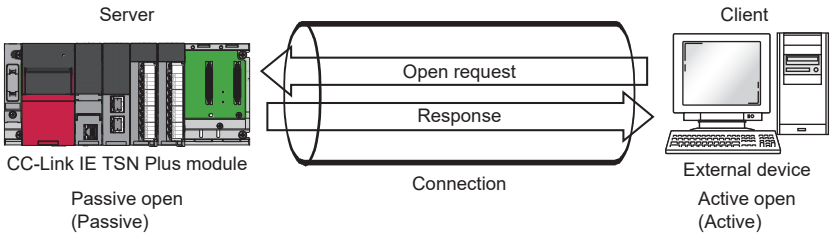
TCP/IP communications

This section describes TCP/IP communications.

Establishing a connection

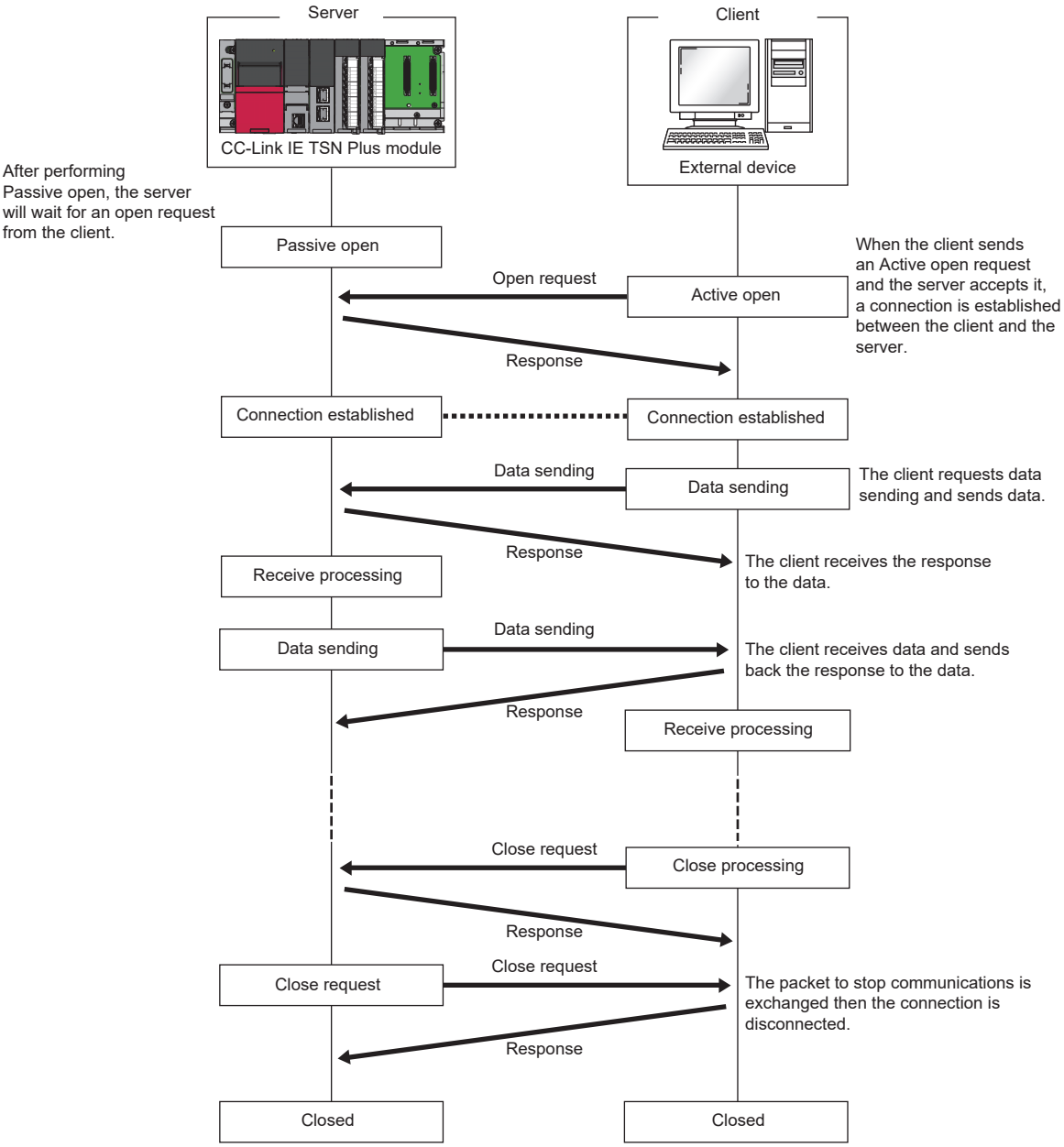
With TCP/IP communications, a connection must be established between the communicating devices. If the server side device has executed the Passive open processing and is in the standby state, the client side device makes an open request (Active open processing) to the server. When a response is returned, the connection is established.
With TCP/IP communications, a connection is established during communication. Since data is exchanged while checking that the data has correctly reached the communication destination, the data reliability can be ensured. Note that the line load is larger than UDP/IP communications.

Ex.
When the CC-Link IE TSN Plus module is Passive open



Communication flow

This section describes the flow from the establishment of connection to end of communication.



Point

Wait at least 500ms or more before executing the open processing again after the close request is sent from the external device to the CC-Link IE TSN Plus module.

A

Active open procedure

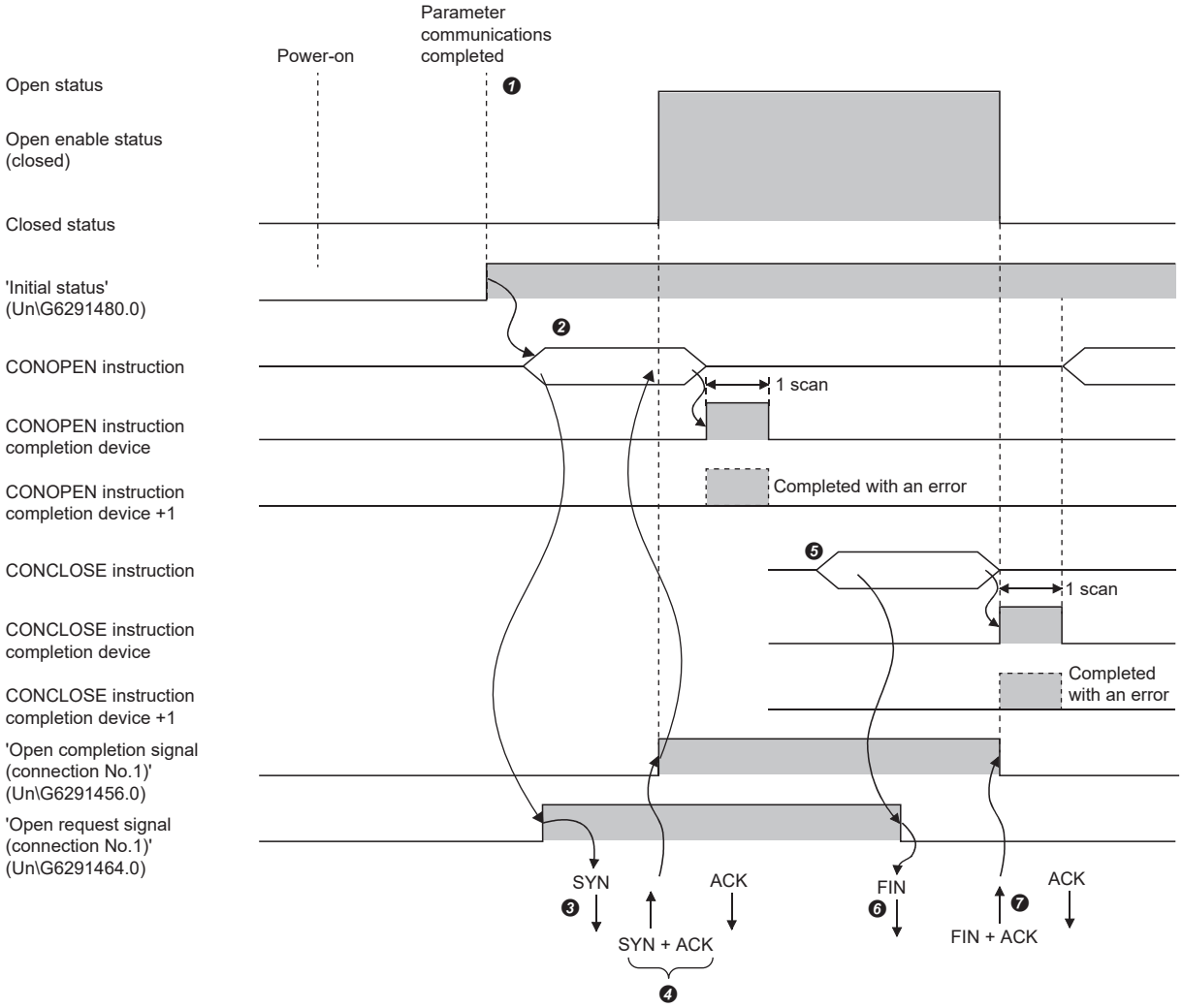
Active open is a connection method that performs an active open processing in respect to an external device (Passive open) that is in a passive open standby state for a connection. The following figure shows the process for the CC-Link IE TSN Plus module to Active open.

For CONOPEN/CONCLOSE instructions, refer to the following.

MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

Ex.

Open/close processing for connection No.1



❶ After the module parameters are set, check that the initial processing for the CC-Link IE TSN Plus module has completed normally. ('Initial status' (Un\G6291480.0): On)

❷ Start the open processing using the CONOPEN instruction.*3 ('Open request signal (connection No.1)' (Un\G6291464.0): On)

❸ The CC-Link IE TSN Plus module executes open processing. (The module sends open request (SYN) to the external device.)

❹ Data can be exchanged after the open processing completes normally.*1

❺ Start the close processing using the CONCLOSE instruction. ('Open request signal (connection No.1)' (Un\G6291464.0): Off)

❻ The CC-Link IE TSN Plus module executes close processing. (The module sends close request (FIN) to external device.)

❼ Data communication ends when close processing completes normally.*2

*1 If RST is returned from the external device after SYN is sent from the CC-Link IE TSN Plus module, open abnormal completion occurs immediately, and the open processing ends.

*2 If ACK or FIN is not returned even after the TCP end timer time, the CC-Link IE TSN Plus module forcibly cuts off the connection (sends RST). (Close abnormal completion)

*3 If the open processing target port has not been linked up, the CONOPEN instruction will complete with an error. Execute the open processing again after link-up, or check that 'Connection status' (Un\G2102344) is set to 1 before starting the open processing. If auto-negotiation fails, the open processing will complete with an error. Retry the open processing after a while.
If the open processing completes with an error again, check the Ethernet cable connection or the operation of the external device and switching hub.

