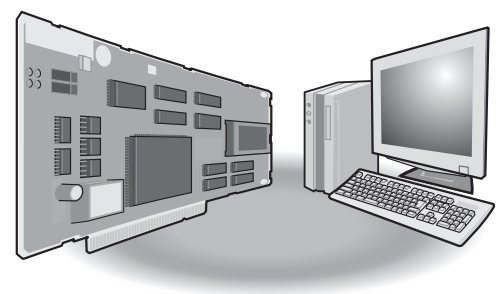# MITSUBISHI ELECTRIC

Network Interface Board

CC-Link IE TSN Interface Board User's Manual

-NZ81GN11-SX
-NZ81GN11-T2
-SW1DNN-CCIETBDM-B

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 user's manual for the module used.

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 a personal computer. 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) The station to which the board is installed may be disconnected from the data link due to a data link error. If this occurs, the data output from the station and written to other stations before the error will be held until the station is reconnected to the network (until its data link is restarted). Provide a mechanism for data link status monitoring and error handling for each station that is connected to the data link system.

- For the operating status of each station after a communication failure, refer to manuals for the network used. For the manuals, please consult your local Mitsubishi representative. Incorrect output or malfunction due to a communication failure may result in an accident.

- When changing data during operation, 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), read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents. Also, determine corrective actions to be taken between the personal computer and CPU module in case of a communication failure.

- Especially, when a remote board is controlled by an external device, immediate action cannot be taken if a problem occurs in the board 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 personal computer 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 board. Doing so may cause malfunction of the board. For the "system area" and "write-protect area", refer to the following.
  ☞ Page 244 Buffer Memory

- 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.

- The optical transmitter and receiver of CC-Link IE TSN use laser diodes (class 1 in accordance with IEC 60825-1). Do not look directly at a laser beam as doing so may harm your eyes.

2

[Design Precautions]

⚠CAUTION

- Do not install the 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.
- Do not power off the personal computer or reset the board while the settings are being written. Doing so will make the data in the setting values undefined and the values need to be set again. Doing so also may cause malfunction or failure of the board.
- Supply power to a board from the secondary side evaluated with SELV (Safety Extra-Low Voltage) and LIM (Limited Energy Circuit).

[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 board. Failure to do so may result in electric shock or cause the board to fail or malfunction.

[Installation Precautions]

⚠CAUTION

- Use a board in an environment mentioned Page 44 General Specifications in this manual, otherwise an electric shock, fire, malfunction, or damage to or deterioration of the product may occur.
- Securely fix the board with board-fixing 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 board, resulting in drop, short circuit, or malfunction.
  For the specified torque range of the board-fixing screws, refer to the manual supplied with the personal computer.
- Beware that the board 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 board. Doing so can cause malfunction or failure of the board.
- Install a board in a personal computer which is compliant with the PCI Express standard (☞ Page 33 Operating Environment), otherwise a failure or malfunction may occur.
- Securely install the board on a PCI Express slot according to the board installation method of the personal computer, otherwise a malfunction, failure, or drop of the board may occur.
- When installing the board, take care not to contact with other boards.
- When installing the board, take care not to get injured by an implemented component or a surrounding member.
- Handle the board in a place where static electricity will not be generated, otherwise a failure or malfunction may occur.
- The board is included in an antistatic envelope. When storing or transporting it, be sure to put it in the antistatic envelope, otherwise a failure or malfunction may occur.
- Do not drop or apply a strong impact to the board as doing so may cause a failure or malfunction.
- Do not touch any connectors while power is on. Doing so will cause electric shock or malfunction.

[Wiring Precautions]

⚠WARNING

- Shut off the external power supply (all phases) used in the system before starting wiring. Failure to do so may result in electric shock or cause the board to fail or malfunction.
- When turning the power ON or starting operation after the board installation and wiring is completed, attach the cover on the board, otherwise an electric shock may occur.

[Wiring Precautions]

⚠CAUTION

- Always ground the personal computer to the protective ground conductor. Failure to do so may cause a malfunction.
- Securely connect the connector to the board. Poor contact may cause malfunction.
- Do not install the 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 communication cable connected to the board in a duct or clamp them. If not, the dangling cable may swing or inadvertently be pulled, resulting in damage to the board or cable or malfunctions due to poor contact.
- Check the interface type and correctly connect a cable. Incorrect wiring (connecting a cable to an incorrect interface) may cause a failure.
- When disconnecting the cable from the board, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. Pulling the cable connected to the board may result in malfunction or damage to the board.
- Prevent foreign matter such as dust or wire chips from entering the personal computer. Such foreign matter may cause a fire, failure, or malfunction.
- Optical fiber cables used in a system must meet the specifications described in this manual (☞ Page 51 Optical fiber cable), otherwise normal data transmission is not guaranteed.
- Ethernet cables used in a system must meet the specifications described in this manual (☞ Page 52 Ethernet cable), otherwise normal data transmission is not guaranteed.
- Special skills and tools are required to connect a communication cable and a dedicated connector plug. When purchasing them, please contact your local Mitsubishi Electric sales office or representative. Incomplete connection may cause a short, fire or malfunction.

[Startup and Maintenance Precautions]

⚠WARNING

● Do not connect or disconnect a communication cable while the power is ON as doing so may cause a malfunction.

● Shut off the external power supply (all phases) used in the system before cleaning the board or retightening the board-fixing screws. Failure to do so may result in electric shock.

[Startup and Maintenance Precautions]

⚠CAUTION

● When changing data during operation, 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), read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.

  Also, determine corrective actions to be taken between the personal computer and external device in case of a communication failure.

● Do not disassemble or modify the board as doing so may cause a failure, malfunction, injury, or 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 board. Failure to do so may cause malfunction.

● Securely fix the board with board-fixing 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 board, resulting in drop, short circuit, or malfunction.

  For the specified torque range of the board-fixing screws, refer to the manual supplied with the personal computer.

● After the first use of the product, do not perform mounting/removing to/from a personal computer more than 50 times (PCI Express standard compliant). Exceeding the limit may cause malfunction.

● 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 board, 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 board to fail or malfunction.

● After unpacking, eliminate static electricity from the board to prevent electrostatic discharge from affecting the board. If an electrostatically charged board comes in contact with a grounded metal object, a sudden electrostatic discharge of the board may cause failure.

● The board is included in an antistatic envelope. When storing or transporting it, be sure to put it in the antistatic envelope, otherwise a failure or malfunction may occur.

● The microprocessor built in the board will reach a high temperature during operation. Do not touch it directly when replacing the board. Doing so may result in a failure, malfunction or injury.

● Prevent the board from dirt. If there is dirt on the board, use an air duster etc. to blow off the dirt not to touch the board itself as much as possible.

[Operating Precautions]

⚠ CAUTION

- When changing data and operating status, read relevant manuals carefully and ensure the safety before operation. Incorrect change may cause system malfunction, damage to the machines, or accidents.
- Do not power off the personal computer or reset the board while the settings are being written. Doing so will make the data in the setting values undefined and the values need to be set again. Doing so also may cause malfunction or failure of the board.

[Disposal Precautions]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

[Transportation Precautions]

⚠ CAUTION

- 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.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric network interface board.

This manual describes the procedures, system configuration, and wiring to use the relevant product shown below.

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the Mitsubishi Electric Network interface board 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

NZ81GN11-SX
NZ81GN11-T2

CONTENTS

CHAPTER 8   CC IE TSN utility   111

CHAPTER 9   PROGRAMMING   167

14

RELEVANT MANUALS

Manual name [manual number]	Description	Available form
CC-Link IE TSN Interface Board User's Manual [SH-082614ENG] (this manual)	Procedure before operation, system configuration, specifications, wiring, functions, and troubleshooting of a CC-Link IE TSN interface board	e-Manual PDF
MELSEC Data Link Library Reference Manual [SH-081035ENG]	Programming, accessible devices and their ranges, functions, sample programs, and error codes for the MELSEC data link library	Print book e-Manual PDF

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.

• Hardware specifications of each part can be found from the product figures.

• Pages that users often browse can be bookmarked.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Buffer memory	Memory in an intelligent function module and network interface board to store data such as setting values and monitor values
CC-Link IE TSN Class	A group of devices and switching hubs compatible with CC-Link IE TSN, ranked 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.
Channel No.	A number that is assigned to identify a board
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).
Cyclic transmission	A function by which data are periodically exchanged among stations on the same network using link devices
Data link	Communications that performed by cyclic transmission and transient transmission
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	A station other than a master station: a local station, a remote station
General-purpose hub	A CC-Link IE TSN Class A switching hub authorized by CC-Link Partner Association
Link device	A device (RX, RY, RWr, RWw, LB, or LW) in a module and a board on CC-Link IE TSN
Link scan (link scan time)	Time required for all the stations on the network to transmit data. The link scan time depends on data volume and the number of transient transmission requests.
Local station	A station that performs cyclic transmission and transient transmission with the master station and other local stations
Logical LED	A virtual LED in a board, not on it
Logical station No.	A virtual station number to be set or specified to access a multiple CPU system or redundant CPU system
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.
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
Redundant system	A system consisting of two systems that have same configuration (CPU module, power supply module, network module, and other modules). Even after an error occurs in one of the two system, the other system takes over the control of the entire system.
Relay station	A station that relays data link to other station with mounting more than one network modules on one programmable controller
Remote 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.
Reserved station	A station reserved for future use. This station is not actually connected, but counted as a connected station.
Transient transmission	A function of communication with another station, which is used when requested by a MELSEC data link library or a utility
TSN HUB	A CC-Link IE TSN Class B switching hub authorized by CC-Link Partner Association
Unicast mode	A communication mode used to send cyclic data to one station

GENERIC TERMS AND ABBREVIATIONS

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

Generic term/abbreviation	Description
Driver WDT	A watchdog timer that monitors the communication status between a network board and a personal computer, or operating status of a personal computer
Board WDT	A watchdog timer that monitors the operating status of a network interface board

1 PART NAMES

This chapter explains the part names of a board.

1.1 NZ81GN11-SX

This section explains the part names of an NZ81GN11-SX.

- Standard size

- Low profile size

No.	Name	Description
(1)	Operating status LED	Indicates the operating status of a board. (☞ Page 18 Operating status LED)
(2)	P1	A port for connecting to CC-Link IE TSN. Connect an optical fiber cable to this port. • Wiring products: ☞ Page 51 Optical fiber cable • Wiring methods: ☞ Page 54 Optical fiber cable
(3)	P2	Same as P1.
(4)	Mounting bracket	A bracket for fixing a board to a personal computer. Two types of standard and low profile are exchangeable.
(5)	Mounting bracket fixing screw	A screw for fixing a mounting bracket to a board. Use this to replace a bracket. For the tightening torque of the mounting bracket fixing screws, refer to the following: ☞ Page 48 Procedure for replacing mounting brackets
(6)	Screw hole for fixing a board	A screw hole for fixing a board to a personal computer. For the tightening torque of the board-fixing screws, refer to the manual supplied with the personal computer.
(7)	Rating plate	The board type and production information are listed.

Operating status LED

This LED indicates the operating status of a board.

No.	Name	Description
(1) (2)	RUN LED ERR LED	Indicates the operating status of the hardware and error contents. The operating status and error contents depending on the combination of lighting statuses are as follows: ■Lightning status of RUN LED — ERR LED • ON — OFF: Normal operation • ON — ON: Error detected or occurring in all stations • ON — Flashing (500 ms interval): Data link faulty station detected[*1] • ON — Flashing (200 ms interval): Error occurring • Flashing — ON: PCI Express bus error • Flashing — OFF: Driver WDT error • OFF — ON/Flashing: Error occurring • OFF — OFF: Hardware failure, driver not yet started, or firmware being updated If a failure occurs, refer to the troubleshooting to take corrective action. (☞ Page 191 ERR LED is ON or flashing)
(3) (4)	P1 SD/RD LED P2 SD/RD LED	Indicates the data sending/receiving status. • ON: Being sent/received • OFF: Not being sent/received

*1 In the following cases, the ERR LED of a local station does not flash even when a data link faulty station is detected. (It remains OFF.)
Unicast mode
A data link error occurs in a CC-Link IE TSN Class A remote station during data linking.

When checking a channel number

While the "Channel No. Setting" screen of the CC IE TSN utility is open, the LED lights according to the current channel number are as shown below.
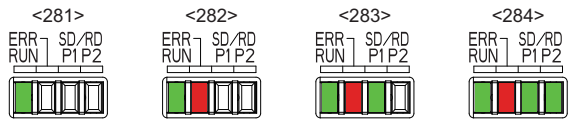
1.2   NZ81GN11-T2

This section explains the part names of an NZ81GN11-T2.

- Standard size

- Low profile size

No.	Name	Description
(1)	Operating status LED	Indicates the operating status of a board. (☞ Page 18 Operating status LED)
(2)	P1	A port for connecting to CC-Link IE TSN. Connect an Ethernet cable to this port. • Wiring products: ☞ Page 52 Ethernet cable • Wiring methods: ☞ Page 55 Ethernet cable
	LINK LED	Indicates the link status. • ON: Linking-up • OFF: Linking-down (☞ Page 193 LINK LED is OFF) If a failure occurs, refer to the troubleshooting to take corrective action.
	L ER LED	Indicates the port status. ■Online mode • ON: Error data received or loopback in progress (☞ Page 193 L ERR LED or L ER LED is ON or flashing) • OFF: Normal data received and loopback not performed If a failure occurs, refer to the troubleshooting to take corrective action. ■Offline mode Always OFF
(3)	P2	Same as P1.
	LINK LED	
	L ER LED	
(4)	Mounting bracket	A bracket for fixing a board to a personal computer. Two types of standard and low profile are exchangeable.
(5)	Mounting bracket fixing screw	A screw for fixing a mounting bracket to a board. Use this to replace a bracket. For the tightening torque of the mounting bracket fixing screws, refer to the following: ☞ Page 48 Procedure for replacing mounting brackets

No.	Name	Description
(6)	Screw hole for fixing a board	A screw hole for fixing a board to a personal computer. For the tightening torque of the board-fixing screws, refer to the manual supplied with the personal computer.
(7)	Rating plate	The board type and production information are listed.

2 PROCEDURE BEFORE OPERATION

This chapter explains the procedure before operation.

1. Installing the software package

Install the software package in a personal computer.

☞ Page 37 SOFTWARE PACKAGE INSTALLATION AND UNINSTALLATION

2. Installing a board

Install a board on a slot of the personal computer.

☞ Page 48 Board Installation

3. Setting a channel number

Set a channel number and check it by using the utility.

☞ Page 49 Channel Number Setting

4. Checking the board

Test the hardware of the installed board for errors.

☞ Page 50 Tests before Wiring (Board Communication Tests)

5. Constructing a network

Configure a system and set parameters necessary for start-up.

 • Wiring (☞ Page 51 Wiring)
 • Parameter setting (☞ Page 112 Setting parameters)

6. Diagnosing the network

Check whether cables are connected properly and a communication is normally established based on the set parameters in network diagnostic.

For details, refer to the following:

☞ Page 131 Diagnosing a network

7. Programming

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

☞ Page 167 PROGRAMMING

> **Point**
>
> When multiple device stations are powered ON simultaneously, the startup time of the device stations may vary. In such a case, the networks are connected in turn, resulting 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.

MEMO

2 PROCEDURE BEFORE OPERATION

3 SYSTEM CONFIGURATIONS

This chapter shows the system configurations.

By using this product, a personal computer can be connected to CC-Link IE TSN as the master station and local station.

3.1 Network Interface Board Configuration

By installing a network interface board in a personal computer, a network system can be connected with the computer.

In the computer, install the dedicated software package for system design, debugging, and maintenance.
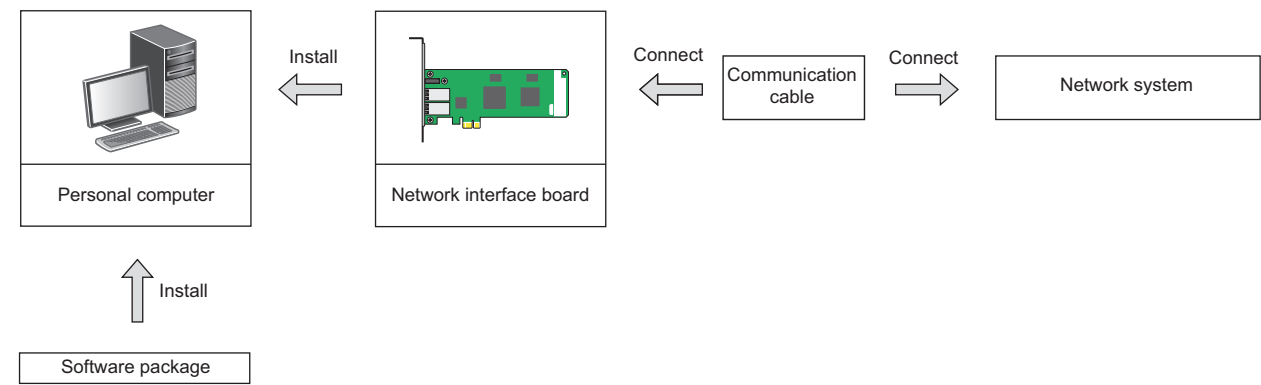
Software package	Network interface board	Communication cable	Network system
SW1DNN-CCIETBDM-B	NZ81GN11-SX	Optical cable	CC-Link IE TSN
	NZ81GN11-T2	Ethernet cable	

3.2 CC-Link IE TSN Configuration

This section shows the system configuration for CC-Link IE TSN using this product.