Passive open procedure

The following two types of connection methods can be used for Passive open of the CC-Link IE TSN Plus module.

Connection method	Description
Unpassive	This connection method executes a passive open processing for the connection to all devices connected to the network without restriction to the IP address or port number of the communication destination.
Fullpassive	When the IP address and port number of the communication destination are specified, this connection method executes a passive open processing for the connection of the specific external device.

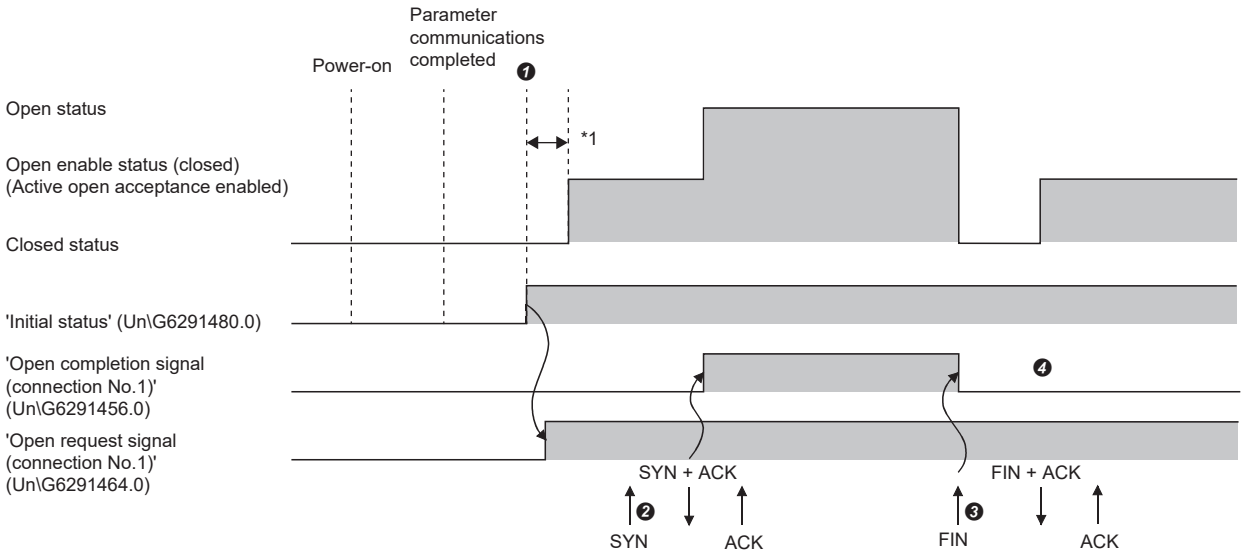
The Open/close processing procedure for Passive open is as follows, depending on the "Opening Method" in "Ethernet Communication Setting" of "Basic Settings". (☞ Page 81 Ethernet Communication Setting)

■When "Do Not Open by Program" is set

The CC-Link IE TSN Plus module is constantly in the open standby state, so the connection is established when Active open is initiated by the external device. This eliminates the need for an open/close processing program on the CC-Link IE TSN Plus module side.

Ex.

Open/close processing for connection No.1



❶ After the module parameters are set, check that the initial processing for the CC-Link IE TSN Plus module has completed normally. ('Initial status' (Un\G6291480.0): On) When the initial processing completes normally, the connection enters the open enable state, and the module waits for the open request from the external device.

❷ The CC-Link IE TSN Plus module executes the open processing when an open request (SYN) is received from the external device. When the open processing ends normally, 'Open completion signal (connection No.1)' (Un\G6291456.0) turns on and data communication is enabled.

❸ The CC-Link IE TSN Plus module executes the close processing when the close request (FIN) is received from the external device. When the close processing completes normally, the open completion signal turns off and data communication is disabled.

❹ After the internal processing in the CC-Link IE TSN Plus module completes, the connection stands by for the open request again.

*1 The open request (SYN) received between the initial processing normal completion to the open request standby state is handled as an error, and the CC-Link IE TSN Plus module sends a connection forced close (RST) (to the external device that sent the open request (SYN)).

Point

Even if "Opening Method" in "Ethernet Communication Setting" of "Basic Settings" is set to "Do Not Open by Program", when open/close processing is performed by a dedicated instruction from the CC-Link IE TSN Plus module, the applicable connection does not return to the open request waiting state after close processing.

■When "Open by Program" is set

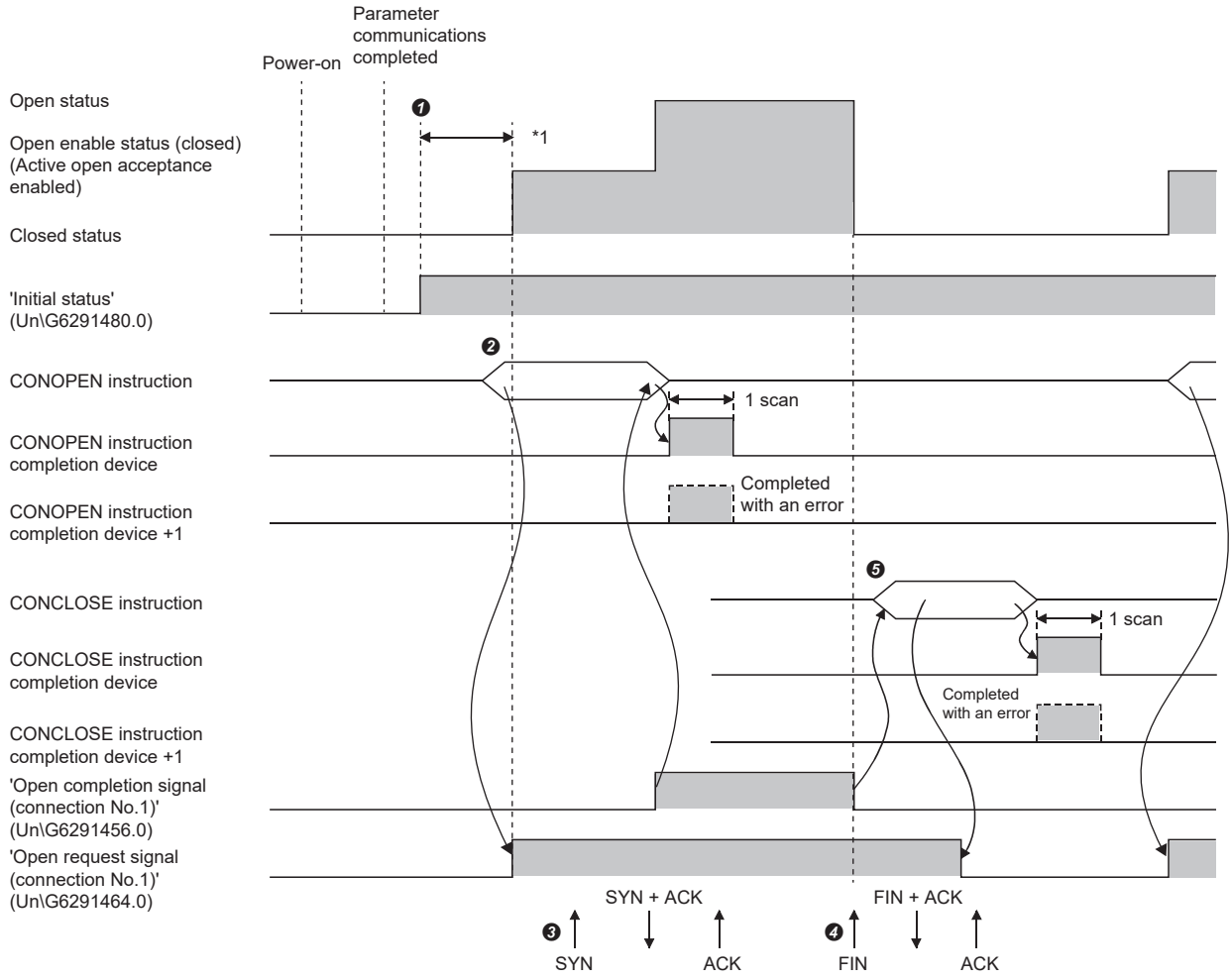
Before the open/close request is received from the external device, the CC-Link IE TSN Plus module must execute the CONOPEN/CONCLOSE instructions on the CC-Link IE TSN Plus module side and enter the open/close standby state. Data can be sent and received after the open processing completes normally.

For CONOPEN/CONCLOSE instructions, refer to the following.

MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

Ex.

Open/close processing for connection No.1



❶ After the module parameters are set, check that the initial processing for the CC-Link IE TSN Plus module has completed normally. ('Initial status' (Un\G6291480.0): On)

❷ Start the open processing using the CONOPEN instruction. ('Open request signal (connection No.1)' (Un\G6291464.0): On)

❸ The CC-Link IE TSN Plus module executes the open processing when an open request (SYN) is received from the external device. When the open processing ends normally, 'Open completion signal (connection No.1)' (Un\G6291456.0) turns on and data communication is enabled.

❹ The CC-Link IE TSN Plus module executes the close processing when the close request (FIN) is received from the external device. When the close processing completes normally, the open completion signal turns off and data communication is disabled.

*1 The open request (SYN) received between the initial processing normal completion to the open request standby state is handled as an error, and the CC-Link IE TSN Plus module sends a connection forced close (RST) (to the external device that sent the open request (SYN)).

Point

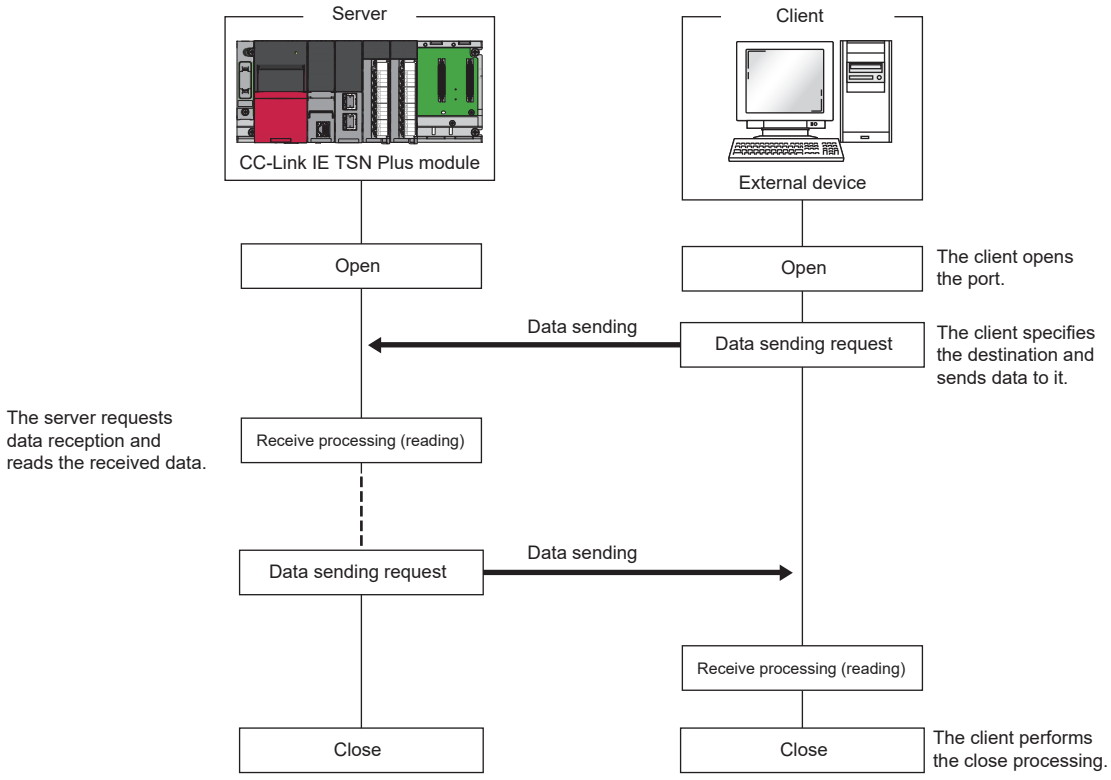
- Change the connection setting before executing the CONOPEN instruction.
- After the open processing is executed, the open request cannot be canceled until the open processing completes. Execute the close processing (CONCLOSE instruction) after open completes.

UDP/IP communications

This section describes the UDP/IP communications. Since UDP/IP communications does not establish a connection during communication and does not check that the communication destination has correctly received the data, the line load is lower. Note that the data reliability is lower than TCP/IP communications.

Communication flow

UDP/IP communications does not require a process to establish a connection with the external device as is required with TCP/IP communications.



Point

Wait at least 500ms or more before executing the open processing again after the close request is sent from the external device to the CC-Link IE TSN Plus module.

Open procedure

The open/close processing procedure is as follows, depending on the "Opening Method" in "Ethernet Communication Setting" of "Basic Settings". (☞ Page 81 Ethernet Communication Setting)

■When "Do Not Open by Program" is set

After the CC-Link IE TSN Plus module mounted station starts up, the UDP/IP communications setting connection automatically opens, and data send/receive is enabled. Program for open/close processing is not required.

Point

Even if "Opening Method" in "Ethernet Communication Setting" of "Basic Settings" is set to "Do Not Open by Program", when open/close processing is performed by a dedicated instruction from the CC-Link IE TSN Plus module, all open/close processing after connection with an external device must be performed by a program.

■When "Open by Program" is set

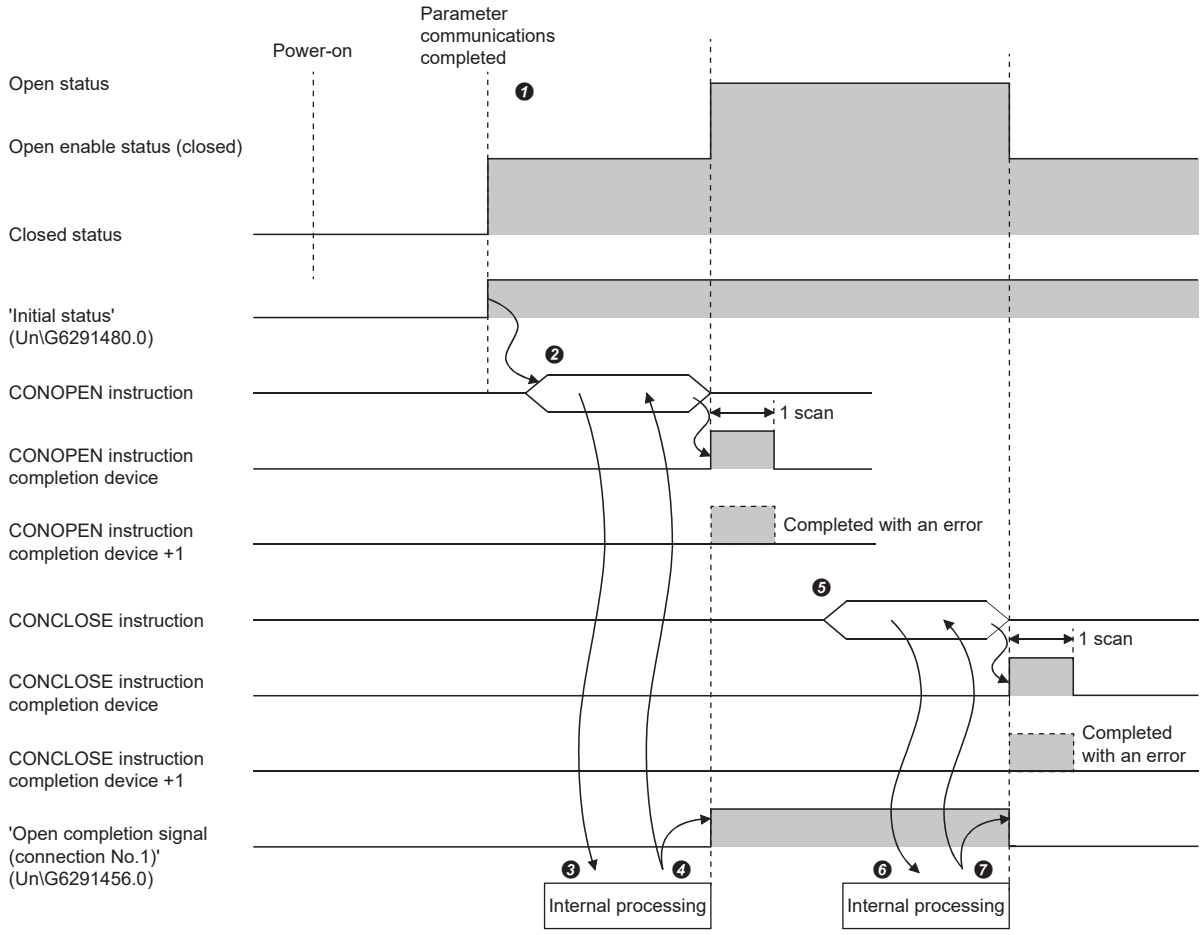
Before the open/close request is received from the external device, the CC-Link IE TSN Plus module must execute the CONOPEN/CONCLOSE instructions on the CC-Link IE TSN Plus module side and enter the open/close standby state. Data can be sent and received after the open processing completes normally.

For CONOPEN/CONCLOSE instructions, refer to the following.

MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

Ex.

Open/close processing for connection No.1



❶ After the module parameters are set, check that the initial processing for the CC-Link IE TSN Plus module has completed normally. ('Initial status' (Un\G6291480.0): On)
❷ Start the open processing using the CONOPEN instruction. ('Open request signal (connection No.1)' (Un\G6291464.0): On)
❸ The CC-Link IE TSN Plus module executes open processing. (only internal processing)
❹ Data can be exchanged after the open processing completes normally.
❺ Start the close processing using the CONCLOSE instruction. ('Open request signal (connection No.1)' (Un\G6291464.0): Off)
❻ The CC-Link IE TSN Plus module executes close processing. (only internal processing)
❼ Data communication ends when close processing completes normally.

Appendix 9 Port Number

A port number for the system cannot be specified.

Use a port number according to the content of and the method for communications with the communication destination.

Port number on the P1 side

Port number		Applications
Decimal	Hexadecimal	
20 to 21	14H to 15H	For system
161 to 162	A1H to A2H	
5001	1389H	MELSOFT transmission port (UDP/IP)
5002	138AH	MELSOFT transmission port (TCP/IP)
45237 to 45239	B0B5H to B0B7H	For system
61440 to 61442	F000H to F002H	
61448	F008H	
61460 to 61464	F014H to F018H	
61500 to 61501	F03CH to F03DH	
62000 to 65534	F230H to FFFEH	

Port number on the P2 side (server)

Port number		Applications
Decimal	Hexadecimal	
2222	8AEH	EtherNet/IP communications (Class1 communications)
5001	1389H	For system
5002	138AH	For system
44818	AF12H	EtherNet/IP communications (Class3/UCMM communications and Class1 connection start (FwdOpen))

Port number on the P2 side (client)

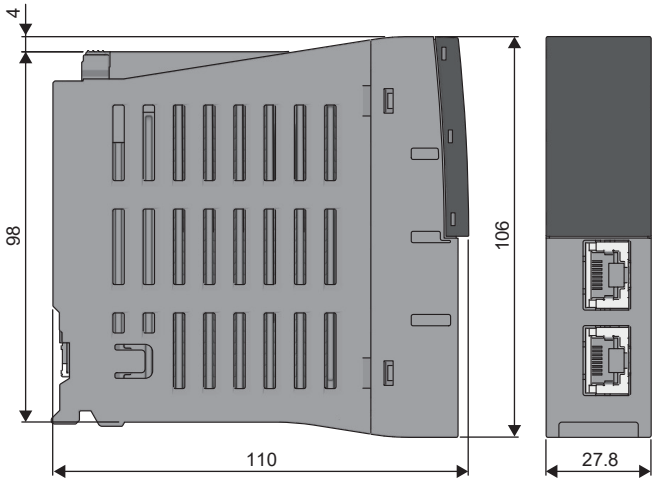
Port number		Applications
Decimal	Hexadecimal	
49512 to 65534	C168H to FFFEH	For system

Common port number for P1/P2

Port number		Applications
Decimal	Hexadecimal	
5000	1388H	Auto-open UDP port
5003 to 5009	138BH to 1391H	For system
5010	1392H	SLMP transmission port (UDP/IP)
5011	1393H	SLMP transmission port (TCP/IP)

Appendix 10 External Dimensions

The following figures show the external dimensions of the CC-Link IE TSN Plus module.