For the system configuration for CC-Link IE TSN as a MELSEC iQ-R series programmable controller system, refer to the following:

📖MELSEC iQ-R CC-Link IE TSN User's Manual (Startup)

> **Point**
>
> For the specifications and considerations for system configurations for CC-Link IE TSN in general, refer to the following manual published by the CC-Link Partner Association.
> 📖CC-Link IE TSN Installation Manual (BAP-C3007ENG-001)
> This manual is available on the CC-Link Partner Association website (www.cc-link.org).

Station types

This product supports the following station types:

- Master station
- Local station

Topologies

Communication with other CC-Link IE TSN supported devices is performed by connecting a cable to the connector of a port (P1 or P2) on a board.

- In a single network, a total of 121 stations including 1 master station and 120 device stations can be connected.
- Any station can be set as a master station. (One master station for a single network)

This product supports the following topologies:

- NZ81GN11-SX: Ring topology
- NZ81GN11-T2: All of the following topologies

Topology	Diagram	Description
Line		Multiple devices are connected in a row. Connect a port on each station in a line.
Star		Multiple devices are connected radially from a switching hub. Connect a port on each station to a switching hub.
Coexistence of line and star		Connect a port on each station to a port on another station or a switching hub.
Ring		Multiple devices are connected in a ring. Connect all stations by connecting each port on a station to two other stations so that data flows through all the stations.

> **Point**
>
> Both P1 and P2 can be used.
> - When only one of P1 and P2 connectors is used in a star topology, either P1 or P2 is applicable.
> - When both connectors are used in a line topology, P1-P1, P2-P2, and P1-P2 connections are applicable.

Connectable device list

The following table lists the connectable devices when using a CC-Link IE TSN board as the master station.

Product name, category		Model name
Network interface board	CC-Link IE TSN board	NZ81GN11-SX NZ81GN11-T2
Master/local module	MELSEC iQ-R series	RJ71GN11-SX RJ71GN11-T2 RJ71GN11-EIP
	MELSEC iQ-F series	FX5-CCLGN-MS
HMI	GOT2000 series	GT27**-X GT27**-S GT27**-V GT2705-V GT25**-S GT25**-V
Inverter	FREQROL-E series	FR-E800-E
	FREQROL-A series	FR-A800 FR-A800-GN
	FREQROL-F series	FR-F800
Remote I/O module	DC input	NZ2GNSS2-8D NZ2GN12A4-16D NZ2GN12A4-16DE NZ2GN2B1-16D NZ2GN2S1-16D NZ2GN2B1-32D NZ2GN2S1-32D NZ2GNCE3-32D NZ2GNCF1-32D
	Transistor output	NZ2GNSS2-8TE NZ2GN12A2-16T NZ2GN12A2-16TE NZ2GN2B1-16T NZ2GN2B1-16TE NZ2GN2S1-16T NZ2GN2S1-16TE NZ2GN2B1-32T NZ2GN2B1-32TE NZ2GN2S1-32T NZ2GN2S1-32TE NZ2GNCF1-32T
	I/O combined	NZ2GN12A42-16DT NZ2GN12A42-16DTE NZ2GNSS2-16DTE NZ2GN2B1-32DT NZ2GN2B1-32DTE NZ2GN2S1-32DT NZ2GN2S1-32DTE NZ2GNCE3-32DT
Analog-digital converter module	Analog input	NZ2GN2B-60AD4 NZ2GN2S-60AD4
Digital-analog converter module	Analog output	NZ2GN2B-60DA4 NZ2GN2S-60DA4

3

Number of connectable networks

Multiple networks can be connected by using a MELSEC series programmable controller in which multiple network modules are mounted as a relay station.

• Up to 239 networks can be connected simultaneously.
• By using the routing function, communication can be established with a station in up to the eighth network system from the own station (number of relay stations: 7). (☞ Page 93 Routing function)
• By using a relay station in which multiple modules with different networks are mounted, networks other than CC-Link IE TSN can also be connected.

> **Point**
>
> For accessible network types and target devices, refer to the following:
> ☐ MELSEC Data Link Library Reference Manual

Precautions

• Use network modules as boards cannot be used as relay stations.
• Network modules mounted on an RQ extension base unit cannot be used as relay stations.

Communication speed

The communication speed of an NZ81GN11-SX is 1 Gbps.

For the communication speed of an NZ81GN11-T2, either 1 Gbps or 100 Mbps can be selected in the parameter. (☞ Page 153 Communication speed setting)

When the communication speed of the master station is set to 1 Gbps, connection can be established with both 100 Mbps devices and 1 Gbps devices included.

However, when using a ring topology, match the communication speed among connected devices.

■When connecting devices with different communication speeds in the same network

• Match the communication speed between the master station and a local station.
• For a remote station with communication speed of 100 Mbps, set the communication period setting to low-speed.
• When connecting a remote station with communication speed of 100 Mbps to a device with communication speed of 1 Gbps, connect them via a switching hub.
• Connection cannot be established if the cyclic data size exceeds 2K bytes in total for all device stations on the 100 Mbps device side including the device at the boundary between devices with communication speeds of 1 Gbps and 100 Mbps. (☞ Page 32 Calculation of the total cyclic data size)

■When connecting a 100 Mbps device by setting the communication speeds of the master station and a local station to 100 Mbps

• Enable the auto-negotiation of the connected device.
• Set the communication period setting of a CC-Link IE TSN Class B device station with communication speed of 100 Mbps to basic period or normal-speed (×4).

CC-Link IE TSN Class

This board supports CC-Link IE TSN Class B.

■When connecting a CC-Link IE TSN Class A device

For an NZ81GN11-T2, connection can be established with CC-Link IE TSN Class A devices included.

When including CC-Link IE TSN Class A devices, set "CC-Link IE TSN Class Setting" in "Basic Settings" to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only" in the parameter. (☞ Page 152 Connection device information)
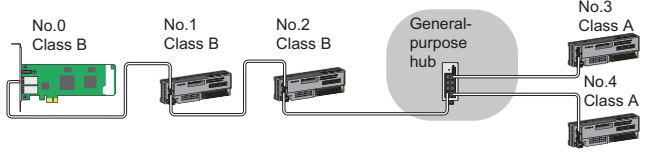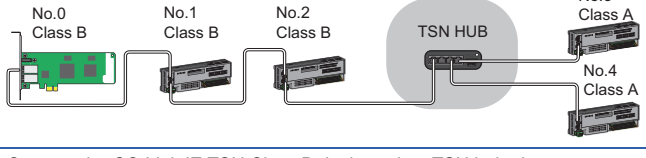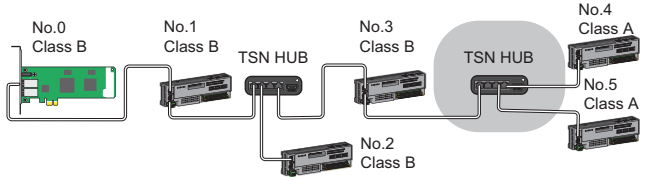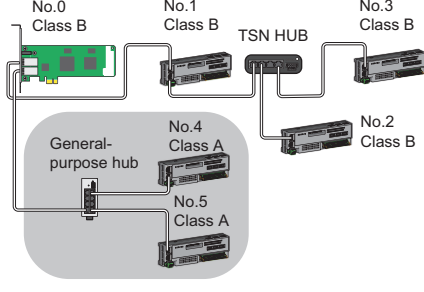
CC-Link IE TSN Class A local stations cannot be connected.

When including a device with protocol version 1.0, limit the number of the connected stations so that the cyclic data size does not exceed 2K bytes in total for 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.

■Using a switching hub properly

For a configuration with CC-Link IE TSN Class B devices only, use a TSN hub as a switching hub to connect a device station.

Considerations for switching hubs when connecting CC-Link IE TSN Class A devices are as follows:

- When using a TSN hub, be sure to check the specifications of the TSN hub on the CC-Link Partner Association website (www.cc-link.org).
- When connecting a TSN hub, set "TSN HUB Setting" in "Basic Settings" to "Use TSN HUB." (☞ Page 152 Connection device information)
- Connect a CC-Link IE TSN Class A device as follows in a configuration with coexistence of line and star.

Configuration	Connection method	TSN HUB Setting
Only CC-Link IE TSN Class A devices are connected in a star topology.	Connect them via a general-purpose hub.	Not to Use TSN HUB
CC-Link IE TSN Class A devices are connected to CC-Link IE TSN Class B devices connected in a line topology.	Connect the CC-Link IE TSN Class B devices with the CC-Link IE TSN Class A devices directly. Or, connect them via a general-purpose hub. 	Not to Use TSN HUB
	When using a TSN hub, set "TSN HUB Setting" to "Use TSN HUB." 	Use TSN HUB
A CC-Link IE TSN Class A device is connected by branching from between CC-Link IE TSN Class B devices.	Connect the CC-Link IE TSN Class B devices via a TSN hub, then connect the CC-Link IE TSN Class A device via the TSN hub.	Use TSN HUB
CC-Link IE TSN Class A devices are connected to CC-Link IE TSN Class B devices connected in a star topology.	Connect the CC-Link IE TSN Class B devices in a star topology via a TSN hub. Connect the CC-Link IE TSN Class B devices with the CC-Link IE TSN Class A devices via another TSN hub. 	Use TSN HUB
CC-Link IE TSN Class A devices are connected to the port other than the one to which the CC-Link IE TSN Class B devices are connected in a star topology.	Connect the CC-Link IE TSN Class A devices directly to the master station. Or, connect them via a general-purpose hub. 	Use TSN HUB

Protocol version

This board supports protocol versions 1.0 and 2.0.

The protocol version can be set in 'Protocol setting' (address 1294018 (13BEC2H)) and can be checked in 'Protocol operating status' (address 1294016 (13BEC0H)) in the buffer memory. (⯈ Page 259 Protocol information)

When there are only CC-Link IE TSN Class B devices as network configuration devices or when there is only one type of protocol versions, setting the protocol version is not required. The board operates with the initial value setting (0: Automatic setting) according to the system configuration.

■Restrictions when including a device with protocol version 1.0

When including a device with protocol version 1.0, limit the number of the connected stations so that the cyclic data size does not exceed 2K bytes in total for 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.

Up to eight CC-Link IE TSN Class B devices and TSN hubs can be connected in total from P1 and P2 on the master station to each end when including a CC-Link IE TSN Class A device with protocol version 1.0.

■Considerations for configurations including both types of protocol versions

The following shows the considerations for configurations including both devices supporting protocol version 2.0 and ones supporting protocol version 1.0.

- CC-Link IE TSN Class A devices with protocol versions 1.0 and 2.0 cannot be included as device stations. Only one of them can be connected.
- If a device station with protocol version 1.0 is detected while the master station is operating with protocol version 2.0, the station does not perform a data link. An event code 00C80 is registered in the master station and information on the unsupported station is stored in 'Station protocol version 2.0 support status' (SW01A0 to SW01A7).
- If the entry of a device supporting protocol version 1.0 into the network is delayed due to differences in the order of powering ON of devices or in the startup time when starting the system, the master station operates with protocol version 2.0 and the device supporting protocol version 1.0 may not perform a data link. (An event code 00C80 is registered in the master station.)

If a device station with protocol version 1.0 does not perform a data link and an event code 00C80 is registered, set 'Protocol setting' (address 1294018 (13BEC2H)) to '1: Protocol version 1.0 fixed' in the device memory of the master station. Then, configuration devices can be used with protocol version 1.0.

In this case, values for operation with protocol version 1.0 are stored in 'Communication cycle interval (calculation value)' (SW0072) and 'Cyclic transmission time (calculation value)' (SW0073).

Therefore, if there is any device station supporting protocol version 2.0 in the same network, refer to 'Communication period setting value (protocol version 2.0)' (address 1277444 to 1277446 (137E04H to 137E06H)) in the buffer memory instead of the above values displayed in the CC-Link IE TSN configuration setting screen to configure "Basic Settings" in the parameter. (⯈ Page 258 Communication period setting value (protocol version 2.0))

3.3 Configuration When Connecting an Ethernet Device

This product does not support communication with Ethernet devices, but can relay communication data.

This section shows the configuration when connecting devices that support IP communication (such as a personal computer, vision sensor, barcode reader, etc.) to CC-Link IE TSN.

The following topologies are supported:

Topology	Description
Line	Connect an Ethernet device to the end of a line topology.
Star	Connect an Ethernet device to a switching hub.
Coexistence of line and star	Connect an Ethernet device to the end of a line topology. For a star topology, connect an Ethernet device to a switching hub.
Ring	A ring topology is not available.

Precautions

- 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.
- When connecting an Ethernet device with communication speed of 100 Mbps to a device with communication speed of 1 Gbps, connect them via a switching hub.

3.4 Configuration When Connecting CC-Link IE TSN Communication Software

This section shows the configuration when connecting CC-Link IE TSN Communication Software.

CC-Link IE TSN Communication Software is equivalent to a CC-Link IE TSN Class A local station.

It can be connected to a CC-Link IE TSN Class B device supporting CC-Link IE TSN or to a TSN hub.

The following topologies are supported:

Topology	Description
Line	Connect CC-Link IE TSN Communication Software to the end of a line topology.
Star	Connect CC-Link IE TSN Communication Software to a TSN hub.
Coexistence of line and star	Connect CC-Link IE TSN Communication Software to the end of a line topology. For a star topology, connect CC-Link IE TSN Communication Software to a switching hub.
Ring	A ring topology is not available.

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

3.5 Available Software

This section shows the software packages supported by this board.

Dedicated software package

The driver and utility must be installed on a personal computer with this board installed by installing a dedicated software package.

Model name	Version
SW1DNN-CCIETBDM-B	1.000A or later

> **Point**
>
> For the method for obtaining the software package and installation procedure, refer to the following:
> ☞ Page 38 Installation

Other software packages

The following table shows the related software packages and their versions supported by this product.

If using a software package with an unsupported version for this product, the functions may not run properly.

Product name	Version	Remarks
GX Works3	1.100E or later	—
CC-Link IE TSN Communication Software	—	No restrictions on versions.
MX Component Version 5	5.006G or later	—

Precautions

Do not use this product and CC-Link IE TSN Communication Software together on the same personal computer.

For the system configuration when using CC-Link IE TSN Communication Software, refer to the following:

☞ Page 29 Configuration When Connecting CC-Link IE TSN Communication Software

3.6 Considerations for System Configuration

This section explains the considerations for configuring a system.

Considerations for combinations with other products

Combinations available in the same personal computer

This product can be installed in the same personal computer as a board that shares the MELSEC data link library.

☞ Page 39 Considerations for using other boards on a personal computer

For devices supporting the MELSEC data link library, refer to the following:

📖 MELSEC Data Link Library Reference Manual

Combination with existing software

No restriction applies when installing and using SW1DNN-CCIETBDM-B in the same personal computer in which other Mitsubishi Electric Network interface boards and/or MELSOFT products are installed.

For the supported versions of related software packages, refer to the following:

☞ Page 30 Other software packages

Considerations for connected devices and network configurations

Devices connected to the same network

Do not connect devices as follows. A failure may occur and communication may not be established normally.
- A module on CC-Link IE TSN and a device with 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 10 Mbps device or a 100 Mbps/1 Gbps device not supporting CC-Link IE TSN is connected to a switching hub being used in CC-Link IE TSN.

■When using a ring topology
- Devices supporting a ring topology must be used for all stations.

Check the applicable devices on the CC-Link Partner Association website (www.cc-link.org).
- Match the communication speed among connected devices.
- Switching hubs cannot be used for a ring topology.
- If a switching hub is included in the configuration, the incorrect ring topology may not be detected in the CC-Link IE TSN diagnostics and event history.

Connection order of devices in the same network

■When connecting a device station with an item unset or unset one
In a line topology, connect a device station to the end when it applies to the following. If not, a data link may not be performed in device stations after the device station.
- Device station with no IP address setting
- Device station not in the network configuration of the master station

■When connecting a device with a different communication speed
A device station with communication speed of 1 Gbps cannot be connected further on the end side than one with 100 Mbps.

■When connecting a CC-Link IE TSN Class A device
Connect a CC-Link IE TSN Class B device on the master station side.
A CC-Link IE TSN Class B device cannot be connected further on the end side than a CC-Link IE TSN Class A device.

■For a combination of protocol versions 1.0 and 2.0
Connection cannot be established if the cyclic data size exceeds 2K bytes in total for all device stations on the CC-Link IE TSN Class A side at the boundary between CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices.
()

■Multicast
The following shows the considerations for configuration devices when setting "Communication Mode" under "Application Settings" to "Multicast."
- For a device station on the master station side, use a device supporting the multicast filter. (📖 Manual for the device used)
- When the following connections are configured on the end side via a switching hub, communication may not be established depending on a device. In that case, 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) is not transferred to the following ports.

Connection configuration for which communication is not established	Port prohibiting the multicast frame transfer
1 Gbps and 100 Mbps device stations are included.	Connection port of the 100 Mbps device station
A local station and an Ethernet device are included.	Connection port of the Ethernet device
A remote station and an Ethernet device are included.	
A local station and a CC-Link IE TSN Class A remote station are included.	Connection port of the CC-Link IE TSN Class A remote station

Calculation of the total cyclic data size

The following shows the formula for calculating the total size of cyclic data.

Variables enclosed in double quotes ("") are the setting values in "Network Configuration Settings" under "Basic Settings."

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

3.7 Operating Environment

This section shows the operating environment of boards.

Item	Description
Personal computer	A personal computer on which Microsoft® Windows® operates
CPU	System requirements of the operating system must be met.
Memory requirements	
PCI Express® bus specifications	Compliant with PCI Express standard (3.3 VDC, Link width 1 lane, Reference clock 100 MHz)
Free hard disk space	3.5 GB or more
Display	Resolution: 1024 × 768 dots or higher
Operating system (English version)[1]	• Windows 11 (Home, Pro, Enterprise, Education)[2] • Windows Server® 2022 (Standard) • Windows Server 2019 (Standard) • Windows Server 2016 (Standard) • Windows 10 (Home, Pro, Enterprise, Education, IoT Enterprise 2021 LTSC, IoT Enterprise 2019 LTSC, IoT Enterprise 2016 LTSB)[2]
Programming language[1]	Visual Basic®, Visual C++®, and Visual C#® in the following Microsoft Visual Studio®: Visual Studio 2022, Visual Studio 2019, Visual Studio 2017
.NET Framework	.NET Framework 4.8 or later
Runtime library[3]	Microsoft Visual C++ 2015-2022 Redistributable (x64) Microsoft Visual C++ 2015-2022 Redistributable (x86)

[1] For a combination of an operating system and a programming language, check the system requirements of each programming language on Microsoft Docs.
[2] 64-bit version only
[3] Installed when installing a software package.
Do not uninstall these runtime libraries.

Considerations for a personal computer

■PCI Express standard

When using a board on a personal computer which is not compliant with the PCI Express standard, troubles caused by failures such as a contact failure or operation error may occur. In addition, a board may not operate on a PCI Express slot for graphics.

For details on the number of boards that can be installed, installation slots, and occupied slots, refer to the following:

☞ Page 47 Hardware Specifications

Considerations for an operating system

■Supported version

OS	Supported version of SW1DNN-CCIETBDM-B
Windows Server 2022, Windows Server 2019, Windows Server 2016	1.000A or later
Windows 11, Windows 10 (64-bit version)	1.000A or later

Microsoft Validation OS cannot be used.

■User authority

Log on as a user with the administrator authority.

• Installation and uninstallation are available only for a user with the administrator authority.
• Utilities can be used only by a user with the administrator authority.

For details on User Account Control (UAC), refer to the following:

☞ Page 290 Windows User Account Control

■Exiting the operating system

Make sure to shut down the personal computer.

■.NET Framework

Select the checkbox of the following for "Turn Windows features on or off" in the control panel.

• .NET Framework 3.5 (including .NET 2.0 or 3.0)

■Unavailable functions

When using any of the following functions, this product may not operate properly.

- Application start-up in Windows compatibility mode
- Fast user switching
- Remote desktop
- Power save mode (hibernate, sleep)
- Fast startup
- Touch function
- Virtual environment such as Client Hyper-V
- Server Core installation
- Tablet mode
- Virtual desktop
- Unified Write Filter
- Text cursor indicator

In the following cases, the screen of this product may not work properly.

- The size of the text and other items in the screen is other than 100% (96 DPI, 9 pt etc.).[*1]
- The resolution of the screen is changed in operation.
- The multi-display is set.

*1   When displaying the screen with high DPI scaling by using a function of the operating system, the display will be blurred.
      For Windows 10 (version 1703 or later), the display can be displayed with high DPI scaling. (☞ Page 34 Considerations when using
      high DPI scaling)

> **Point**
>
> - To end the operating system, shut down the computer always.
> - For the behavior in the power save mode, refer to the following:
>   (☞ Page 291 Behavior When Entering Power Save Mode or Enabling Fast Startup)

■Considerations when using high DPI scaling

For Windows 10 (version 1703 or later), the screen can be displayed with high DPI scaling.

Set the properties of the .exe file for the CC IE TSN utility by the following procedure:

1. Select and right-click 'CCIETBDMUTL.exe,' then select [Properties] from the shortcut menu.

'CCIETBDMUTL.exe' is stored in "CCIETBDM\UTL" in the folder where the software package is installed.

Example) C:\Program Files (x86)\MELSOFT\BD\CCIETBDM\UTL

2. Click the [Change high DPI settings] button in the [Compatibility] tab.

3. Select the checkbox of "Override high DPI scaling behavior. Scaling performed by:," then select "System" from the pull-
down list.

Set the properties of the .exe file for the device monitor utility by the following procedure:

1. Select and right-click 'dvmonutl.exe,' then select [Properties] from the shortcut menu.

'dvmonutl.exe' is stored in "Common\UTL" in the folder where the software package is installed.

Example) C:\Program Files (x86)\MELSOFT\BD\Common\UTL

If another board that shares the device monitor utility is already installed, browse to its folder.

Example) C:\MELSEC\Common\UTL

2. Select the checkbox of "Run this program in compatibility mode for:" in the [Compatibility] tab, then select "Windows 8."

3. Click the [Change high DPI settings] button in the [Compatibility] tab.

4. Select the checkbox of "Override high DPI scaling behavior. Scaling performed by:," then select "System" from the pull-
down list.

The following lists the setting values for "Change the size of text, apps, and other items" and the recommended display resolution for each setting value in Windows.

Setting value	Display resolution
100%	1024 × 768 dots or higher
125%, 150%	1900 × 1200 dots or higher
175%, 200%	2880 × 1620 dots or higher
225%, 250%	3840 × 2160 dots or higher

Settings other than those listed above are not supported.

For the operating system other than Windows 10 (version 1703 or later), set the size of the text and other items in the screen to 100% (96 DPI, 9 pt etc.).

To use high DPI scaling in Windows 10 earlier than version 1703, update Windows 10.

The Windows version can be checked by the following procedure:

1. Enter "winver" in the search box of Windows, and select it from the menu.

2. Check the version in the displayed screen.

■Upgrading and updating an operating system

The following upgrade and update of an operating system are not supported:

• Upgrade

• Windows 10 major update (version upgrade)

Update an operating system by the procedure in the following:

☞ Page 300 Updating an operating system

> **Point**
>
> When updating an operating system, check if an update is available and update it manually.
>
> Make sure to prevent an operating system from being updated automatically by setting and operating it as follows.
>
> Examples:
>
> • Set the active time.
>
> • Do not connect a personal computer to the Internet or an intranet.

■Considerations for the date and time setting

Set the date and time in Windows by satisfying the following conditions:

Target	Setting condition, range	Description
Daylight saving time setting	An area where the time is adjusted for one hour for daylight savings	If this condition is not satisfied, an error occurs. When using this product in the area where the condition is not satisfied, turn OFF "Set time zone automatically" in the "Date and Time" settings to disable Windows daylight saving time settings.
Time data	1980/1/1 0:00:00 to 2079/12/31 23:59:59	If setting a time out of the range, the time may not be synchronized correctly.
Time zone	-12 hours to +13 hours (UTC -12:00 to UTC +13:00)	If setting a value out of the range, an error occurs.

Considerations for a user program

■Supported versions of SW1DNN-CCIETBDM-B

User program	Supported version
32-bit version user program[*1]	All versions
64-bit version user program[*2]	

*1 Can be created and executed on a 64-bit operating system.

*2 Can be created on a 32-bit operating system.

■MELSEC data link library

For the considerations when using the MELSEC data link library, refer to the following:

📖MELSEC Data Link Library Reference Manual

Considerations for the utility

■Memory usage amount

It is recommended to use the CC IE TSN utility with 160 MB or more free space in the memory.

High memory usage may cause files not to be saved or performance to be degraded. When a message on the memory usage amount appears, save files then restart the utility.

■Characters and languages used

Use characters in the Basic Multilingual Plane.

If the characters outside the Basic Multilingual Plane are specified, a program may not run properly.

If an input language is different from the language set in the regional settings on Windows, some functions may not operate properly.

In that case, unify these languages.

Surrogate pair characters are not available.

For unusable character strings for file names and path names, refer to the following:

☞ Page 293 Unusable Character Strings (Reserved Words)

When starting the device monitor utility from the CC IE TSN utility, change the system locale in Windows according to the display language for the CC IE TSN utility.

The device monitor utility can be used in the following languages depending on an operating system used.

 • For a Japanese version operating system, Japanese or English is available for the display.
 • For an operating system other than Japanese versions, English is available for the display.

For considerations for display language switching, refer to the following:

☞ Page 115 Display language switching

4 SOFTWARE PACKAGE INSTALLATION AND UNINSTALLATION

This chapter explains the software package installation and uninstallation.

4.1 Considerations for Installation and Uninstallation

This section explains the considerations for installation and uninstallation.

- Log on as a user with the administrator authority.
- Before installation and uninstallation, remove all applications registered in the startup then restart Windows.
- Make sure to close other applications running on Windows (including resident software such as antivirus software) before installation and uninstallation.
- The installer may not run normally if an update program for either operating system or software of other companies such as Windows Update and Java® update may start automatically. Before installing, change the setting so that the update program does not start automatically.
- Check that the display setting is correct in Windows Device Manager, then install an appropriate display driver or update Windows.
- A network drive cannot be specified as the installation destination.
- Select the checkbox of ".NET Framework 3.5 (including .NET 2.0 or 3.0)" for "Turn Windows features on or off" in the control panel.
- When installing the software package, enable the user account control. (☞ Page 290 Windows User Account Control)
- If only the driver is installed or updated, the consistency between the driver and utility cannot be identified, and the board may not operate properly. Do not install or update the driver other than the method described in this chapter. (☞ Page 42 When driver installation fails)
- Microsoft Visual C++ Runtime Library is also installed when installing the software package. Do not uninstall it because it is required to execute the driver and service to control this product. If Microsoft Visual C++ Runtime Library is uninstalled, reinstall the software package.

4.2 Installation

This section explains the procedure for installing the software package.

Obtaining the software

Please contact your local Mitsubishi Electric sales office or representative.

Software package model name: SW1DNN-CCIETBDM-B

Installation procedure

1. Save the obtained data for installation to the system drive, CD, etc.

2. Start the installer.

Double-click "setup.exe" in the "Disk1" folder.

3. Follow the on-screen instructions to select or enter the necessary information.

When actions displayed in the screen are not clear, refer to the following:

☞ Page 40 When an action displayed in the screen is not clear

4. Restart the personal computer.

When installation is normally completed

The driver and utilities for a board are registered.

When using other network interface boards on the same personal computer, refer to the following:

☞ Page 39 Considerations for using other boards on a personal computer

Driver

The driver is installed automatically after the installation of the software package and the board in a personal computer is completed.

When the driver installation is normally completed, the following driver is displayed in the Windows Device Manager.

Device name	Driver name
MELSEC CC-Link IE TSN Device	MELSEC NZ CC-Link IE TSN Controller

Utility

When the installation is normally completed, the following utilities are registered in Windows Start.

Folder	Name	Description
[MELSOFT]	CC IE TSN Utility(Board)	To start the CC IE TSN utility. This utility is for setting a board and displaying the status.
	Device Monitor Utility(Board)[*1]	To start the device monitor utility. This utility is for monitoring devices and changing current values.
	e-Manual Viewer e-Manual Viewer Help	To display the manual.

*1 It may be registered in the [MELSEC] folder in the start menu when the software package of another board, for which the device monitor utility is used in common, is installed in the same personal computer.

If e-Manual Viewer is already installed by another MELSOFT product, it is installed over in the same path.

For the functions and handling methods of utilities, refer to the manual for the installed software package. The corresponding user's manual is stored in the 'Manual' folder of the software package.

MELSEC data link library

The MELSEC data link library is a library used to access own station link devices of a board and device memory of programmable controller CPUs of other stations using a board.

It is stored in "Common" in the folder where the software package is installed.

Service application

The following Windows services are registered:

Service name	Function	Reference
MELSECPowerManager	A service application for monitoring the Windows power option settings every 30 seconds to prevent a personal computer from entering the power save mode (hibernate, sleep) or enabling the fast startup function Once installation is completed normally, the power option settings are changed by MELSECPowerManager to disable the power save mode (hibernate, sleep) or the fast startup function.	Page 292 MELSECPowerManager
NZCcietsn Time Synchronization Service	A service application for applying the time in a CPU module or personal computer distributed from the master station to the personal computer in a local station	Page 102 Time synchronization

Considerations for using other boards on a personal computer

The device monitor utility, MELSEC data link library, and MELSECPowerManager are used for the following software packages of other network interface boards in common.

- SW0DNC-MNETH-B
- SW1DNC-CCBD2-B
- SW1DNC-MNETG-B
- SW1DNC-CCIEF-B
- SW1DNN-CCIETBDM-B

The newer software package data is validated when installing them on the same personal computer.

■MELSEC Data Link Library Reference Manual

For the function and handling method of the device monitor utility and MELSEC data link library, refer to MELSEC Data Link Library Reference Manual that is corresponding to the installed software package.

- The manual for this product is installed as e-Manual. Refer to MELSEC Data Link Library Reference Manual in e-Manual Viewer.
- When installing a board that shares the MELSEC data link library and is provided with the manual in PDF format after installing this product, refer to the manual for a product with a newer version.
- For the method for updating e-Manual, refer to e-Manual Viewer Help.

When installation is terminated or failed

When the installation is terminated or failed, check the following procedure and retry the installation.
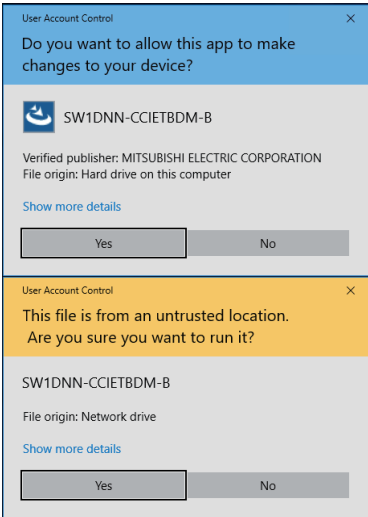
Operating procedure
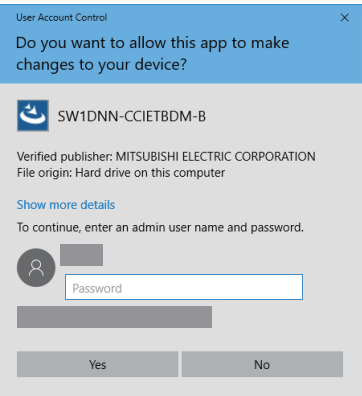
1. Check the considerations for installation and uninstallation.

☞ Page 37 Considerations for Installation and Uninstallation

2. Restart the personal computer.

3. If the utility can be uninstalled, uninstall it and restart the personal computer.

☞ Page 43 Uninstallation

4. Reinstall the utility by following the installation procedure.

☞ Page 40 When an action displayed in the screen is not clear

5. If the personal computer does not operate normally after the reinstallation, check if the computer has any problems.

☞ Page 194 Checking the operation environment, Page 194 Checking the personal computer and operating system

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries
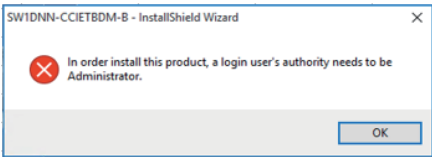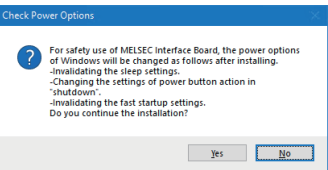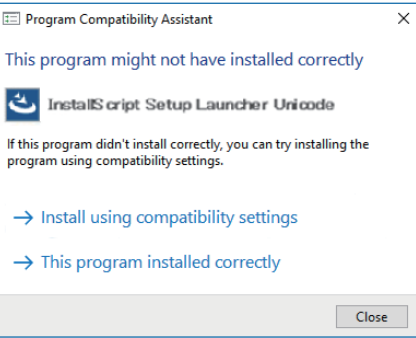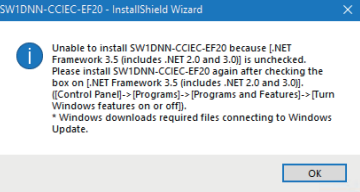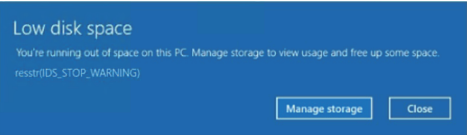
> **Point**
>
> For reinstallation, restart the personal computer after uninstallation.