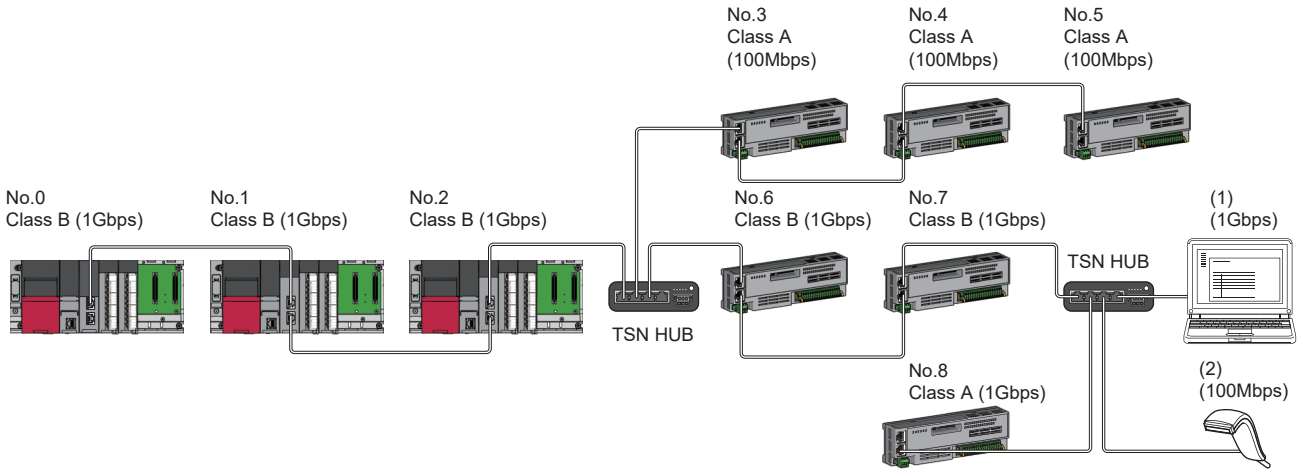
(Unit: mm)

Appendix 11 Structure of CC-Link IE TSN Class B/A Devices (Protocol Version 1.0 Only) and Ethernet Devices

The following diagram shows the system configuration under the conditions below:

- CC-Link IE TSN Plus module and connected devices do not support protocol version 2.0.
- "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only" is set for "Connection Device Information" under "Basic Settings" in the engineering tool.

When "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only", up to 121 devices (1 master station and 120 device stations) can be connected.

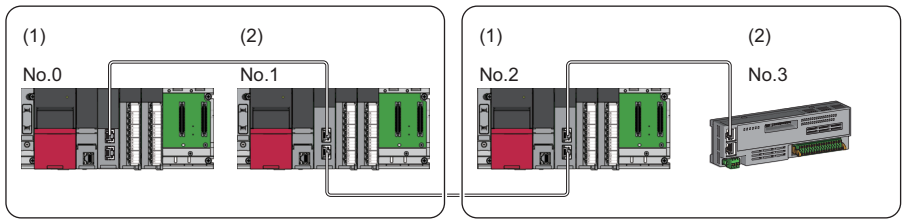


No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3 to No.8: Remote station
(1), (2): Ethernet device
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

The availability of connection of network configuration devices varies depending on the communication mode and communication speed.

Communication mode	Reference
Unicast mode	☞ Page 596 When the communication speed for the master station is set to 1Gbps ☞ Page 597 When the communication speed for the master station is set to 100Mbps
Multicast mode	☞ Page 598 When the communication speed for the master station is set to 1Gbps ☞ Page 599 When the communication speed for the master station is set to 100Mbps

The following terms are used to describe the terms in the tables referenced.



No.0: Master station
No.1, No.2: Local station
No.3: Remote station
(1) Device on the master station side (The master station or a device near the master station)
(2) Device on the end side (A device far from the master station)

Structure of unicast mode

This mode indicates the availability of connection with a network configuration device when "Communication Mode" under "Application Settings" is set to "Unicast".

When the communication speed for the master station is set to 1Gbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station is set to "1Gbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (The side near the master station)		Device on the end side (The side far from the master station)							
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class A device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	1Gbps	○S*4*5	×	○S*4	△S*1*4	○SH*4	△S*1*4	○SH	△SH*6
Local station (CC-Link IE TSN Class B device)	1Gbps	○S*5*7	×	○S*7	△S*1*3*7	○SH*2*7	△SH*1*2*7	○SH*8	△SH*6*8
	100Mbps	×	×	×	×	×	×	×	×
Remote station (CC-Link IE TSN Class B device)	1Gbps	○S*5	×	○S	△S*1*3	○SH*2	△SH*1*2	○SH	△SH
	100Mbps	×	×	×	○S*1*3	×	○SH*1*2*3	×	○SH
Remote station (CC-Link IE TSN Class A) device	1Gbps	×	×	×	×	○SH*2	△SH*1*2	○SH	△SH
	100Mbps	×	×	×	×	×	○SH*1*2	×	○SH

*1 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Low-Speed".

*2 A connection cannot be established if the total cyclic data size of all device stations on the CC-Link IE TSN Class A device side exceeds 2K bytes at the boundary between CC-Link IE TSN Class B and CC-Link IE TSN Class A. (☞ Page 56 Calculation of the total cyclic data size)

*3 A connection cannot be established if the total cyclic data size of all device stations on the 100Mbps device side exceeds 2K bytes at the boundary between the communication speed of 1Gbps and 100Mbps. (☞ Page 56 Calculation of the total cyclic data size)

*4 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*5 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*6 If the device on the master station side is a CC-Link IE TSN Plus module, P2 can be connected without passing through a switching hub.

*7 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*8 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

When the communication speed for the master station is set to 100Mbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station set to "100Mbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (The side near the master station)		Device on the end side (The side far from the master station)							
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class A device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	100Mbps	×	○S*2*3*4	×	○S*2*3	×	○SH*3	×	○SH
Local station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	○S*2*4*5	×	○S*2*5	×	○SH*1*5	×	○SH*6
Remote station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	○S*2*4	×	○S*2	×	○SH*1	×	○SH
Remote station (CC-Link IE TSN Class A device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	×	×	×	×	○SH*1	×	○SH

*1 A connection cannot be established if the total cyclic data size of all device stations on the CC-Link IE TSN Class A device side exceeds 2K bytes at the boundary between CC-Link IE TSN Class B and CC-Link IE TSN Class A. (☞ Page 56 Calculation of the total cyclic data size)

*2 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Basic Period" or "Normal-Speed" (4 times).

*3 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*4 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*5 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*6 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

Structure of multicast mode

This mode indicates the availability of connection with a network configuration device when "Communication Mode" under "Application Settings" is set to "Multicast".

When the communication speed for the master station is set to 1Gbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station is set to "1Gbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (The side near the master station)		Device on the end side (The side far from the master station)							
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class A device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	1Gbps	○S*4*6*7	×	○S*4*6	△S*1*4*6	○SH*4*6	△SH*1*4*6	○SH*4	△SH*4*8
Local station (CC-Link IE TSN Class B device)	1Gbps	○S*4*7*9	×	○S*4*9	△S*1*3*4*5*9	○SH*2*3*4*9	△SH*1*2*3*4*9	○SH*3*4*10	△SH*3*4*8*10
	100Mbps	×	×	×	×	×	×	×	×
Remote station (CC-Link IE TSN Class B device)	1Gbps	○S*4*7	×	○S*4	△S*1*3*4*5	○SH*2*3*4	△SH*1*2*3*4	○SH*3*4	△SH*3*4
	100Mbps	×	×	×	○S*1*4*5	×	○SH*1*2*3*4*5	×	○SH*3*4
Remote station (CC-Link IE TSN Class A device)	1Gbps	×	×	×	×	○SH*2*4	△SH*1*2*4	○SH*4	△SH*4
	100Mbps	×	×	×	×	×	○SH*1*2*4	×	○SH*4

*1 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Low-Speed".

*2 A connection cannot be established if the total cyclic data size of all device stations on the CC-Link IE TSN Class A device side exceeds 2K bytes at the boundary between CC-Link IE TSN Class B and CC-Link IE TSN Class A. (☞ Page 56 Calculation of the total cyclic data size)

*3 For a local station or remote station of a device on the master station side, use a device supporting the multicast filter. To determine whether the device supports the multicast filter, refer to the manual of the device used.

*4 When the device is connected on the end side via the switching hub as shown below, communication may not be possible depending on the type of the device.
The communication will be enabled by configuring settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the ports specified below.

Connection structure that cannot be communicated	Port that prohibits multicast frame transfer
Device stations with different communication speeds of 1Gbps and 100Mbps coexist.	Connection port of the device station with 100Mbps
A local station and Ethernet device coexist.	Connection port of the Ethernet device
A local station and CC-Link IE TSN Class A remote station coexist.	Connection port of the CC-Link IE TSN Class A remote station
The remote station and Ethernet device coexist.	Connection port of the Ethernet device

*5 A connection cannot be established if the total cyclic data size of all device stations on the 100Mbps device side exceeds 2K bytes at the boundary between the communication speed of 1Gbps and 100Mbps. (☞ Page 56 Calculation of the total cyclic data size)

*6 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*7 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*8 If the device on the master station side is a CC-Link IE TSN Plus module, P2 can be connected without passing through a switching hub.

*9 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*10 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

When the communication speed for the master station is set to 100Mbps

This mode indicates the availability of connection with a network configuration device when "Communication Speed" of the master station set to "100Mbps".

○: Connection available, △: Connection available via a switching hub, ×: Connection not available

S: TSN hub available

H: General-purpose hub available

Device on the master station side (The side near the master station)		Device on the end side (The side far from the master station)							
		Local station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class B device)		Remote station (CC-Link IE TSN Class A device)		Ethernet device	
		1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps	1Gbps	100Mbps
Master station (CC-Link IE TSN Class B device)	100Mbps	×	○S*2*4*5*6	×	○S*2*5	×	○SH*4*5	×	○SH*4
Local station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	○S*2*4*6*7	×	○S*2*7	×	○SH*1*3*4*7	×	○SH*3*4*8
Remote station (CC-Link IE TSN Class B device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	○S*2*4*6	×	○S*2	×	○SH*1*3*4	×	○SH*3*4
Remote station (CC-Link IE TSN Class A device)	1Gbps	×	×	×	×	×	×	×	×
	100Mbps	×	×	×	×	×	○SH*1*4	×	○SH*4

*1 A connection cannot be established if the total cyclic data size of all device stations on the CC-Link IE TSN Class A device side exceeds 2K bytes at the boundary between CC-Link IE TSN Class B and CC-Link IE TSN Class A. (☞ Page 56 Calculation of the total cyclic data size)

*2 For a device station with a communication speed of 100Mbps, set "Communication Period Setting" to "Basic Period" or "Normal-Speed" (4 times).

*3 For a local station or remote station of a device on the master station side, use a device supporting the multicast filter. To determine whether the device supports the multicast filter, refer to the manual of the device used.