When an action displayed in the screen is not clear

The following table shows the actions to be taken in each screen.

Screen	Action
	Appears when the user account control is enabled. Click the [Yes] button.
	Appears when logging on as a user without the administrator authority. Log off, and log on as a user with the administrator authority, then try again.

| Screen	Action
SW1DNN-CCIETBDM-B - InstallShield Wizard In order install this product, a login user's authority needs to be Administrator. OK	Appears when the user account control is disabled and logging on as a user without the administrator authority. Check the user account control settings. (☞ Page 290 Windows User Account Control) Log off, and log on as a user with the administrator authority, then try again.
Check Power Options For safety use of MELSEC Interface Board, the power options of Windows will be changed as follows after installing. -Invalidating the sleep settings. -Changing the settings of power button action in "shutdown". -Invalidating the fast startup settings. Do you continue the installation? Yes No	Click the [Yes] button. MELSECPowerManager is installed and the power option setting of Windows is changed automatically. For details on MELSECPowerManager, refer to the following: ☞ Page 292 MELSECPowerManager
Program Compatibility Assistant This program might not have installed correctly InstallScript Setup Launcher Unicode If this program didn't install correctly, you can try installing the program using compatibility settings. → Install using compatibility settings → This program installed correctly Close	If this screen appears during or after the installation, click "This program installed correctly." If this screen appears when the installation is terminated, click the [Close] button and close the screen. Do not select "Install using compatibility settings." An incorrect module may be installed.
SW1DNN-CCIEC-EF20 - InstallShield Wizard Unable to install SW1DNN-CCIEC-EF20 because [.NET Framework 3.5 (includes .NET 2.0 and 3.0)] is unchecked. Please install SW1DNN-CCIEC-EF20 again after checking the box on [.NET Framework 3.5 (includes .NET 2.0 and 3.0)]. ([Control Panel]->[Programs]->[Programs and Features]->[Turn Windows features on or off]). * Windows downloads required files connecting to Windows Update. OK	Appears when .NET Framework 3.5 (including .NET 2.0 and 3.0) is set to disabled. Reinstall the utility after searching the control panel for the "Turn Windows features on or off" and enabling the function of ".NET Framework 3.5 (including .NET 2.0 and 3.0)." The procedure when .NET Framework 3.5 (including .NET 2.0 and 3.0) is disabled is the same as that of other MELSOFT products. For details on the procedure, refer to technical bulletin FA-A-0207.
Low disk space You're running out of space on this PC. Manage storage to view usage and free up some space. resstr(IDS_STOP_WARNING) Manage storage Close	Appears when there is insufficient free disk space due to other applications or operations during the installation. ❶ Click the [Close] button. ❷ End all tasks related to the installer of this product ("InstallScript Setup Launcher Unicode" and "MELSOFT iQ Works") in the task manager of Windows. ❸ Secure free space on the installation destination. ❹ Reinstall the software package.

When driver installation fails

The driver is installed automatically after the installation of the software package and the board in a personal computer is completed.
If the driver is not recognized after the board installation, update the driver in Device Manager.
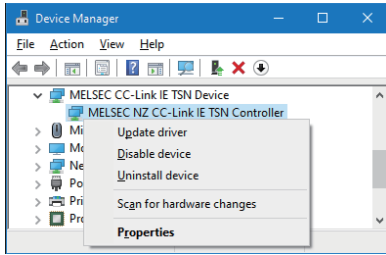
1. Open Windows Device Manager, and right-click any of the following then select "Update driver."
- "MELSEC CC-Link IE TSN Device" ⇨ "MELSEC NZ CC-Link IE TSN Controller"
- "MELSEC CC-Link IE TSN Device" ⇨ "Network Controller"
- "Other devices" ⇨ "Network Controller"

2. Click "Browse my computer for drivers."
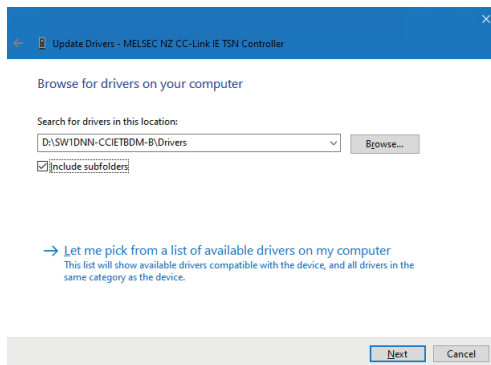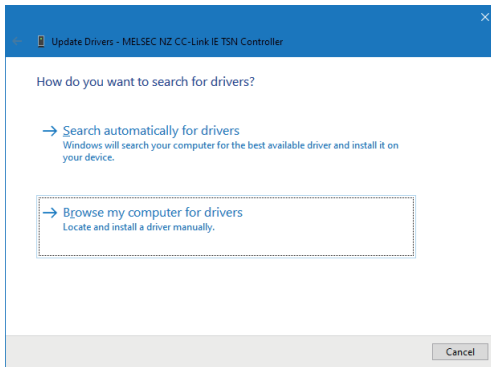
3. In "Search for drivers in this location," set "\Drivers" folder of the software package.
(Example: "D:\SW1DNN-CCIETBDM-B\Drivers")
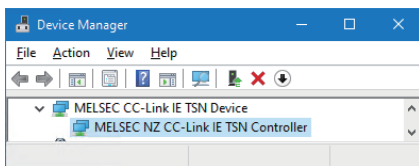Select the checkbox of "Include subfolders."
When the folder where driver software is stored is not automatically detected, select the following folder:
- "Drivers\x64"

4. Click the [Next] button.

When the driver is normally updated, "MELSEC NZ CC-Link IE TSN Controller" is displayed under "MELSEC CC-Link IE TSN Device" in Device Manager.

If the problem persists, refer to the following:

4.3 Uninstallation

This section explains the procedure for uninstalling the software package.

Uninstallation procedure

Be sure to uninstall the software package in the control panel of Windows.

> **Point**
> - Save parameters as necessary before uninstallation.
> - When a screen confirming the deletion of common files appears at uninstallation:
>   Select "No to All." If deleting common files, other applications may not run normally.
> - MELSECPowerManager may not be uninstalled due to the compatibility with other installed software packages. For details on MELSECPowerManager, refer to the following:
>   ☞ Page 292 MELSECPowerManager

When uninstallation is normally completed

When the uninstallation is normally completed, the icon registered in the Windows Start is deleted.

When uninstallation fails

When the uninstallation fails, it is necessary to reinstall the software package and uninstall it by performing the following procedure.

Operating procedure

1. Check the considerations for installation and uninstallation.
☞ Page 37 Considerations for Installation and Uninstallation

2. Save the data for installation to the system drive, or insert an installation media to the drive.

3. Display the "Run" screen using the Windows Start or quick access menu.

4. Append option "-A" and execute "setup.exe" in the "Disk1" folder in the installation data.
Example: C:\Temp\Disk1\setup.exe -A

5. Reinstall the utility by following the installation procedure.

6. Uninstall the software package.

7. If the software package cannot be uninstalled normally, check if the personal computer has any problems.
☞ Page 194 Checking the operation environment, Page 194 Checking the personal computer and operating system
If the problem persists, refer to the following:
☞ Page 217 Information Required for Inquiries

> **Point**
> - When specifying option '-A,' Install information (information in C:\Program Files (x86)\InstallShield Installation Information) is deleted.

Deletion by specifying another option

- After uninstallation, when specifying option "-N" and executing "setup.exe," event history files (all files under C:\ProgramData\MELSOFT\BD\CCIETBDM\EVENTLOG) that are not deleted in normal uninstallation can be deleted.
- If NZCcietsn Time Synchronization Service is not deleted during uninstallation, specify option "-B." When specifying option "-B" and executing "setup.exe," it is deleted.

5 SPECIFICATIONS

This chapter explains the general and performance specifications of a board.

5.1 General Specifications

The following table shows the common specifications of each board to use.

Item	Specification		
Ambient operating temperature	0 to 55℃		
Ambient storage temperature	-25 to 75℃		
Ambient operating humidity	5 to 95% RH, non-condensing		
Ambient storage humidity	5 to 95% RH, non-condensing		
Vibration resistance	Compliant with JIS B 3502: 2021 and IEC 61131-2: 2017 Sweep count: 10 times each in X, Y, and Z directions	Frequency: 5 to 8.4 Hz	Constant amplitude: 3.5 mm
		Frequency: 8.4 to 150 Hz	Constant acceleration: 10 m/s^2
Shock resistance	Compliant with JIS B 3502: 2021 and IEC 61131-2: 2017 150 m/s^2, 3 times each in X, Y, and Z directions		
Operating atmosphere	No corrosive gases, flammable gases, less conductive dust		
Operating altitude[*1]	0 to 2000 m[*4]		
Installation location	Inside a control panel for indoor use		
Overvoltage category[*2]	Ⅱ or less		
Pollution degree[*3]	2 or less		

*1 Do not use or store a board in an environment where the atmospheric pressure is higher than an altitude of 0 m as doing so may cause a malfunction.
When using a board in such a pressurized environment, please contact your local Mitsubishi Electric sales office or representative.
*2 This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery on the premises. Category Ⅱ applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.
*3 This indicates the degree to which conductive material is generated in an environment in which the equipment is used. Pollution degree 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensation must be expected occasionally.
*4 When using a board at an altitude above 2000 m, the withstand voltage performance and the upper limit of the ambient operating temperature will decrease. Please contact your local Mitsubishi Electric sales office or representative.

Point

The general specifications for both a board and a personal computer must be satisfied after installation.

5.2 Performance Specifications of CC-Link IE TSN

The following table shows the performance specifications of CC-Link IE TSN.

Item			Description	
			NZ81GN11-SX	**NZ81GN11-T2**
Maximum link points per network[*1]	RX		16K points (16384 points, 2 KB)	
	RY		16K points (16384 points, 2 KB)	
	RWr		8K points (8192 points, 16 KB)	
	RWw		8K points (8192 points, 16 KB)	
	LB	Link points extended setting: "Not to Extend"/disabled	32K points (32768 points, 4 KB)	
		Link points extended setting: "Extend"	128K points (131072 points, 16 KB)	—
	LW	Link points extended setting: "Not to Extend"/disabled	16K points (16384 points, 32 KB)	
		Link points extended setting: "Extend"	512K points (524288 points, 1024 KB)	—
Maximum link points per station	RX		16K points (16384 points, 2 KB)	
	RY		16K points (16384 points, 2 KB)	
	RWr		8K points (8192 points, 16 KB)	
	RWw		8K points (8192 points, 16 KB)	
	LB	Link points extended setting: "Not to Extend"/disabled	32K points (32768 points, 4 KB)	
		Link points extended setting: "Extend"	128K points (131072 points, 16 KB)	—
	LW	Link points extended setting: "Not to Extend"/disabled	16K points (16384 points, 32 KB)	
		Link points extended setting: "Extend"	512K points (524288 points, 1024 KB)	—
Transient transmission			Communication with MD functions	
Transient transmission capacity			Up to 1920 B	
Transient reception capacity			Receive buffer (internal memory) 2 KB × 128 (total: 256 KB)	
Communication speed			1 Gbps	1 Gbps/100 Mbps
Minimum synchronization cycle			125.00 μs	
CC-Link IE TSN Class			CC-Link IE TSN Class B device	
CC-Link IE TSN Protocol version			Protocol version 2.0/1.0	
Network topology			Ring topology	Line topology, star topology, coexistence of line and star topologies, and ring topology
Communication cable			Cable satisfying the standards (☞ Page 51 Target product)	
Maximum station-to-station distance			550 m	100 m
Overall cable distance	Line topology		—	12000 m (when 121 stations are connected)
	Ring topology		66550 m (when 121 stations are connected)	12100 m (when 121 stations are connected)
	Others		—	Depends on the system configuration.
Maximum number of connectable stations per network			121 (1 master station and 120 device stations)[*2]	
Number of pieces of connectable CC-Link IE TSN Communication Software			—	2
Block data assurance per station			121	
Maximum number of networks			239	
Maximum number of groups			32	

Item	Description	
	NZ81GN11-SX	**NZ81GN11-T2**
Communication method	Time sharing method	Time sharing method/time-managed polling method
Multicast filter	Supported	
Encoding scheme	8B10B	
Laser class (JIS C 6802, IEC60825-1)	Class 1 laser product	—
Jumbo frame	—	Not 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 set in "Network Configuration Settings" under "Basic Settings."

*2 The maximum number of connectable stations differs depending on the master station. For details, refer to the user's manual for the master station used.

5.3 Performance Specifications of Ethernet

This product does not support communication with Ethernet devices, but can relay communication data.

This section shows the performance specifications for relaying communication data on a network for communication with Ethernet devices.

Item		Description	
		NZ81GN11-SX	**NZ81GN11-T2**
Transmission specifications	Data transmission speed	1 Gbps	1 Gbps/100 Mbps
	Communication mode	1000BASE-SX	• 1000BASE-T • 100BASE-TX
		Full duplex	
	Maximum frame size	1518 bytes	
	Maximum segment length (distance between a switching hub and station)[1]	550 m	100 m
	Number of cascade connections	—	Consult the manufacturer of the switching hub used.
	IP version	IPv4 supported	

*1 For the maximum segment length (distance between switching hubs), consult the manufacturer of the switching hub used.

Point

The operation of a CC-Link IE TSN interface board with the following connection methods is not guaranteed. Check the operation before use.

• Connection using Internet (general public line) (Internet-access service offered by an Internet service provider or a telecommunications carrier)
• Connection using a firewall device
• Connection using a broadband router
• Connection using a wireless LAN

For communicating with an SLMP-supported Ethernet device, use a device that supports sending and receiving SLMP messages.

5.4 Hardware Specifications

The following table shows the hardware specifications of a board.

Item		Specification	
		NZ81GN11-SX	NZ81GN11-T2
Number of boards that can be installed		Up to 4	
Installation slot		PCI Express® x1, x4, x8, x16 slot (Standard, low profile size)	
Occupied slot		1 slot	
Personal computer connection I/F		PCI Express	
Personal computer transfer speed		Up to 5 Gbps when connected with PCI Express 2.0	
Number of personal computer lanes		x 1	
Internal current consumption[*1]		1.08 A (3.3 VDC)	1.14 A (3.3 VDC)
External dimensions	Height	• Standard size: 121 mm • Low profile size: 80 mm	
	Width	18.5 mm	
	Depth	181 mm	
Weight		• Standard size: 0.09 kg • Low profile size: 0.08 kg	• Standard size: 0.08 kg • Low profile size: 0.08 kg

*1 Supply power to a board from the secondary side evaluated with SELV (Safety Extra-Low Voltage) and LIM (Limited Energy Circuit).

Precautions

To comply with the UL61010-2-201/CSA-C22.2 No.61010-2-201 standards, install a board in an industrial PC.

6 INSTALLATION AND WIRING

This chapter explains the installation and wiring methods of each board, wiring products, and wiring precautions.

6.1 Installation Environment

Use a board in an environment mentioned in the general specifications; otherwise, an electric shock, fire, malfunction, or damage to or deterioration of the product may occur.

☞ Page 44 General Specifications

Always ground the personal computer to the protective ground conductor. Failure to do so may cause a malfunction.

For installation of a personal computer in which a board is installed, refer to the manual for the personal computer.

6.2 Board Installation

The following shows the procedure for installing a board.

1. Turning the power OFF

Turn the power of a personal computer OFF if it is ON.

2. Installing a board

Install a board on a slot of the personal computer.

3. Fixing the board

Fix the board to the personal computer with board-fixing screws.

For the tightening torque of the screws, refer to the manual for the personal computer.

4. Turning the power ON

Turn the power of the personal computer ON.

Precautions

After the first use of a board, do not install/uninstall it on a personal computer more than 50 times (PCI Express standard compliant). Exceeding the limit may cause malfunction.

Procedure for replacing mounting brackets

The following shows the procedure for replacing a standard-size mounting bracket with a low profile-size mounting bracket.
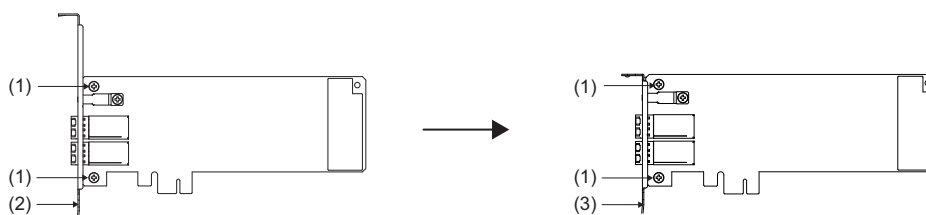
(1)   Mounting bracket fixing screw
(2)   Standard-size mounting bracket
(3)   Low profile-size mounting bracket

1. Remove the mounting bracket fixing screws.

2. Remove the standard-size mounting bracket.

Keep the unused brackets in secure place.

3. Align the low profile-size mounting bracket with the screw holes on the board.

4. Tighten the screws.

Tighten the screw on the bottom side (connection terminal side to be inserted into the slot) first.

Screw tightening torque: 0.425 to 0.575 N·m (4.34 to 5.86 kgf·cm)

6.3 Channel Number Setting

Channel numbers are set for each board to identify them.

'281' is set for the board channel number as a factory default but it can be changed in the range from '281' to '284.'

Channel numbers being set are used to specify the target boards when setting parameters or executing MELSEC data link library functions.

Precautions

When installing multiple boards in the same personal computer, set channel numbers without duplication.

Channel number duplication may cause this product to malfunction.

Setting method

Channel numbers can be set in the CC IE TSN utility.

For the setting method, refer to the following:

☞ Page 121 Channel number setting

> **Point**
>
> Channel numbers set in the CC IE TSN utility are saved to the non-volatile memory in a board.
>
> In addition, channel numbers being set are retained when performing any of the following operations:
> - Restarting a personal computer
> - Changing the board installation position
> - Changing a personal computer to which a board is installed

6

6.4 Tests before Wiring (Board Communication Tests)

This section explains the board tests before network wiring.

The board communication test is for checking the hardware of a board.

When starting using a board or if a communication is unstable, whether a hardware failure occurs can be checked.

The following contents are tested in the board communication test.

Item	Check point
Internal self-loopback test	Whether the board communication function runs correctly can be checked.
External self-loopback communication test	Whether a communication can correctly be performed using a cable connected between two connectors of a board can be checked.

Operating procedure

1. Connect the P1 connector with the P2 connector by using a cable.

Do not perform the board communication test while connecting with another station; otherwise, the operation of the station may be regarded as abnormal.

2. Display the parameter setting screen for a board to be tested in the CC IE TSN utility.

☞ Click the parameter setting tab of a channel number set for the target board in the CC IE TSN utility.
The parameter setting screen appears.

3. Set "Module Communication Test" in the parameter.

☞ Set "Board Operation Mode" under "Application Settings" to "Module Communication Test." (☞ Page 155 Board operation mode setting)

4. Write the parameters to the board.

☞ [Online] ⇨ [Write to Board]
Parameters are written and the board is reset, then the test is performed.

5. Check the test result in the "Board Information List" screen of the CC IE TSN utility. (☞ Page 130 Board information list)

Corrective actions when an error occurs are as follows:

Error description	Corrective action
Internal self-loopback test error	Please contact your local Mitsubishi Electric sales office or representative.
External self-loopback test connection error	Check and/or replace the connection of cables and perform the test again.
External self-loopback test communication error	If the test is abnormally completed again, please contact your local Mitsubishi Electric sales office or representative.

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

> **Point** 🖉
>
> With the mdBdModSet function of MELSEC data link library, the board communication test can be performed by using a user program.

6.5 Wiring

This section explains the wiring products and wiring methods.

Wiring products

The following explains the wiring products.

Target product

The following cables are used for each board.
- NZ81GN11-SX: Optical fiber cable
- NZ81GN11-T2: Ethernet cable

Precautions for communication cables

- For communication cables used in a system, select ones that meet the specifications described in this section; otherwise, normal data transmission is not guaranteed.
- The bend radius of cable is limited. For details, check the specifications of a cable in use.

Optical fiber cable

Use an optical fiber cable and connector authorized by CC-Link Partner Association.

For details, refer to the CC-Link Partner Association website (www.cc-link.org).

Communication speed	Optical fiber cable		Connector	
	Type and standard	Description	Type and standard	Description
1 Gbps	IEEE802.3z 1000BASE-SX compatible GI type silica glass multimode optical fiber cable Standard: IEC 60793-2-10 A1a.1 compliant	Outside diameter of the core/clad: 50μm/125μm Transmission loss: 3.5dB/km or lower [λ=850nm] Transmission band: 500MHz·km or higher [λ=850nm]	Duplex LC connector Standard: IEC 61754-20 Type LC compliant	Connection loss: 0.3 dB or lower Polished surface: PC (Physical Contact) polishing

Optical fiber cables with connectors are available from Mitsubishi Electric System & Service Co., Ltd. (Catalogs for optical fiber cables are also available.)

In addition, on-site connector polishing, terminal assembly, and fusion splicing are available. Please contact your local Mitsubishi Electric sales office or representative.

Type	Model (manufacturer)
Multimode optical fiber (GI)	QG series (Mitsubishi Electric System & Service Co., Ltd.)

Ethernet cable

Use an Ethernet cable that satisfies the following standards:

Communication speed	Ethernet cable	Connector	Standard
1 Gbps	Category 5e or higher, straight cable (shielded, STP)	RJ45 connector	Cable satisfying the following standards: • IEEE802.3 (1000BASE-T) • ANSI/TIA/EIA-568-B (Category 5e)
100 Mbps	Category 5 or higher, straight cable (shielded, STP)		Cable satisfying the following standards: • IEEE802.3 (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 cables are also available.)

In addition, the connector processing of cable length is available for your preference. Please contact your local Mitsubishi Electric sales office or representative.

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

Precautions

Check the following:

• Is any cable disconnected?

• Does any cable short?

• Are the connectors securely connected?

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

The maximum station-to-station distance of the Ethernet cable is 100 m. However, the length may be shorter depending on the operating environment of the cable.

For details, contact the manufacturer of the cable used.

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 board 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

Use the following switching hubs.

Term	CC-Link IE TSN Class	Description
TSN hub[1]	CC-Link IE TSN Class B device	For the models and usage methods of the switching hubs, refer to the CC-Link Partner Association website (www.cc-link.org).
General-purpose hub[2]	CC-Link IE TSN Class A device	

[1]   Use of the following is recommended for TSN hub:

Type	Model (manufacturer)
CC-Link IE TSN industrial managed switch	NZ2MHG-TSNT☐ (Mitsubishi Electric Corporation)

[2]   When connecting a CC-Link IE TSN Class A device that supports the protocol version 2.0 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.

When cascading switching hubs, check the specifications of switching hubs used.

Switching hubs can be cascaded.

Precautions

- Do not configure a ring topology when modules are connected to a switching hub. Doing so, all stations will fail and data links cannot be performed.
- A ring topology that is configured incorrectly can be detected as an error in the CC-Link IE TSN diagnostics and event history. However, if the system is configured with a switching hub, the error may not be detected.
- For the restrictions on switching hubs, refer to the manual for each product.

6

Wiring methods

The following shows the connecting and disconnecting methods of a communication cable.

Optical fiber cable

The following shows the connecting and disconnecting methods of an optical fiber cable.

■Connecting method

1. Turn the power of a personal computer OFF.

2. Check the insertion direction, and insert the connector of an optical fiber cable into the connector on a board until it clicks.
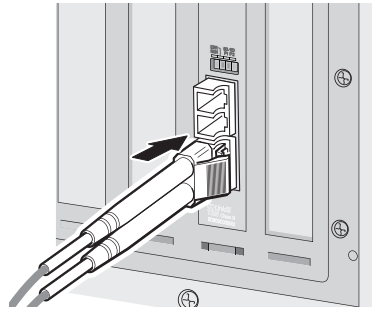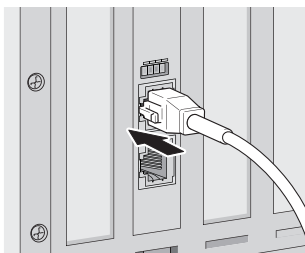

3. Lightly pull the cable to check that it is securely connected.

■Disconnecting method

1. Turn the power of a personal computer OFF.

2. Pull out an optical fiber cable while pinching the connector hook on the cable.

Ethernet cable

■Connecting method

1. Turn the power of a personal computer OFF.

2. Check the insertion direction, and insert the connector of an Ethernet cable into the connector on a board until it clicks.

3. Lightly pull the cable to check that it is securely connected.

4. Turn the power of the personal computer ON.

5. Check whether the LINK LED of P1 or P2 connected with an Ethernet cable is ON.[*1]
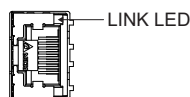
LINK LED

*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.

■Disconnecting method

1. Turn the power of a personal computer OFF.

2. Pull out the Ethernet cable while pinching a clip on the connector.
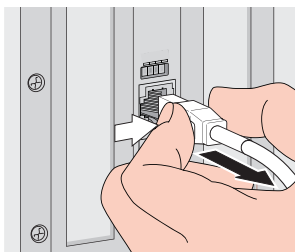
Precautions for connecting and disconnecting cables

- When attaching/detaching a cable to/from a board, pull or insert the cable by holding the cable connector with your hand.
- When installing a board in a personal computer, secure a space of approximately 10 mm to the right and left of the optical connector. If the space cannot be secured due to an adjacent board or installing slot position, it may be difficult to connect and disconnect an optical cable.
- Depending on an adjacent board or installing slot position, it may be difficult to disconnect a cable. In that case, use the following dedicated tool.

Product name	Cable type	Model name	Manufacturer
Connector detaching tool	Optical fiber cable	SCT-SLM	Mitsubishi Electric System & Service Co., Ltd.
	Ethernet cable	PCRT1	Panduit Corp.
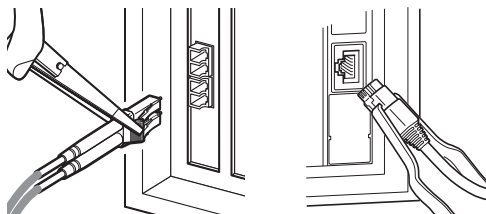
Wiring precautions

The order of cable connections is not related to station numbers. Stations can be connected even if they are not in order of station number.

Point

Both P1 and P2 can be used.
- When only one of P1 and P2 connectors is used in a star topology, either P1 or P2 is applicable.
- When both connectors are used in a line topology, P1-P1, P2-P2, and P1-P2 connections are applicable.

Precautions for laying communication cables

- Place the communication cable connected to the board in a duct or clamp them. If not, the dangling cable may swing or inadvertently be pulled, resulting in damage to the board or cable or malfunctions due to poor contact. (☞ Page 243 Grounding cables with a cable clamp)
- Protect the core wire in the connector of a cable or a board to prevent touching by hand and sticking dirt or dust. If any oil from your hand, dirt or dust sticks the core wire, it may increase the transmission loss and fail a data link.

6.6 Tests after Wiring

This section explains the tests for a line and cable that should be performed after network wiring.
These tests need to be performed in the actual network configuration.

Communication test

The communication test is for checking whether the communication route from the own station to a destination is correctly set for a transient transmission.
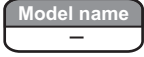☞ Page 139 Communication test

CC-Link IE TSN diagnostics

Network diagnostics is for checking whether cables are connected properly and a communication is performed normally based on the set parameters.
☞ Page 132 CC-Link IE TSN diagnostics

7 FUNCTIONS

This chapter shows the functions of this product.

The following icons shown at the beginning of detailed description for each function indicate whether each model supports the function.

Icon	Description
Model name ○	Indicates that the model in the icon supports the function.
Model name —	Indicates that the model in the icon does not support the function.

7.1 Function Lists

This section lists the functions.

Board

Cyclic transmission

Data is periodically communicated among stations on a network by using link devices.

○: Available, —: Not available

Function	Description	NZ81GN11-SX		NZ81GN11-TX	
		Master station	Local station	Master station	Local station
Communication using RX, RY, RWr, and RWw	To communicate data in units of bits and words between the master station and a device station. ☞ Page 63 Communication using RX, RY, RWr, and RWw ☞ Page 71 Communication using RX, RY, RWr, RWw, LB, and LW	○	○	○	○
Communication using LB and LW	To communicate data in units of bits and words between the master station and a local station. ☞ Page 69 Communication using LB and LW ☞ Page 71 Communication using RX, RY, RWr, RWw, LB, and LW	○	○	○	○
Link point extension	To extend the maximum link points of the link relay (LB) and the link register (LW) per network and per station. ☞ Page 74 Link point extension	○	○	—	—
Link refresh	To automatically transfer device data between a personal computer and a board. ☞ Page 76 Link refresh	○	○	○	○
Link device access	To access link devices of the own station from a user program. ☞ Page 78 Access to link devices	○	○	○	○
Cyclic data assurance	To assure cyclic data for each 32 bit or for each station. ☞ Page 79 Cyclic data assurance	○	○	○	○
Communication cycle coexistence	To perform communication in multiple communication cycles according to each device station when device stations with different communication cycles are included in a network. ☞ Page 83 Communication cycle coexistence	○	—	○	—
Input status setting from data link faulty station	To set whether to clear or hold an input from a disconnected station on the receiving side. ☞ Page 84 I/O maintenance setting	○	○	○	○

Transient transmission

○: Available

Function	Description	NZ81GN11-SX		NZ81GN11-TX	
		Master station	Local station	Master station	Local station
SEND/RECV function	To send/receive data to/from other stations using the MELSEC data link library function. ☞ Page 88 SEND/RECV function	○	○	○	○
Communication by specifying devices and buffer memory of another station	To send/receive data to/from devices of a CPU module in another station or buffer memory of a remote station by using the MELSEC data link library. ☞ Page 92 Communication by specifying devices and buffer memory of another station	○	○	○	○
Communication using utilities	To monitor other stations and send/receive data to/from other stations by using the CC IE TSN utility and device monitor utility. ☞ Page 92 Communication using utilities	○	○	○	○
Routing function	To perform relay processing for transient transmission according to a routing path. A routing path is automatically collected in dynamic routing. For static routing, users can specify it. ☞ Page 93 Routing function	○	○	○	○

Security

○: Available

Function	Description	NZ81GN11-SX		NZ81GN11-TX	
		Master station	Local station	Master station	Local station
IP filter	To identify the IP address of an access source to prevent unauthorized access. ☞ Page 94 IP filter	○	○	○	○

RAS

○: Available, —: Not available

Function	Description	NZ81GN11-SX		NZ81GN11-TX	
		Master station	Local station	Master station	Local station
Device station disconnection	To stop a data link in a station where an error has occurred and continue it only in stations operating normally. ☞ Page 96 Device station disconnection	○	—	○	—
Automatic return	To automatically reconnect a station disconnected from a network due to a data link error and restart the data link when the station recovers from the error. ☞ Page 96 Automatic return	○	○	○	○
Loopback	To continue a data link with normally operating stations even if a cable is disconnected or an error occurs in a station in a ring topology network system. ☞ Page 97 Loopback function	○	○	○	○
Master station duplication detection	To detect duplication if there are multiple master stations in one network. ☞ Page 100 Master station duplication detection	○	—	○	—
IP address duplication detection	To detect duplication if there are stations with the same IP address in one network. ☞ Page 101 IP address duplication detection	○	○	○	○
Time synchronization	To synchronize the time in a device station with that in a time synchronization source (personal computer in the master station). ☞ Page 102 Time synchronization	○	○	○	○
Event history	To collect and save errors detected by this product, operations performed on this product, information on errors occurred on a network, etc. ☞ Page 104 Event history function	○	○	○	○

Diagnostics

○: Available

Function	Description	NZ81GN11-SX		NZ81GN11-TX	
		Master station	Local station	Master station	Local station
Board communication test	To check the hardware of a board. This function should be performed when a communication is unstable. ☞ Page 50 Tests before Wiring (Board Communication Tests)	○	○	○	○
Board diagnostics	To check the board information, LED status, error details, etc. ☞ Page 125 Diagnosing a board	○	○	○	○
Communication test	To check if the communication route from the own station to a destination is correctly set for a transient transmission. ☞ Page 139 Communication test	○	○	○	○
CC-Link IE TSN diagnostics	To monitor the status of CC-Link IE TSN. ☞ Page 131 Diagnosing a network	○	○	○	○

Others

○: Available, —: Not available

Function	Description	NZ81GN11-SX		NZ81GN11-TX	
		Master station	Local station	Master station	Local station
Driver WDT function	To monitor the operation of the software (operating system, driver) using the timer function on a CC-Link IE TSN interface board. ☞ Page 107 Driver WDT function	○	○	○	○
RECV automatic execution function	To automatically execute the RECV instruction by the driver when the SEND instruction is received. ☞ Page 108 RECV automatic execution function	○	○	○	○
Reserved station specification	To reserve a station for future use. Reserved stations are not actually connected but counted as connected stations in the network and not detected as faulty stations. ☞ Page 108 Reserved station specification	○	—	○	—
Error invalid station setting	To prevent the master station from detecting a device station as an error station even if the device station is disconnected during a data link. This function can also be used to replace a device station during a data link. ☞ Page 108 Error invalid station setting	○	—	○	—
MELSECPowerManager	To change Windows settings to prevent a personal computer from entering the power save mode or enabling the fast startup. ☞ Page 292 MELSECPowerManager	○	○	○	○
Data collection in CC-Link IE TSN Communication Software	To receive cyclic data of CC-Link IE TSN in CC-Link IE TSN Communication Software. ☞ Page 109 Data collection in CC-Link IE TSN Communication Software	—	—	○	○
Co-recording	To send a co-recording trigger, which is received in the master station from a device station, to another device station. ☞ Page 109 Co-recording	○	—	○	—
Firmware update	To update the firmware of a board installed in a personal computer. ☞ Page 296 Firmware update	○	○	○	○

7

CC IE TSN utility

The following table shows the functions of the CC IE TSN utility.