*4 When the device is connected on the end side via the switching hub as shown below, communication may not be possible depending on the type of the device.
The communication will be enabled by configuring settings with the switching hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the ports specified below.

Connection structure that cannot be communicated	Port that prohibits multicast frame transfer
A local station and Ethernet device coexist.	Connection port of the Ethernet device
A local station and CC-Link IE TSN Class A remote station coexist.	Connection port of the CC-Link IE TSN Class A remote station

*5 If the device on the master station side is a CC-Link IE TSN Plus module, only P1 can be connected.

*6 If the device on the end side is a CC-Link IE TSN Plus module, only P1 can be connected.

*7 Connection is not possible if the device on the master station side is a CC-Link IE TSN Plus module.

*8 If the device on the master station side is a CC-Link IE TSN Plus module, only P2 can be connected.

Precautions

When a TSN hub is used, check the TSN hub specifications on the CC-Link Partner Association website (www.cc-link.org).

Structure with modules on CC-Link IE TSN

This section describes the system configurations when CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices coexist, or when the system consists of modules with CC-Link IE TSN (master station, local stations, remote stations) of CC-Link IE TSN Class A devices only.

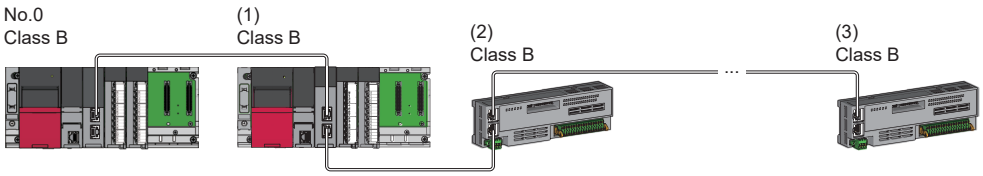
Item	Network topology	Reference
Structure with CC-Link IE TSN modules only	Line topology	Page 600 Line topology
	Star topology	Page 601 Star topology
	Coexistence of line and star topologies	Page 603 Coexistence of line and star topologies
Structure with CC-Link IE TSN modules with a communication speed of 100Mbps	Line topology	Page 605 Line topology
	Star topology	Page 605 Star topology
	Coexistence of line and star topologies	Page 607 Coexistence of line and star topologies

Connection with modules on CC-Link IE TSN only

■Line topology

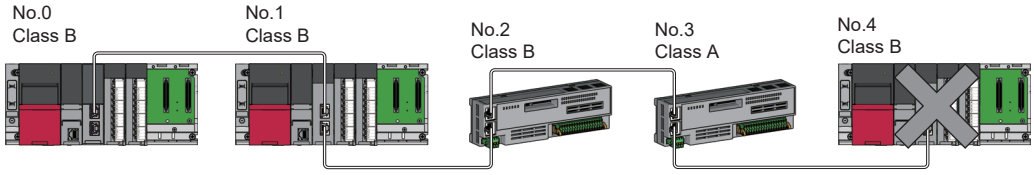
The network is configured in a line topology.

- Up to eight CC-Link IE TSN Class B devices can be connected to the master station.



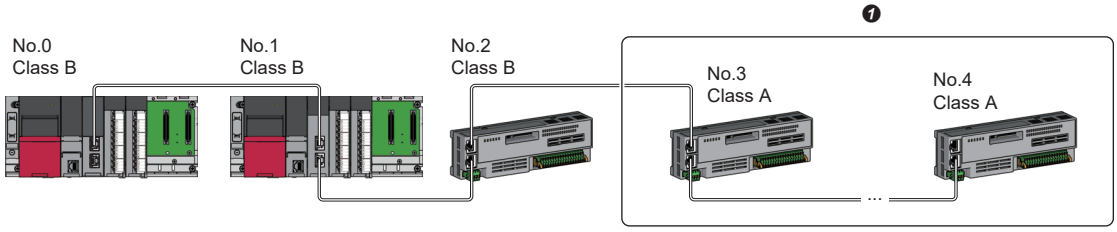
No.0: Master station (CC-Link IE TSN Plus module)
(1) Local station (1st device)
(2) Remote station (2nd device)
(3) Remote station (8th device)
Class B: CC-Link IE TSN Class B device

- A CC-Link IE TSN Class B device cannot be connected to a CC-Link IE TSN Class A device.



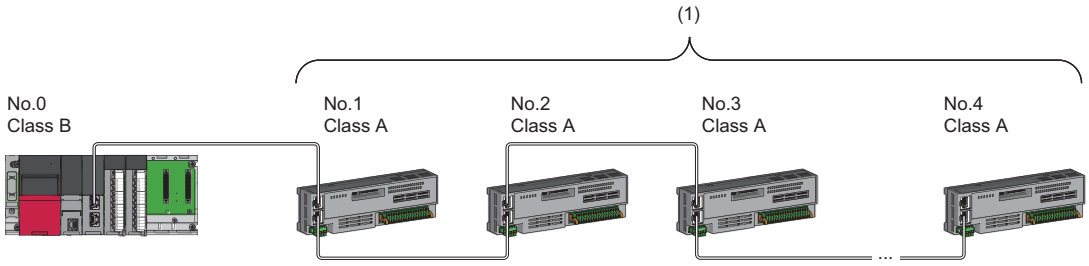
No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.4: Local station
No.2, No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

- A connection cannot be established if the total cyclic data size of all device stations on the CC-Link IE TSN Class A device side including the CC-Link IE TSN Class A device that forms the boundary between CC-Link IE TSN Class B and CC-Link IE TSN Class A exceeds 2K bytes.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3, and No.4: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device
❶ Set the total cyclic data size within 2K bytes.

• When the device stations are CC-Link IE TSN Class A devices only, up to 120 device stations can be connected.

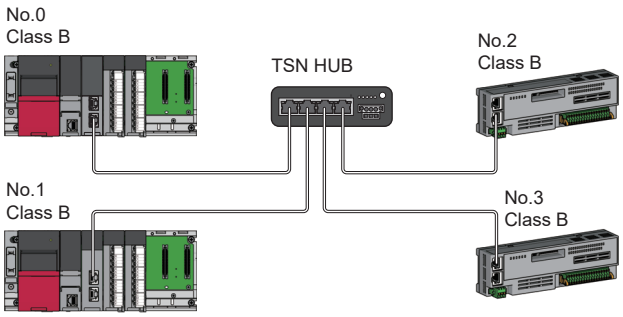


No.0: Master station (CC-Link IE TSN Plus module)
No.1 to No.4: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device
(1) Total of the device stations: Up to 120

■Star topology

The network is configured in a star topology via a switching hub.

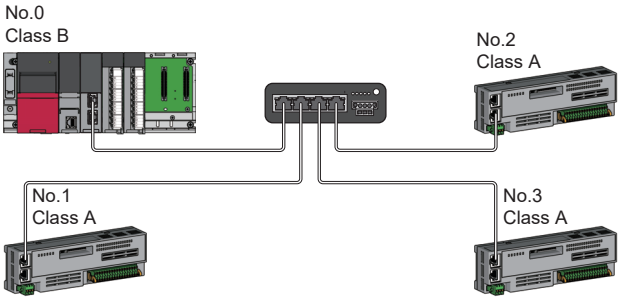
• When connecting CC-Link IE TSN Class B devices in a star topology, use a TSN hub.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station
Class B: CC-Link IE TSN Class B device

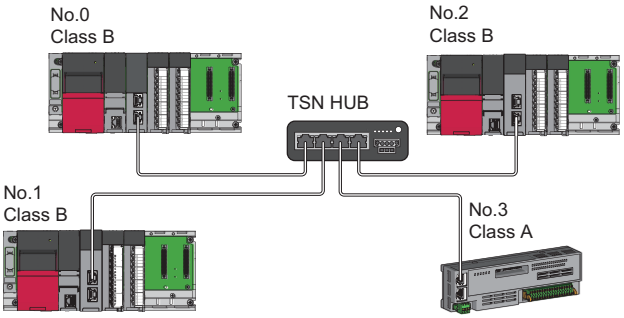
A

- When connecting a CC-Link IE TSN Class A device to a CC-Link IE TSN Class B device or connecting a CC-Link IE TSN Class A device to another CC-Link IE TSN Class A device in a star topology, connect them via a switching hub.



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2, and No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

- When "Communication Mode" is set to "Multicast", if a local station and a CC-Link IE TSN Class A remote station are both connected on the end side via a switching hub, communication may not be possible depending on the type of the device. The communication will be enabled by configuring settings with the TSN hub so that multicast frame (with multicast MAC addresses 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the CC-Link IE TSN Class A remote station.

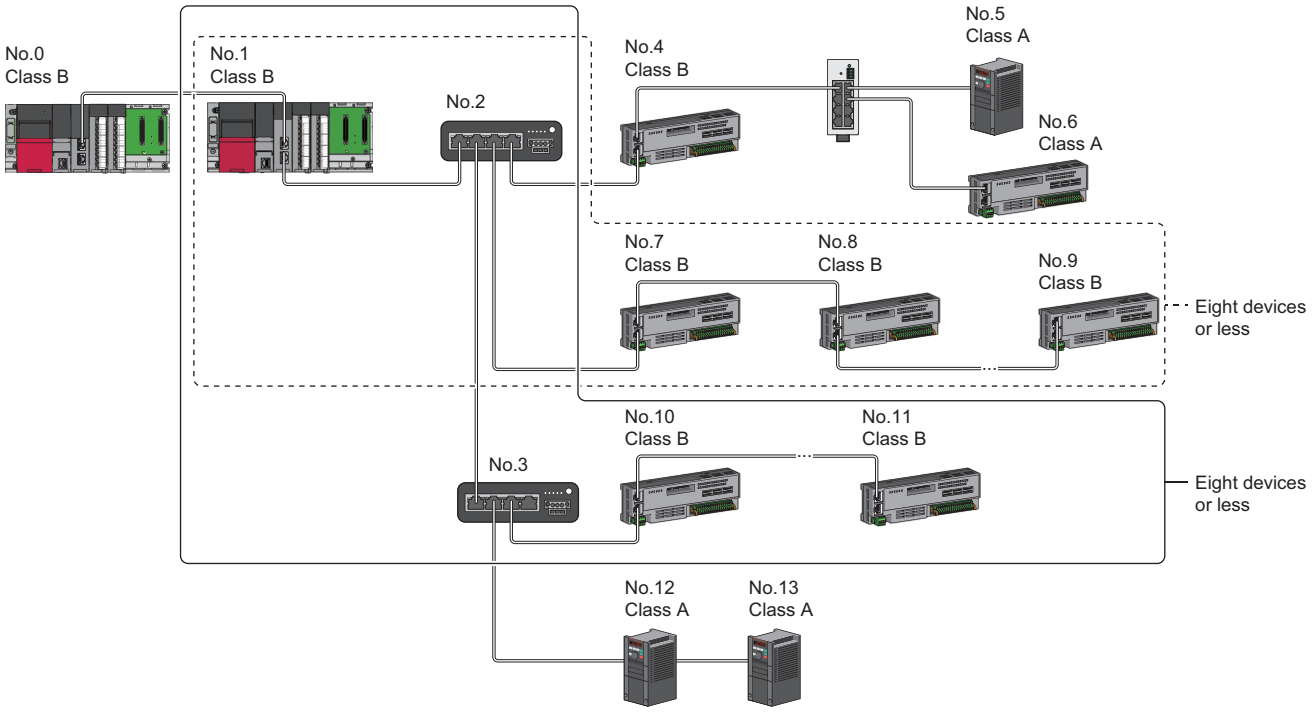


No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Coexistence of line and star topologies

Line and star topologies can be mixed according to the availability of connection described below.