Function		Description	Reference
Project basic function	File reading	To read files from a personal computer.	Page 119 File reading
	File saving	To save files to a personal computer.	Page 119 File saving
Online operation function	Reading from a board	To read parameters from an installed board.	Page 122 Reading parameters from a board
	Writing to a board	To write parameters to a board.	Page 122 Writing parameters to a board
	Verifying data with a board	To compare parameters being edited with data in a board.	Page 123 Parameter verification
	Channel number setting	To check/set the channel number of a board.	Page 121 Channel number setting
	Reset operation	To reset a board.	Page 124 Reset
Diagnostics function	Board diagnostics	To check the board information, LED status, error details, etc.	Page 125 Diagnosing a board
	CC-Link IE TSN diagnostics	To monitor the status of CC-Link IE TSN.	Page 131 Diagnosing a network
Tool function	Device monitor utility	To start the device monitor utility.	Page 124 Device monitor utility
	Profile management	To register or delete profiles.	Page 120 Profile management
	Firmware Update Tool	To start a tool for updating the firmware of a board installed in a personal computer.	Page 296 Firmware update
Parameter setting function		To set the operation mode, network configuration, etc. of a board.	Page 144 Parameter Setting

Device monitor utility

For the device monitor utility, refer to the following:

📖MELSEC Data Link Library Reference Manual

7.2 Cyclic Transmission

This section shows periodic data communication among stations on a network using link devices.

Link devices

Both the link devices (RX/RY/RWr/RWw) of CC-Link IE Field and those (LB/LW) of CC-Link IE Controller can be used for CC-Link IE TSN.

Link device	Description	Range
Remote input (RX)	Bit data input from a device station to the master station on CC-Link IE Field Network or CC-Link IE TSN (For some areas in a local station, data are input in the opposite direction.)	RX0 to RX3FFF
Remote output (RY)	Bit data output from the master station to a device station on CC-Link IE Field Network or CC-Link IE TSN (For some areas in a local station, data are output in the opposite direction.)	RY0 to RY3FFF
Remote register (RWr)	Word data input from a device station to the master station on CC-Link IE Field Network or CC-Link IE TSN (For some areas in a local station, data are input in the opposite direction.)	RWr0 to RWr1FFF
Remote register (RWw)	Word data output from the master station to a device station on CC-Link IE Field Network or CC-Link IE TSN (For some areas in a local station, data are output in the opposite direction.)	RWw0 to RWw1FFF
Link relay (LB)	Bit data sent from each station on CC-Link IE Controller Network or CC-Link IE TSN	■When not extending the number of points LB0 to LB7FFF ■When extending the number of points LB0 to LB1FFFF
Link register (LW)	Word data sent from each station on CC-Link IE Controller Network or CC-Link IE TSN	■When not extending the number of points LW0 to LW3FFF ■When extending the number of points LW0 to LW7FFFF
Link special relay (SB)	Bit data that indicates the operating status and data link status of a module or board on a network	SB0 to SBFFF
Link special register (SW)	Word data that indicates the operating status and data link status of a module or board on a network	SW0 to SWFFF

Link devices can be assigned in the parameter of the master station. (☞ Page 148 Network configuration setting)

■Data flow of link devices on a board

Data is sent and received mutually between this board and the CC-Link IE TSN driver buffer in a personal computer by using link devices (RX, RY, RWr, RWw, LB, and LW) of this board. (☞ Page 76 Link refresh)

This corresponds to the relationship between link devices of a network module and link relays (B) or link registers (W) of a CPU module.
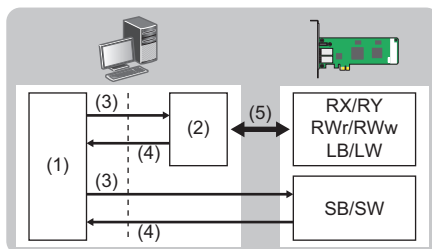
(1)   User program
(2)   CC-Link IE TSN driver buffer
(3)   Writing
(4)   Reading
(5)   Link refresh

CC-Link IE TSN driver buffer is an area included in the driver of a CC-Link IE TSN interface board to handle information and data. Link devices can be written/read in a user program. (☞ Page 78 Access to link devices)

Calculation of the total cyclic data size

The following shows the formula for calculating the total size of cyclic data.

Variables enclosed in double quotes ("") are the setting values in "Network Configuration Settings" under "Basic Settings."

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

Unicast mode and multicast mode

In cyclic transmission, data is sent and received according to each communication mode as follows:

Communication mode	Description
Unicast mode	• Cyclic data is sent to one station. • In this mode, cyclic data from another station cannot be received in a local station. Use this mode when there is no local station or when cyclic data from another station does not need to be received in a local station. • The cyclic transmission time is shorter than communicating in multicast mode. (☞ Page 275 Processing Time)
Multicast mode	• Cyclic data is sent to multiple stations. • In this mode, cyclic data from another station can be received in a local station. Use this mode when cyclic data from another station needs to be received in a local station. • The cyclic transmission time is longer than communicating in unicast mode. (☞ Page 275 Processing Time)

- The communication mode can be set in "Application Settings" in the parameter of the master station. (☞ Page 154 Communication mode)
- In multicast mode, set "Communication Period Setting" to "Basic Period" in "Network Configuration Settings" for a local station.

■Considerations for multicast mode

Even in multicast mode, data sent from a CC-Link IE TSN Class A remote station is not received in a local station.

- RX and RWr sent from a CC-Link IE TSN Class A remote station cannot be received in a local station. (☞ Page 68 Multicast mode)
- To acquire RX and RWr sent from a CC-Link IE TSN Class A remote station in a local station, create a program to send them from the master station to the local station.
- If a data link error occurs in multicast mode, the ERR LED flashes in a local station; however, it does not flash in the local station even if a data link error occurs in a CC-Link IE TSN Class A remote station during a data link. (It remains OFF.)
- In multicast mode, 'Data link error status of each station' (SB00B0), 'Total number of linked stations current value' (SW0059), etc. can be checked in a local station by using SB and SW. However, some SB and SW cannot be used to check information on CC-Link IE TSN Class A remote stations.

Communication using RX, RY, RWr, and RWw

Data in units of bits and words is communicated between the master station and a device station.

Combination of stations	Reference	
Master station and local station	Page 63 Unicast mode	Page 65 Multicast mode
Master station and remote station	Page 66 Unicast mode	Page 66 Multicast mode
Coexistence of master station, local station, and remote station	Page 67 Unicast mode	Page 68 Multicast mode

Master station and local station

■Unicast mode

Data is communicated between the master station and each local station on a 1:1 basis. It is not communicated between local stations.

No.0, No.1, No.2: Station No.0 (master station: board), station No.1, station No.2

→ No.1, → No.2: Range of sending to station No.1, range of sending to station No.2

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

(1)   Personal computer

(2)   CC-Link IE TSN driver buffer

• Output from the master station

❶ Device values are written to the CC-Link IE TSN driver buffer in the personal computer from a user program.

❷ The status of the CC-Link IE TSN driver buffer in the personal computer is stored in the link devices (RY and RWw) of the board by link refresh.

❸ The statuses of the link devices (RY and RWw) of the master station are stored in the link devices (RX and RWr) of each local station by cyclic data transfer processing.

❹ The statuses of the link devices (RX and RWr) of the local station are stored in the devices of the CPU module by link refresh.
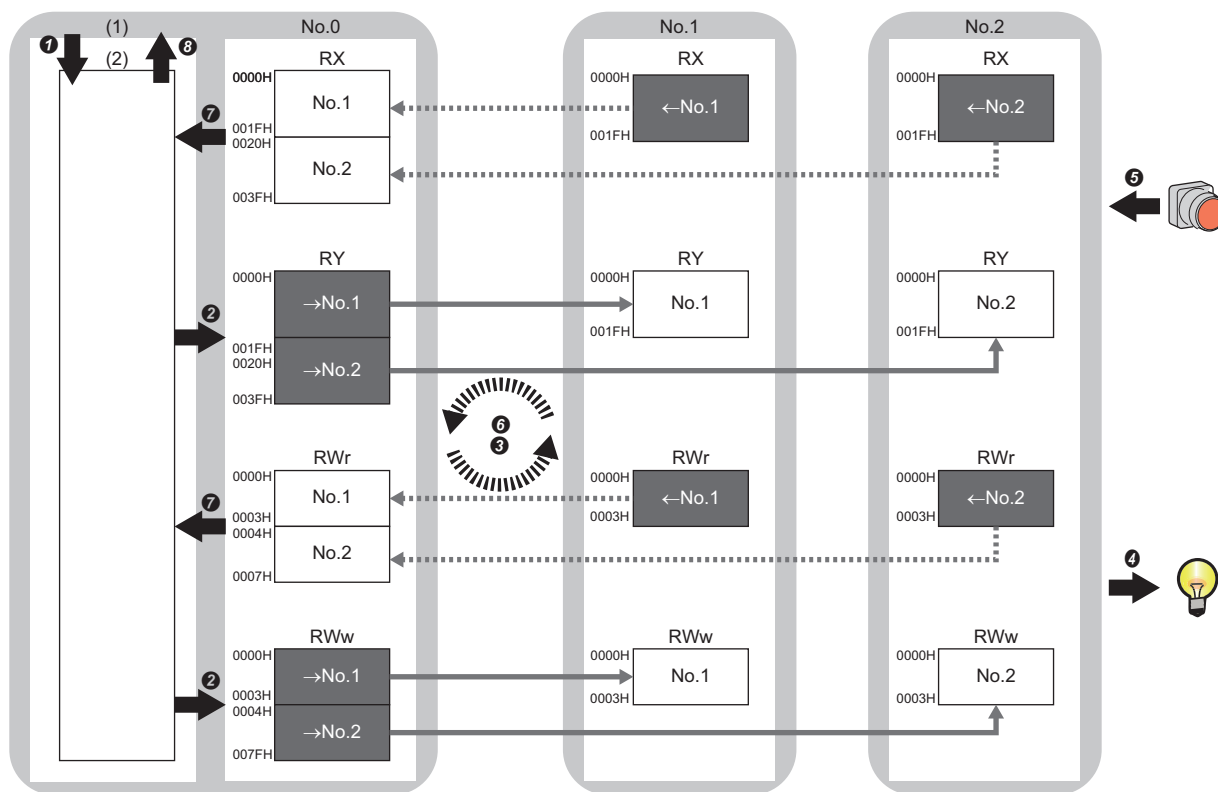
• Input from the local station

❺ The devices turn ON and the END processing is performed in a sequence scan of the CPU module in the local station.

❻ The statuses of the devices of the CPU module are stored in the link devices (RY and RWw) of the local station by link refresh.

❼ The statuses of the link devices (RY and RWw) of the local station are stored in the link devices (RX and RWr) of the master station by cyclic data transfer processing.

❽ The statuses of the link devices (RX and RWr) of the board set as the master station are stored in the CC-Link IE TSN driver buffer in the personal computer by link refresh.

❾ Device values are read from the CC-Link IE TSN driver buffer in the personal computer to the user program.

■Multicast mode

Data is sent on a line in multicasting from the master station and local stations within their respective ranges.

No.0, No.1, No.2: Station No.0 (master station: board), station No.1, station No.2

→ No.1, → No.2: Range of sending to station No.1, range of sending to station No.2

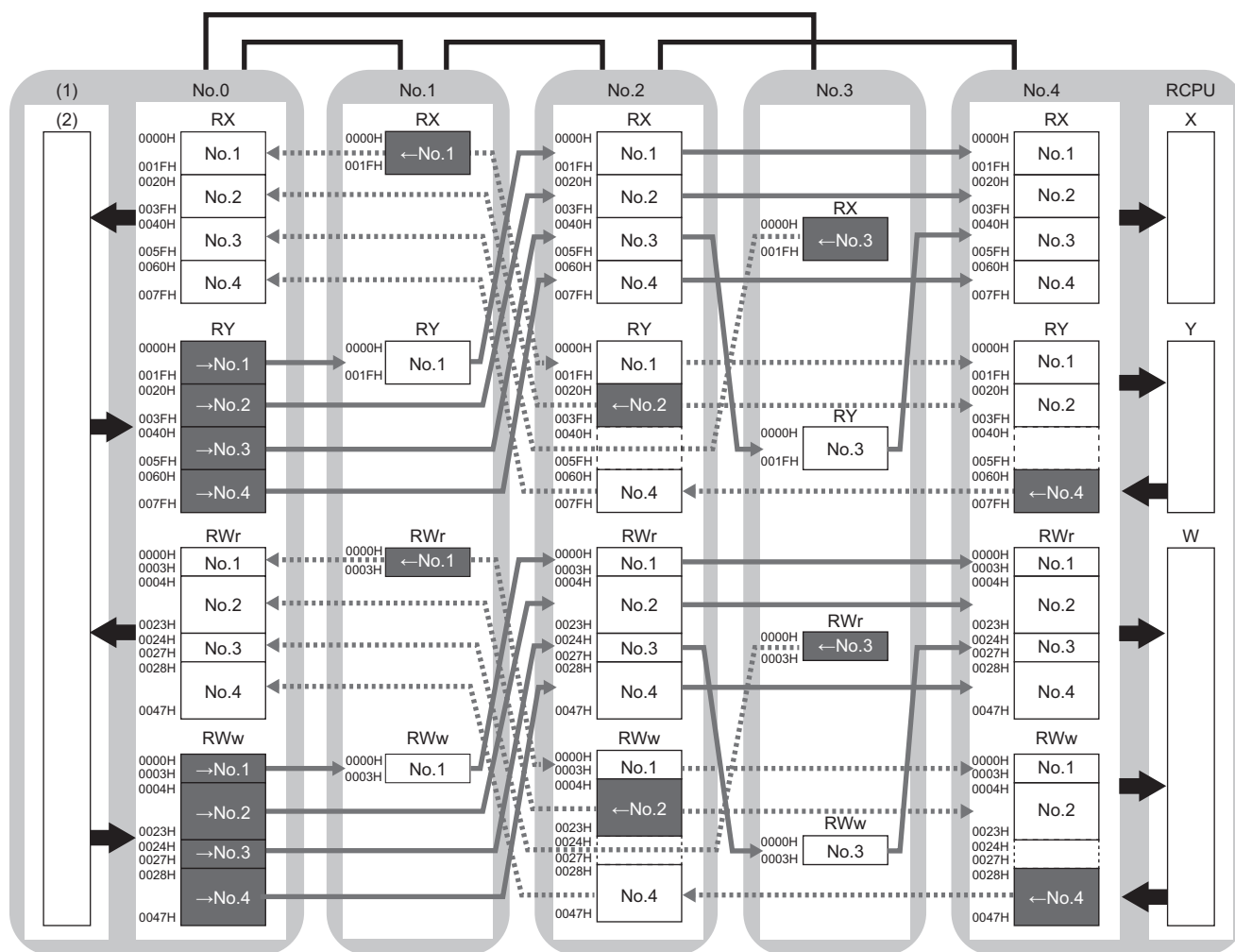← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

(1)   Personal computer

(2)   CC-Link IE TSN driver buffer

• Output from the master station

❶ Device values are written to the CC-Link IE TSN driver buffer in the personal computer from a user program.

❷ The status of the CC-Link IE TSN driver buffer in the personal computer is stored in the link devices (RY and RWw) of the board by link refresh.

❸ The statuses of the link devices (RY and RWw) of the master station are stored in the link devices (RX and RWr) of local stations on the same network by cyclic data transfer processing.

❹ The statuses of the link devices (RX and RWr) of the local stations are stored in the devices of the CPU module by link refresh.

• Input from the local stations

❺ The devices turn ON and the END processing is performed in a sequence scan of the CPU module in the local station.

❻ The statuses of the devices of the CPU module are stored in the link devices (RY and RWw) of the local station by link refresh.

❼ The statuses of the link devices (RY and RWw) of the local station (station No.2) are stored in the link devices (RX and RWr) of the master station and in those (RY and RWw) of the local station (station No.1) on the same network by cyclic data transfer processing.

❽ The statuses of the link devices (RX and RWr) of the board set as the master station are stored in the CC-Link IE TSN driver buffer in the personal computer by link refresh.

❾ Device values are read from the CC-Link IE TSN driver buffer in the personal computer to the user program.

Master station and remote station

■Unicast mode

Data is communicated between the master station and each remote station on a 1:1 basis. It is not communicated between remote stations.