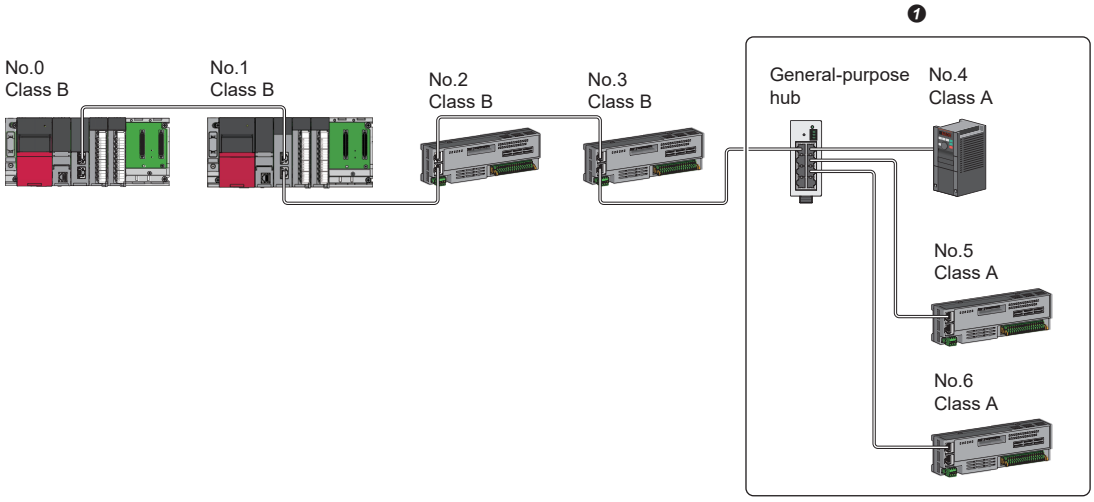
- Up to eight CC-Link IE TSN Class B devices including TSN hub can be connected from the master station to the end of each network.
- When connecting CC-Link IE TSN Class A devices, connect them to the end side of a CC-Link IE TSN Class B device or to a TSN hub. A star topology is also possible using a switching hub.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Device station (1st device)
No.2: TSN hub (2nd device)
No.3: TSN hub (3rd device)
No.4, No.5, No.6, No.12, No.13: Device station
No.7: Device station (3rd device)
No.8, No.10: Device station (4th device)
No.9, No.11: Device station (8th device)
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

A

• A connection cannot be established if the total cyclic data size of all device stations on the CC-Link IE TSN Class A device side exceeds 2K bytes at the boundary between CC-Link IE TSN Class B and CC-Link IE TSN Class A.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2 to No.6: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device
❶ Set the total cyclic data size within 2K bytes.

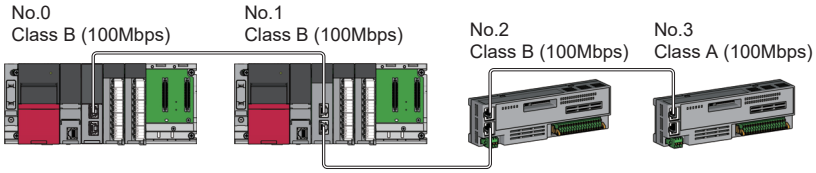
Connection with modules on CC-Link IE TSN with a communication speed of 100Mbps

This section describes the network topology when "Communication Speed" under "Application Settings" is set to "100Mbps".

■Line topology

The network is configured in a line topology.

- Adjust the communication speed of the module.
- When connecting modules with different communication speeds, connect the modules via a general-purpose hub.

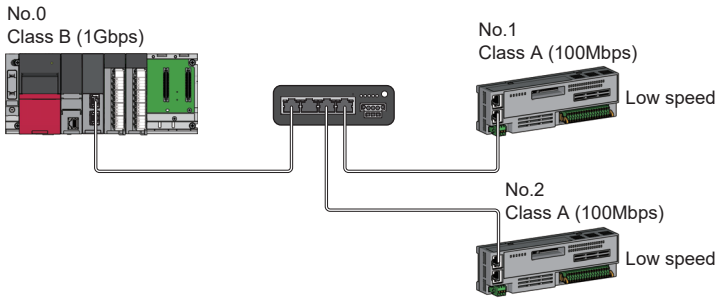


No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Star topology

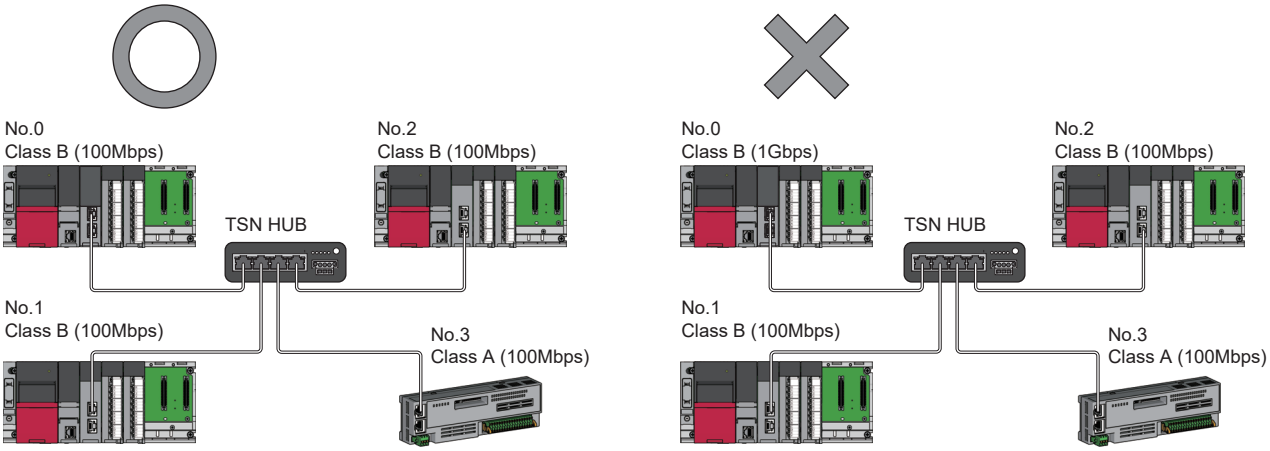
The network is configured in a star topology via a switching hub.

- When the master station with a communication speed of 1Gbps and a remote station with a communication speed of 100Mbps exist in the structure, set "Communication Period Setting" to "Low-Speed" for the remote station with a communication speed of 100Mbps.



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

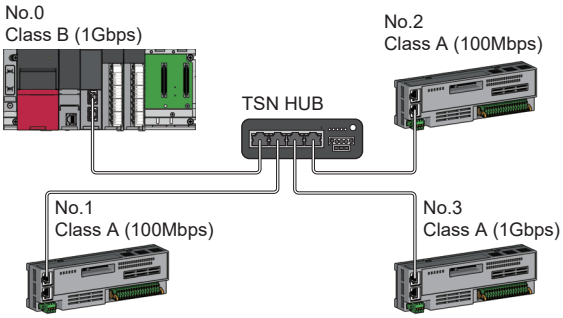
- Connect the master station and local station at the same communication speed.



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

A

- When "Communication Mode" is set to "Multicast" and the communication speed of the master station is 1Gbps, communication may not be possible depending on the type of the device if device stations with different communication speeds of 1Gbps and 100Mbps coexist on the end side via the switching hub. The communication will be enabled by configuring settings with the TSN hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the device station with 100Mbps.

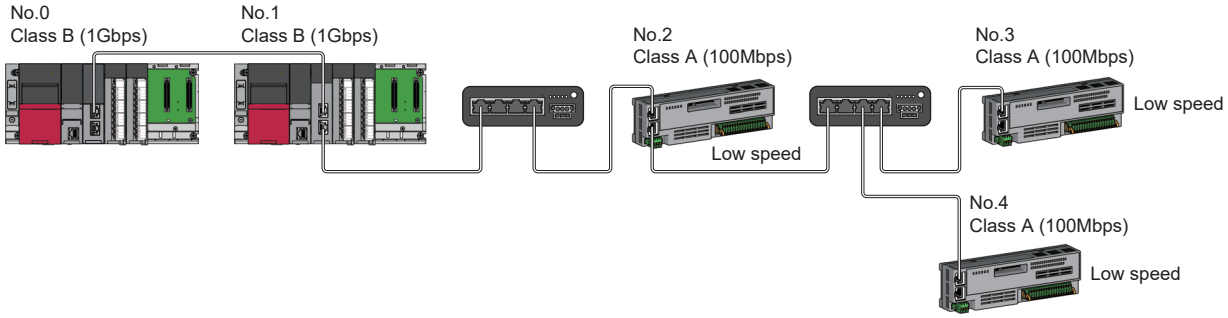


No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2, and No.3: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

■Coexistence of line and star topologies

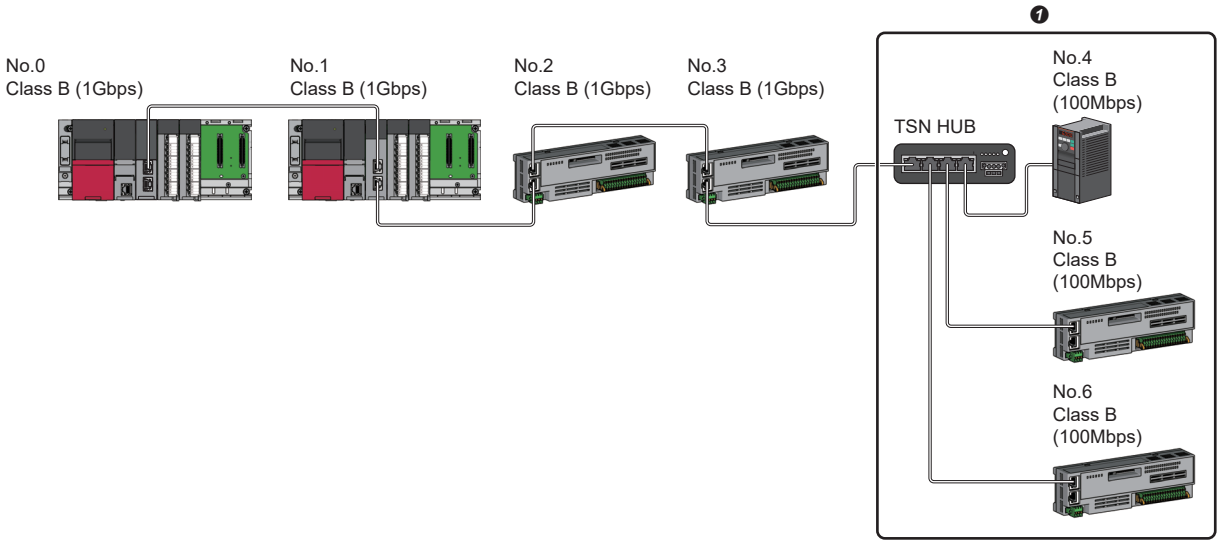
Line and star topologies can be mixed in the same network configuration.