No.0, No.1, No.2: Station No.0 (master station: board), station No.1, station No.2

→ No.1, → No.2: Range of sending to station No.1, range of sending to station No.2

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

(1)   Personal computer
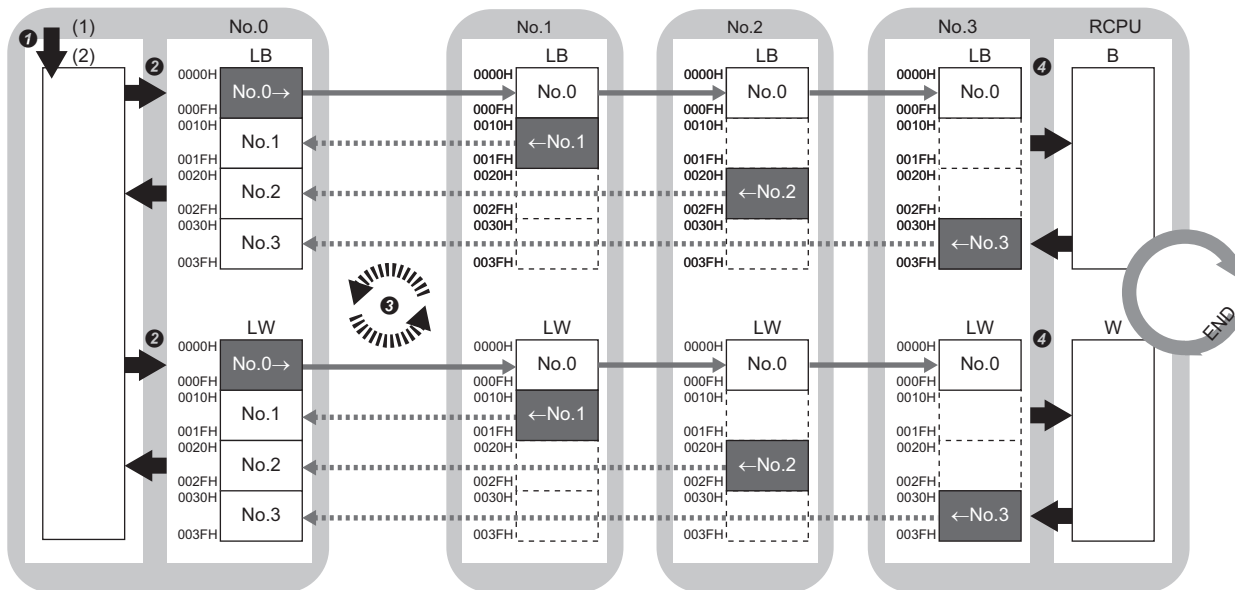
(2)   CC-Link IE TSN driver buffer

- Output from the master station

❶ Device values are written to the CC-Link IE TSN driver buffer in the personal computer from a user program.
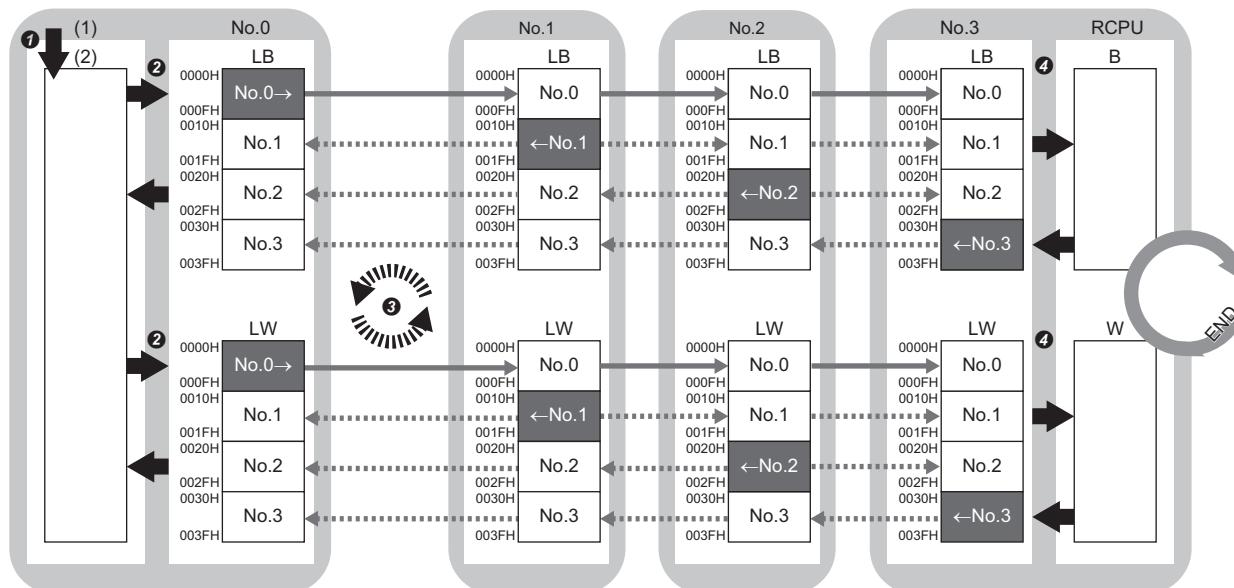
❷ The status of the CC-Link IE TSN driver buffer in the personal computer is stored in the link devices (RY and RWw) of the board by link refresh.

❸ The statuses of the link devices (RY and RWw) of the master station are stored in the link devices (RY and RWw) of remote stations by cyclic data transfer processing.

❹ The statuses of the link devices (RY and RWw) of the remote stations are output to an external device.

- Input from the remote stations

❺ The status of the external device is stored in the link devices (RX and RWr) of the remote stations.

❻ The statuses of the link devices (RX and RWr) of the remote stations are stored in the link devices (RX and RWr) of the master station by cyclic data transfer processing.

❼ The statuses of the link devices (RX and RWr) of the board set as the master station are stored in the CC-Link IE TSN driver buffer in the personal computer by link refresh.

❽ Device values are read from the CC-Link IE TSN driver buffer in the personal computer to the user program.

■Multicast mode

- Data is sent on a line in multicasting from the master station and remote stations within their respective ranges.

- Data is communicated in each station in the same manner as unicast mode, because all data is received in the master station but data from other remote stations is discarded in a remote station. (☞ Page 66 Unicast mode)

Coexistence of remote stations and local stations

■Unicast mode

- Data is communicated between the master station and each remote station, and the master station and each local station on a 1:1 basis.
- It is not communicated between remote stations, local stations, or a remote station and local station.
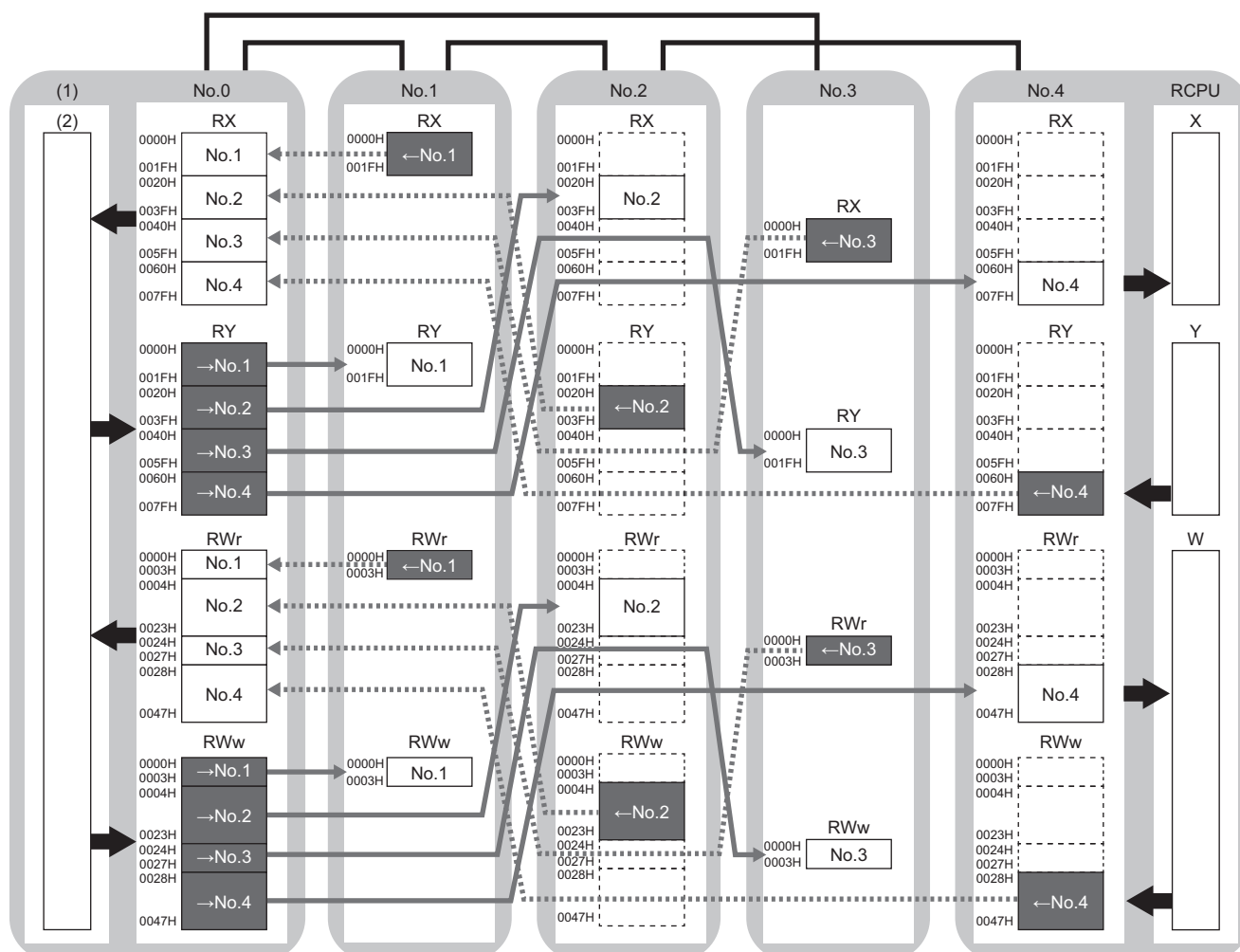
No.0, No.1, No.2, No.3, No.4: Station No.0 (master station: board), station No.1 (remote station), station No.2 (local station), station No.3 (remote station), station No.4 (local station)

→ No.1, → No.2, → No.3, → No.4: Range of sending to station No.1, range of sending to station No.2, range of sending to station No.3, range of sending to station No.4

← No.1, ← No.2, ← No.3, ← No.4: Range of sending from station No.1, range of sending from station No.2, range of sending from station No.3, range of sending from station No.4

(1)   Personal computer

(2)   CC-Link IE TSN driver buffer

■Multicast mode

Data in all device stations can be acquired in the master station and each local station.

No.0, No.1, No.2, No.3, No.4: Station No.0 (master station: board), station No.1 (remote station), station No.2 (local station), station No.3 (remote station), station No.4 (local station)
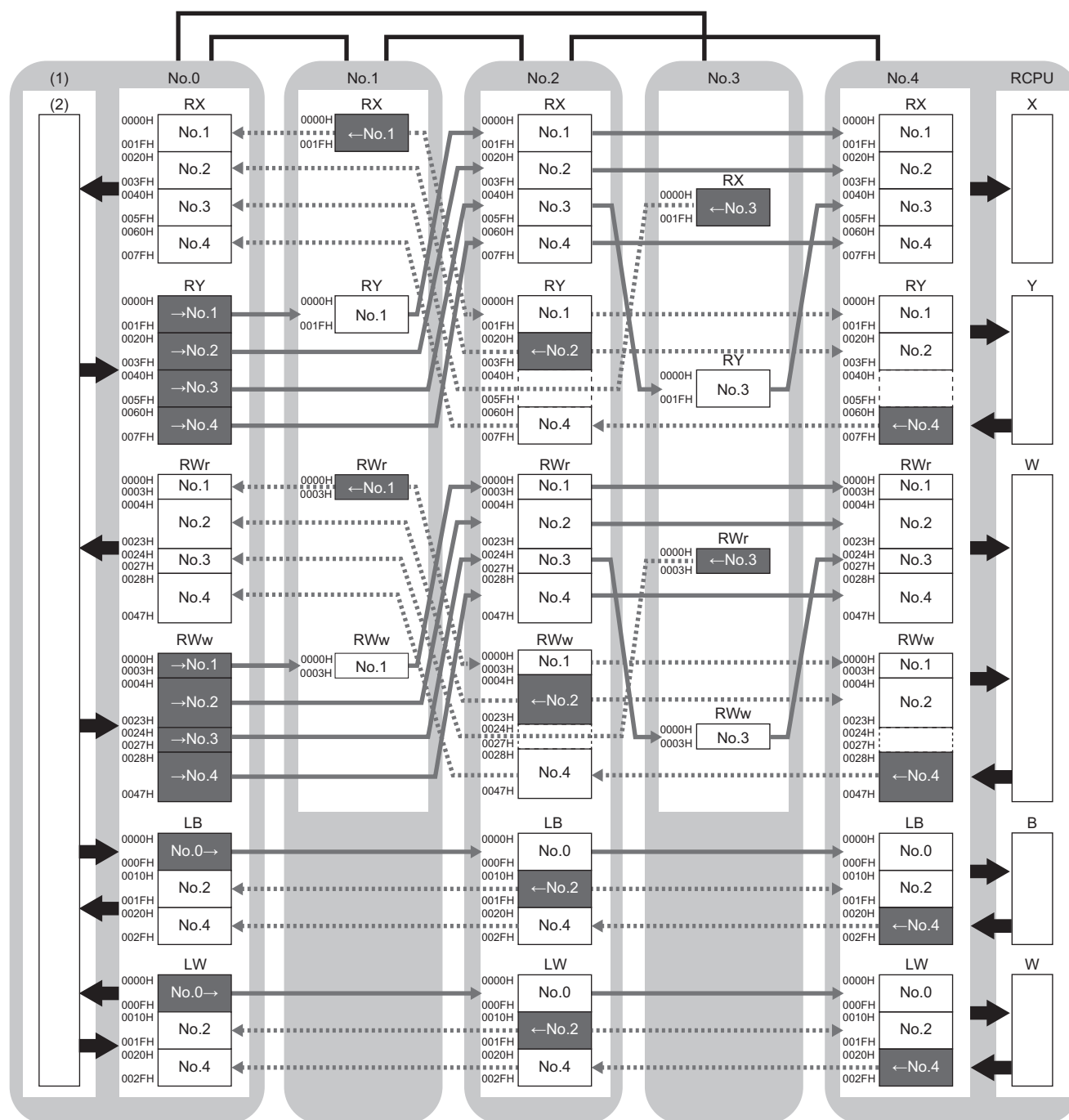
→ No.1, → No.2, → No.3, → No.4: Range of sending to station No.1, range of sending to station No.2, range of sending to station No.3, range of sending to station No.4

← No.1, ← No.2, ← No.3, ← No.4: Range of sending from station No.1, range of sending from station No.2, range of sending from station No.3, range of sending from station No.4

(1)   Personal computer

(2)   CC-Link IE TSN driver buffer

Communication using LB and LW

NZ81GN11-SX ○   NZ81GN11-T2 ○

Data in units of bits and words is communicated between the master station and a local station.

Master station and local station, local station and local station

■Unicast mode

Data is communicated between the master station and each local station on a 1:1 basis. It is not communicated between local stations.

No.0, No.1, No.2, No.3: Station No.0 (master station: board), station No.1, station No.2, station No.3

No.0 →: Range of sending to stations No.1, 2, and 3

← No.1, ← No.2, ← No.3: Range of sending from stations No.1, 2, and 3

(1)   Personal computer

(2)   CC-Link IE TSN driver buffer

❶ Device values are written to the CC-Link IE TSN driver buffer in the personal computer from a user program.

❷ The status of the CC-Link IE TSN driver buffer in the personal computer is stored in the link devices (LB and LW) of the board by link refresh.

❸ The statuses of the link devices (LB and LW) of the master station are stored in the link devices (LB and LW) of each local station on the receiving side by cyclic data transfer processing.

❹ The statuses of the link devices (LB and LW) are stored in the devices of the CPU module on the receiving side.

■Multicast mode

Link device data is communicated between local stations in addition to the master station and a local station.

No.0, No.1, No.2, No.3: Station No.0 (master station: board), station No.1, station No.2, station No.3

No.0 →: Range of sending to stations No.1, 2, and 3

← No.1, ← No.2, ← No.3: Range of sending from stations No.1, 2, and 3

(1)   Personal computer

(2)   CC-Link IE TSN driver buffer

❶ Device values are written to the CC-Link IE TSN driver buffer in the personal computer from a user program.

❷ The status of the CC-Link IE TSN driver buffer in the personal computer is stored in the link devices (LB and LW) of the board by link refresh.