- Up to eight CC-Link IE TSN Class B devices including TSN hub can be connected from the master station to the end of each network.
- When the master station with a communication speed of 1Gbps and a remote station with a communication speed of 100Mbps exist in the structure, set "Communication Period Setting" to "Low-Speed" for the remote station with a communication speed of 100Mbps.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3, and No.4: Remote station
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

- When the communication speed of the master station is 1Gbps, a connection cannot be established if the total cyclic data size of device stations on the 100Mbps device side exceeds 2K bytes. This includes the devices with a communication speed of 100Mbps that form a boundary between the communication speed of 1Gbps and 100Mbps.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2 to No.6: Remote station
Class B: CC-Link IE TSN Class B device
❶ Set the total cyclic data size within 2K bytes.

A

Structure with modules on CC-Link IE TSN and Ethernet devices

Connection with modules on CC-Link IE TSN and Ethernet devices

This section describes the system configurations when CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices coexist, or when the system consists of modules with CC-Link IE TSN (master station, local stations, remote stations) of CC-Link IE TSN Class A devices only and Ethernet devices.

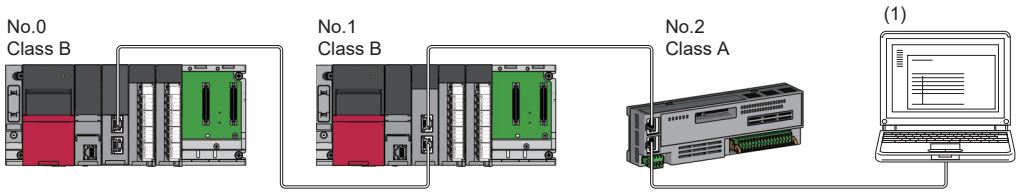
Network topology	Reference
Line topology	Page 608 Line topology
Star topology	Page 608 Star topology
Coexistence of line and star topologies	Page 609 Coexistence of line and star topologies

■Line topology

The network with modules and devices is configured in a line topology. A general-purpose hub is not required.

Up to eight CC-Link IE TSN Class B devices can be connected to the master station.

Connect Ethernet devices to the end of the network.

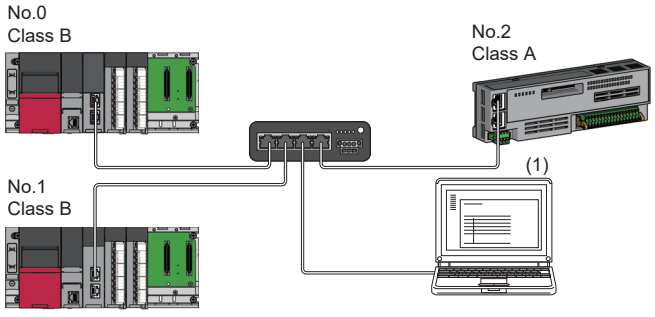


No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station (1st module)
No.2: Remote station
(1) Ethernet device
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

When an error occurs in a device station, the stations connected after the faulty station will be disconnected.

■Star topology

Modules or devices are connected in a star topology via a switching hub.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2: Remote station
(1) Ethernet device
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

Point

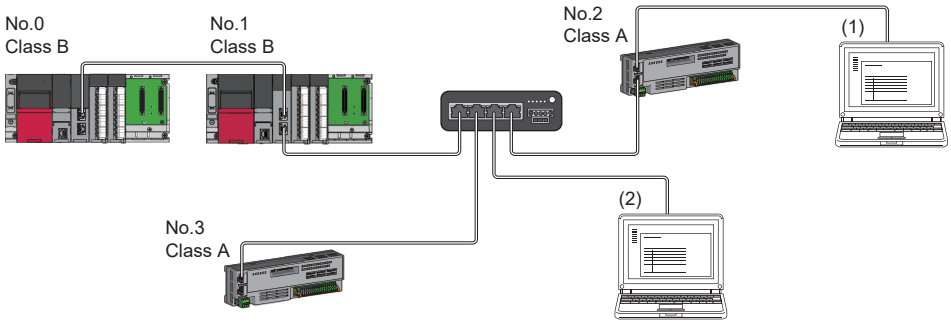
Since cyclic data is sent to an Ethernet device when "Communication Mode" is set to "Multicast" and a local station is used with an Ethernet device on the end side via a switching hub, communication may not be possible depending on the type of an Ethernet device.

The communication will be enabled by configuring settings with the TSN hub so that the multicast frame (with multicast MAC address 09:00:70:00:10:02 and 09:00:70:00:10:05) will not be transferred to the port of the Ethernet device.

■Coexistence of line and star topologies

Line and star topologies can be mixed according to the availability of each connection.

- Up to eight CC-Link IE TSN Class B devices including TSN hub can be connected from the master station to the end of each network.
- Connect Ethernet devices at the end of line topology.
- When connecting the Ethernet device in a star topology, connect the Ethernet device to a switching hub.



No.0: Master station (CC-Link IE TSN Plus module)
No.1: Local station
No.2, No.3: Remote station
(1), (2): Ethernet device
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

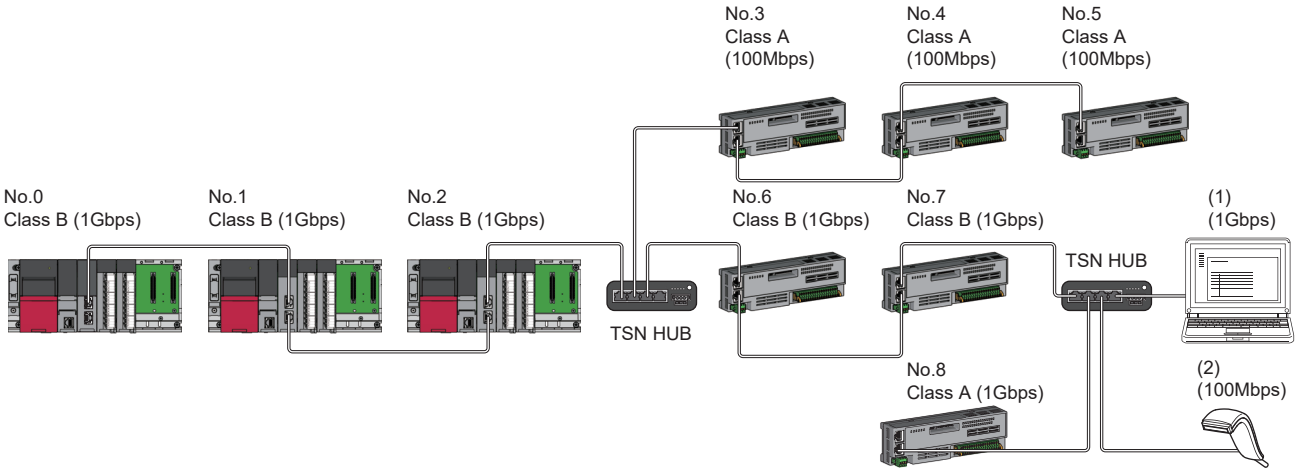
A

Appendix 12 Structure of CC-Link IE TSN Class B/A Devices (Mixture of Protocol Versions 1.0 and 2.0) and Ethernet Devices

The following diagram shows the system configuration under the conditions below:

- CC-Link IE TSN Plus module supports protocol version 2.0.
- CC-Link IE TSN Plus modules support a mixture of protocol versions 1.0 and 2.0.
- "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only" is set for "Connection Device Information" under "Basic Settings" in the engineering tool.

When "Connection Device Information" under "Basic Settings" of the master station is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only", up to 121 devices (1 master station and 120 device stations) can be connected.



No.0: Master station (CC-Link IE TSN Plus module)
No.1, No.2: Local station
No.3 to No.8: Remote station
(1), (2): Ethernet device
Class A: CC-Link IE TSN Class A device
Class B: CC-Link IE TSN Class B device

Time synchronization method and connection specifications for network configuration devices

The following table shows references for time synchronization methods and connection specifications based on the protocol version 2.0 support status of the network configuration devices.

With protocol version 1.0: Includes devices that support protocol version 1.0

Protocol version 2.0 only: Only devices that support protocol version 2.0

None: Operation without time synchronization

Protocol version 1.0/2.0 mixed of the device station		Time synchronization method for devices				Connection specifications reference
CC-Link IE TSN Class A device	CC-Link IE TSN Class B device	CC-Link IE TSN Class A device		CC-Link IE TSN Class B device		
		Protocol version 1.0	Protocol version 2.0	Protocol version 1.0	Protocol version 2.0	
With protocol version 1.0	With protocol version 1.0	IEEE1588	None	IEEE1588	IEEE1588	Page 595 Structure of CC-Link IE TSN Class B/A Devices (Protocol Version 1.0 Only) and Ethernet Devices
	Protocol version 2.0 only	IEEE1588	None	—	IEEE1588	
Protocol version 2.0 only	With protocol version 1.0	—	None	IEEE802.1AS	IEEE802.1AS	Page 38 Structure of CC-Link IE TSN Class B/A Devices and Ethernet Devices
	Protocol version 2.0 only	—	None	—	IEEE802.1AS	

Precautions

- A device station with the protocol version 1.0 may not perform a data link when the master station is operating with the protocol version 2.0. If a device station that does not support protocol version 2.0 is detected, that station does not perform a data link, the event code 00C80 is registered in the master station, and the information on stations that do not support protocol version 2.0 is stored in 'Station protocol version 2.0 support status' (SW01A0 to SW01A7).
- In the system configuration with a mix of the devices that support the protocol version 2.0 and devices that support the protocol version 1.0, if the device supporting the protocol version 1.0 delays to join the network because the power-on order or startup time of the device at the system start-up varies, the master station operates with the protocol version 2.0 and the device supporting the protocol version 1.0 may not perform a data link. (Event code 00C80 is registered on the master station.)

Point

- The operating protocol can be checked with 'Protocol operating status' (Un\G1294016).
- When a device station with the firmware version of "02" or later that supports the protocol version 1.0 does not perform a data link, if the system needs to operate with the protocol version 1.0 fixed, set the operating protocol by using buffer memory. (☞ Page 612 Operating protocol setting) Note that, when 'Protocol setting' (Un\G1294018) is set to '1: Protocol version 1.0 fixed', the values of the communication cycle interval and the cyclic transmission time that are stored in 'Communication cycle interval (calculation value)' (SW0072) and 'Cyclic transmission time (calculation value)' (SW0073) are the values for the operation with the protocol version 1.0. For this reason, if a device station that supports the protocol version 2.0 also needs to perform a data link, refer to 'Communication cycle intervals (calculation value)' (Un\G1277444), 'Cyclic transmission time (calculation value)' (Un\G1277445), and 'Transient transmission time (calculation value)' (Un\G1277446), and set appropriate values in "Communication Period Interval Setting", "Cyclic Transmission Time" and "Transient Transmission Time" in "Communication Period Setting" under "Basic Settings".

Setting Method

■Operating protocol setting

The protocol for operation when a device supporting the protocol version 2.0 and a device supporting the protocol version 1.0 coexist in the network can be set with 'Protocol information' (Un\G1294016 to Un\G1294031) in the buffer memory. The setting value is enabled after the system is reset or the power is turned off and on, and it is held by the CC-Link IE TSN Plus module. For details on the buffer memory, refer to the following.

☞ Page 518 Protocol information (Un\G1294016 to Un\G1294031)

1. Check the protocol currently held by the CC-Link IE TSN Plus module with 'Protocol setting status' (Un\G1294021).
2. To change the protocol, store the set value in 'Protocol setting' (Un\G1294018) and set 'Write request' (Un\G1294017) to 1.
3. Check that 'Write execution status' (Un\G1294019) is 1 and 'Setting result' (Un\G1294020) is 0. If the setting result is not set to 0, check the error code and sett again.
4. Reset the CPU modules or power off and on the system.

Point

- The operating protocol setting can be performed with firmware version "02" or later of the CC-Link IE TSN Plus module.
- The protocol for operation during the initialization sequence is determined and stored in 'Protocol operating status' (Un\G1294016). Alternatively, to change the protocol before resetting the CPU module or powering off and on the system in Step 4, change the write request to 0 and then change the protocol setting value. After changing the value, change 'Write request' (Un\G1294017) to 1 again.
- Set the operating protocol before operating the system, when cables are not connected. If the setting is changed during system operation, problems such as failure to update a link special relay (SB) or link special register (SW) may occur temporarily.

Precautions

- The operating protocol can be checked with 'Protocol operating status' (Un\G1294016).
- When the device station used is set to "CC-Link IE TSN Class A" and "Communication Period Setting" is set to "Low-Speed", depending on the maximum response time during the time-managed polling method, the communication cycle interval, and the setting value of low-speed, send/receive of the cyclic data cannot be guaranteed within the period of the device station set to "Low-Speed" in "Communication Period Setting" and "Low-Speed". In this case, a communication period setting error (error code: 31ABH) occurs and the CC-Link IE TSN Plus module stops.
- If there is a device station for which "CC-Link IE TSN Class Setting" is set to "CC-Link IE TSN Class A" and "Communication Period Setting" is set to "Low-Speed", parameter values for guaranteeing send/receive of cyclic data within the "Low-Speed" period to/from the device station with "Communication Period Setting" set to "Low-Speed" are stored in 'Multiple cycle setting (low speed)' (Un\G1277442) and 'Communication cycle intervals (calculation value)' (Un\G1277443). Set "Low-Speed" under "Multiple Period Setting" and "Communication Period Interval Setting" to values equal to or greater than the values stored in 'Multiple cycle setting (low speed)' (Un\G1277442) and 'Communication cycle intervals (calculation value)' (Un\G1277443) respectively. However, if modules selected in "Network Configuration Settings" are all general CC-Link IE TSN modules, the parameter values are not stored in the buffer memory areas.
- If "CC-Link IE TSN Class Setting" of the general CC-Link IE TSN module added to "Network Configuration Settings" is set to "CC-Link IE TSN Class A" and "Low-Speed" in "Multiple Period Setting" and "Communication Period Interval Setting" are set to values of 'Multiple cycle setting (low speed)' (Un\G1277442) and 'Communication cycle intervals (calculation value)' (Un\G1277443), the cyclic data may not be able to be sent/received. In this case, add the actual device to be used to "Network Configuration Settings" or refer to the manual for the device used to check the maximum response time for the time-managed polling method, calculate and set the communication cycle interval setting.

Point

For details on troubleshooting by symptom, refer to the following.

☞ Page 413 TROUBLESHOOTING BY SYMPTOM

Operation when devices with protocol version 1.0/2.0 are combined

The following table lists the restrictions when combining the protocol version 1.0/2.0 in connected devices.

Protocol version 1.0/2.0		Restrictions
CC-Link IE TSN Class A device	CC-Link IE TSN Class B device	
With protocol version 1.0	With protocol version 1.0	• Up to eight CC-Link IE TSN Class B devices can be connected to each port of the master station. • A connection cannot be established if the total cyclic data size of all device stations on the CC-Link IE TSN Class A device side exceeds 2K bytes at the boundary between CC-Link IE TSN Class B and CC-Link IE TSN Class A.
	Protocol version 2.0 only	
Protocol version 2.0 only	With protocol version 1.0	A connection cannot be established if the total cyclic data size of all device stations on the CC-Link IE TSN Class A device side exceeds 2K bytes at the boundary between CC-Link IE TSN Class B and CC-Link IE TSN Class A.
	Protocol version 2.0 only	None

Operation when combined with versions of other products

The following tables show the parameters used for operation of the CC-Link IE TSN Plus module when compatible/non-compatible products are combined.

■"CC-Link IE TSN Class Setting" of each device station in the "CC-Link IE TSN Configuration" window of the "Network Configuration Settings"

Engineering tool	Operation
1.080J or earlier	The module operates with protocol version 1.0.
1.085P or later	The module operates with protocol version 1.0/2.0.

■Multiplier setting for "Low-Speed" in "Multiple Period Setting" under "Basic Settings"

Engineering tool	Operation
1.080J or earlier	Only "×16" can be set.
1.085P or later	"×16", "×32", "×64", "×128" can be set.

■"TSN HUB Setting " in "Connection Device Information" under "Basic Settings"

Engineering tool	Operation
1.080J or earlier	The setting is not available.
1.085P or later	The module operates with protocol version 1.0/2.0.

Precautions

If parameters are written with an engineering tool whose version is 1.085P or later for a project created with an engineering tool of version 1.080J or earlier without opening "Network Configuration Settings" once, the module operates with the protocol version 1.0.

Appendix 13 Added and Enhanced Functions

The following table lists the added and enhanced functions in the CC-Link IE TSN Plus module.

Added and enhanced functions	CC-Link IE TSN Plus module firmware version	EtherNet/IP Configuration tool version	GX Works3 version
Improved function for detection of connected/disconnected devices	"02" or later	—	1.085P or later
Connection with a CC-Link IE TSN Class A device that supports the CANopen profile with the protocol version 2.0	"02" or later	—	1.085P or later
Enabled display of a list of PPS (communication processing performance) for each connection in the connection settings of the EtherNet/IP device	"03" or later	Version 1.02C	1.090U or later
Added EtherNet/IP support for intelligent function module monitor	"03" or later	Version 1.02C	1.090U or later
Added support for the function to automatically detect EtherNet/IP devices	"04" or later	Version 1.03D	1.095Z or later
Enabled the selection of Change of State using the transmission trigger during the target operation in the connection settings for the EtherNet/IP device	"04" or later	Version 1.03D*1	—
Added support for Large_Foward_Open with Class3 message communications	"04" or later	Version 1.03D	1.095Z or later
Enabled the selection of Exclusive Owner using the application type during the target operation in the connection settings for the EtherNet/IP device	"05" or later	Version 1.04E	1.095Z or later
Added support for the IP address setting of the device stations	"05" or later	—	1.100E or later

*1 The selection is also enabled with the EtherNet/IP Configuration tool Ver.1.02C or earlier by registering an RJ71GN11-EIP EDS file of revision 2.1 or later.

Appendix 14 Software Licenses and Copyrights

This section describes the licenses and copyrights of the software used in this product.

MD5 Message-Digest Algorithm

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REVISIONS

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

Revision date	*Manual number	Description
January 2022	SH(NA)-082472ENG-A	First edition
June 2022	SH(NA)-082472ENG-B	■Added or modified parts SAFETY PRECAUTIONS, WHEN USING A SWITCHING HUB WITH CC-Link IE TSN, TERMS, GENERIC TERMS AND ABBREVIATIONS, Chapter 2, Section 2.1, 2.2, 4.1, 4.2, 8.1, 9.1, 9.2, 9.3, 9.4, 12.3, 13.6, Chapter 15, Section 17.1, Chapter 18, Section 18.1, 19.1, 19.3, Chapter 20, 21, Appendix 3, 4, 5, 6, 11 to 14, COPYRIGHTS
December 2022	SH(NA)-082472ENG-C	■Added or modified parts Section 3.2, 8.1, 8.2, Chapter 15, Section 17.2, 18.1, 18.2, 19.1, 19.3, Chapter 20, Appendix 6, 7, 11, 13
May 2023	SH(NA)-082472ENG-D	■Added or modified parts Section 8.2, 12.2, Chapter 18, Section 18.2, 19.3, Appendix 13
June 2023	SH(NA)-082472ENG-E	■Added or modified parts Section 2.2, Appendix 11
October 2023	SH(NA)-082472ENG-F	■Added or modified parts SAFETY PRECAUTIONS, Section 3.2, Chapter 5, 7, Section 8.1, 8.2, 9.1, 12.2, 14.1, Chapter 15, Section 18.1, 19.1, 19.3, Appendix 3, 13

Japanese manual number: SH-082471-F

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

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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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(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

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MODEL CODE: 13JX6C

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