❸ The statuses of the link devices (LB and LW) of the master station are stored in the link devices (LB and LW) of each local station on the receiving side by cyclic data transfer processing.

❹ The statuses of the link devices (LB and LW) are stored in the devices of the CPU module on the receiving side.

Communication using RX, RY, RWr, RWw, LB, and LW

Data in units of bits and words is communicated between the master station and a device station.

Coexistence of a 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: board), station No.1 (remote station), station No.2 (local station), station No.3 (remote station), station No.4 (local station)

→ No.1, → No.2, → No.3, → No.4: Range of sending to station No.1, range of sending to station No.2, range of sending to station No.3, range of sending to station No.4

← No.1, ← No.2, ← No.3, ← No.4: Range of sending from station No.1, range of sending from station No.2, range of sending from station No.3, range of sending from station No.4

No.0 →: Range of sending to stations No.2 and 4

(1)   Personal computer

(2)   CC-Link IE TSN driver buffer

■Multicast mode

No.0, No.1, No.2, No.3, No.4: Station No.0 (master station: board), station No.1 (remote station), station No.2 (local station), station No.3 (remote station), station No.4 (local station)

→ No.1, → No.2, → No.3, → No.4: Range of sending to station No.1, range of sending to station No.2, range of sending to station No.3, range of sending to station No.4

← No.1, ← No.2, ← No.3, ← No.4: Range of sending from station No.1, range of sending from station No.2, range of sending from station No.3, range of sending from station No.4

No.0 →: Range of sending to stations No.2 and 4

(1)   Personal computer

(2)   CC-Link IE TSN driver buffer

Link point extension

This is for extending the maximum link points of the link relay (LB) and the link register (LW) per network and per station.

The maximum link points per network and per station are extended to the following values according to the parameter setting.

LB/LW points extended setting	LB	LW
Not to extend	32K points (32768 points, 4 KB)	16K points (16384 points, 32 KB)
Extend	128K points (131072 points, 16 KB)	512K points (524288 points, 1024 KB)

Setting method

The following shows the procedure for setting parameters.

1. Set "Communication Mode" under "Application Settings" to "Multicast" for the master station. (☞ Page 154 Communication mode)

2. Set "LB/LW Points Extended Setting" under "Application Settings" to "Extend" for the master and local station. (☞ Page 154 Link points extended setting)

3. Assign link relays (LB) and link registers (LW) for the master station. (☞ Page 158 CC-Link IE TSN Configuration Setting)

4. Adjust the communication period setting for the master station. (☞ Page 74 Communication period setting)

Restriction

- Only the multicast mode is supported as the communication mode.
- Connection can be established only when setting "LB/LW Points Extended Setting" under "Application Settings" to "Extend" for all master and local stations and the settings are the same.
- The size of cyclic data must be 556 KB or less, which is the total of the assignment ranges of RX/RY/RWr/RWw and the value obtained by dividing the number of points of LB/LW used for each station by the communication period setting LB/LW.

■Communication period setting

If the number of link points increases by extending the number of points of LB/LW, data to be sent becomes larger; therefore, all data may not be sent in one communication cycle.

In this case, it is required to divide data to be sent at a time by setting the following under "Basic Settings" in the parameter of the master station.

- "Communication Period Setting (LB/LW)" in "Network Configuration Settings" for each station (☞ Page 148 Network configuration setting)
- "Multiple Period Setting" (☞ Page 150 Communication period setting)

When extending the number of points of LB/LW and setting "Communication Period Setting LB/LW" to an item other than "Basic Period," data of LB/LW is divided into equal portions according to the magnification set under "Multiple Period Setting" and sent.

Example) Station with "Communication Period Setting LB/LW" set to "Normal-Speed"

When selecting "×4" for "Normal-Speed" under "Multiple Period Setting," data of LB/LW is divided into four portions and sent one by one every cycle.

Example) Station with "Communication Period Setting LB/LW" set to "Low-Speed"

When selecting "×16" for "Low-Speed" under "Multiple Period Setting," data of LB/LW is divided into 16 portions and sent one by one every cycle.

■Cyclic data size when extending the number of points of LB/LW

The following shows the formula for calculating the total size of cyclic data when extending the number of points of LB/LW.

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

When setting "Normal-Speed" to 'M times' and "Low-Speed" to 'N times' under "Multiple Period Setting," the numbers of points of "LB Setting" and "LW Setting" are as follows:

- Number of points of "LB Setting" = Number of points of "LB Setting" of a local station with "Communication Period Setting LB/LW" set to "Basic Period" + (Number of points of "LB Setting" of a local station with "Communication Period Setting LB/LW" set to "Normal-Speed" ÷ M) + (Number of points of "LB Setting" of a local station with "Communication Period Setting LB/LW" set to "Low-Speed" ÷ N)
- Number of points of "LW Setting" = Number of points of "LW Setting" of a local station with "Communication Period Setting LB/LW" set to "Basic Period" + (Number of points of "LW Setting" of a local station with "Communication Period Setting LB/LW" set to "Normal-Speed" ÷ M) + (Number of points of "LW Setting" of a local station with "Communication Period Setting LB/LW" set to "Low-Speed" ÷ N)

Example) Total size of cyclic data received in the master station for the following settings (byte):

Station type	RX setting	RWw setting	LB setting	LW setting	Communication period setting LB/LW
Local station	32	256	4096	8192	Basic period
Local station	32	256	8192	16384	Normal-speed (×4)

$256 + (146 \times 2) + ((32 + 32) \div 8) + ((256 + 256) \times 2) + ((4096 + (8192 \div 4)) \times 2) + ((8192 + (16384 \div 4)) \times 2) = 38444$

Considerations

■Same setting in the same network

When using the link points extended setting, set "LB/LW Points Extended Setting" to "Extend" for both the master station and local station in the same network. A station with "Extend" set and one with "Not to Extend" set cannot be included in the same network.

○: Communication available

LB/LW points extended setting for the master station	LB/LW points extended setting for a local station	
	Not to extend	Extend
Not to extend	○	• An event (00C75H) occurs in the master station. • An error (2221H) occurs in a local station.
Extend	• An event (00C75H) occurs in the master station. • An error (2221H) occurs in a local station.	○

Neither local stations nor remote stations can be connected to the same network if they do not support the LB/LW points extended setting.

■Buffer memory

When setting "LB/LW Points Extended Setting" to "Extend," the address of the link device area in the buffer memory is changed. If this area is referenced by a user program, etc., an action must be taken, such as changing the reference of the buffer memory based on the value in 'Link points extended setting' (SB0063).

☞ Page 244 Buffer memory lists

Link refresh

Link device data is automatically transferred between the CC-Link IE TSN driver buffer in a personal computer and a board.

(1)   CC-Link IE TSN driver buffer
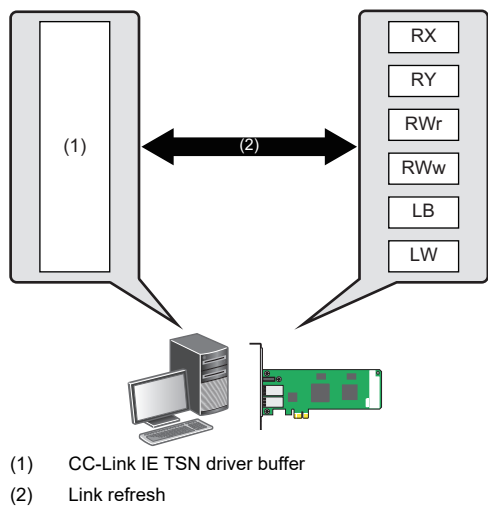
(2)   Link refresh

Concept of the link refresh range (number of points)

Link refresh is performed in the ranges set in "Refresh Setting" and "Network Configuration Settings" under "Basic Settings."
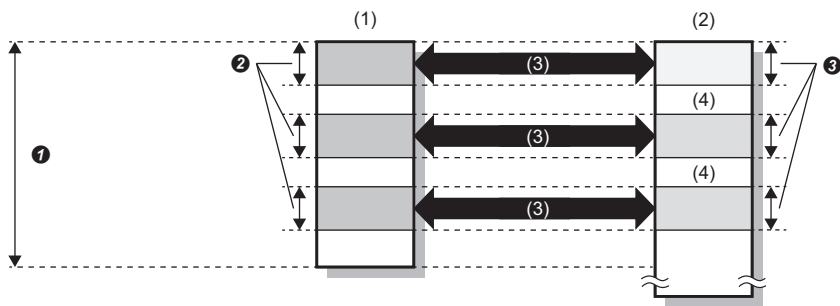
(1)   Personal computer (CC-Link IE TSN driver buffer)

(2)   Board

(3)   Link refresh

(4)   Empty

❶ Range set in "Refresh Setting" under "Basic Settings"

❷ Actual link refresh range

❸ Range set in "Network Configuration Settings" under "Basic Settings"

Link refresh timing

Link refreshes are performed in a link refresh cycle set in the parameter.

A link refresh and communication between stations are asynchronous.

(1)	Link refresh cycle
(2)	Communication between stations
(3)	Setting time
(4)	Link refresh
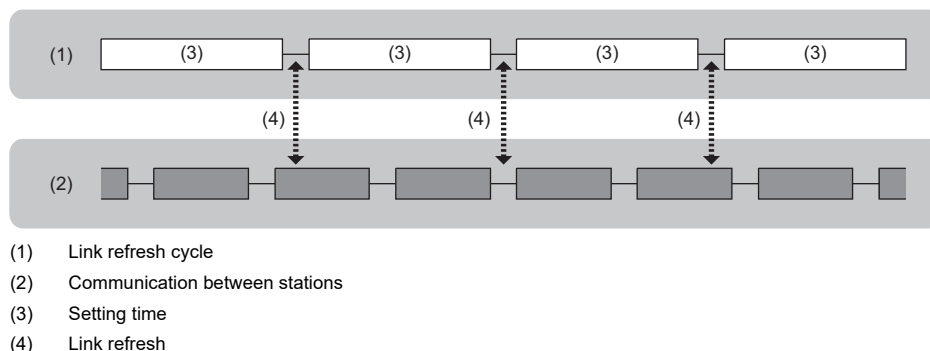
When handling 32-bit or larger data, old and new data may overlap in 16-bit units depending on the timing of link refresh.

In this case, use the function for assuring data for each station or in 32-bit units. (☞ Page 79 Cyclic data assurance)

Link refresh time

The link refresh cycle can be checked in "Board Diagnostics" screen. (☞ Page 126 Board list)

A link refresh cycle set in the parameter is compared with a link refresh processing time, and the longer one is applied as the link refresh cycle.

Shortening of transmission delay time

The transmission delay time can be shortened by reducing the number of link refresh points and shortening a communication cycle interval.

By setting only link devices used for a user program for the link refresh range, the number of link refresh points can be reduced.

Setting method

Assign link refresh ranges in "Refresh Setting" under "Basic Settings." (☞ Page 148 Refresh setting)

Set the link refresh cycle in "Driver Setting" under "Application Settings." (☞ Page 156 Driver setting)

Access to link devices

To read/write data from/to link devices of the own board in a user program, use MELSEC data link library functions.

> **Point**
>
> For details on the functions for accessing devices, refer to the following:
> 📖 MELSEC Data Link Library Reference Manual

When accessing link devices (RX, RY, RWr, RWw, LB, LW) with functions, data is sent to/received from the CC-Link IE TSN driver buffer in a personal computer.

When accessing link special relays (SB) or link special registers (SW), data is directly sent to/received from link devices in a board.
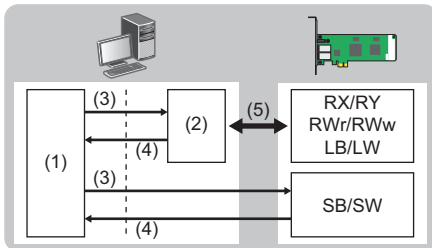
(1)   User program
(2)   CC-Link IE TSN driver buffer
(3)   Writing
(4)   Reading
(5)   Link refresh

Precautions

- A value written to the CC-Link IE TSN driver buffer is applied to a link device of a board after link refresh.
- If a value is outside the link refresh range, it is not applied to a link device of a board even if written to the CC-Link IE TSN driver buffer.
- For a receive area from another station in the link refresh range, a value is overwritten by link refresh even if written to the CC-Link IE TSN driver buffer.

Cyclic data assurance

The cyclic data can be assured for each 32 bit or for each station.

○: Applicable, —: Not applicable

Method	Description	Link refresh	Access to buffer memory
32-bit data assurance	Data is assured in 32-bit units. It is automatically assured by satisfying assignment conditions of link devices.	○	○
Station-based block data assurance	Data is assured in station-based units. It is assured by enabling the station-based block data assurance in the parameter setting.	○	—
Interlock program	Data exceeding 32 bits is assured. It is assured by configuring an interlock in a program.	○	○

Point

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

Setting method

Set the station-based block data assurance in "Supplementary Cyclic Settings" under "Application Settings." (☞ Page 153 Supplementary cyclic setting)

When setting "Station-based Block Data Assurance" to disable, data is assured in 32-bit units.

When setting "Station-based Block Data Assurance" to enable for the master station, data in all stations is assured for each station.

32-bit data assurance

Data in RWr, RWw, LW, and buffer memory is assured in 32-bit units.

If the following conditions are satisfied for access, 32-bit data is assured.

- The start device numbers of RWr, RWw, and LW are multiples of 2.
- The numbers of points assigned to RWr, RWw, and LW are multiples of 2.
- The start address of buffer memory is a multiple of 2.

(1)   CC-Link IE TSN driver buffer

(2)   Link device
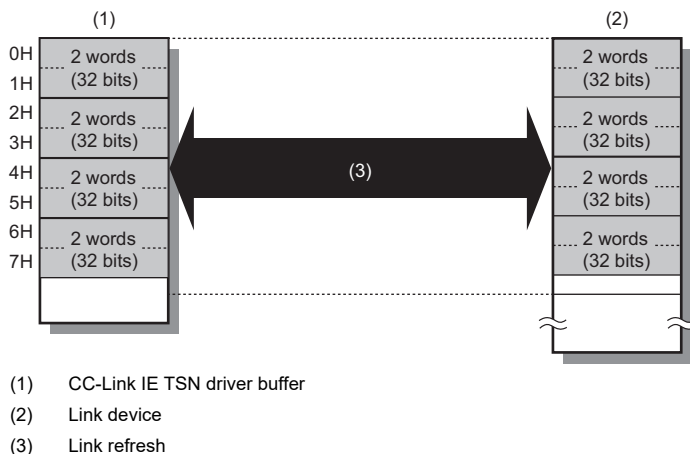
(3)   Link refresh

Station-based block data assurance

Cyclic data is assured for each station by handshaking between the CC-Link IE TSN driver buffer and a board for link refresh.

Link devices are assured as follows:

- RX, RY, RWw, and RWr are assured for each station.
- LB and LW are assured for each station.

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

(1)   CC-Link IE TSN driver buffer

(2)   Link device
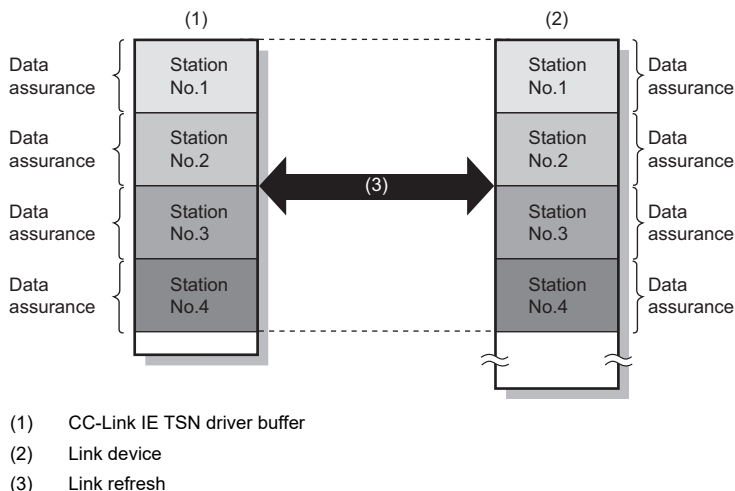
(3)   Link refresh

■Considerations

RX, RY, RWw, and RWr cannot be assured for each station with LB and LW.

Interlock program

Data exceeding 32 bits is assured without using the station-based block data assurance.

By using a target device for link refresh and configuring an interlock in a user program, cyclic data is assured.

- Remote input and output (RX/RY): ☞ Page 81 Data assurance by handshake of the remote input and output
- Remote register (RWw/RWr): ☞ Page 82 Data assurance by handshake of the remote registers
- Link relay (LB): ☞ Page 82 Data assurance by handshake of the link relays

■Data assurance by handshake of the remote input and output

Handshaking in data of a remote input/output (RX/RY) prevents data inconsistency in remote registers (RWw/RWr).

The following shows an example for sending RWw0 to RWw3 of the master station to RWr0 to RWr3 of the local station.

In this example, handshaking is performed by turning ON RY0 of the local station when storing sent data is completed.
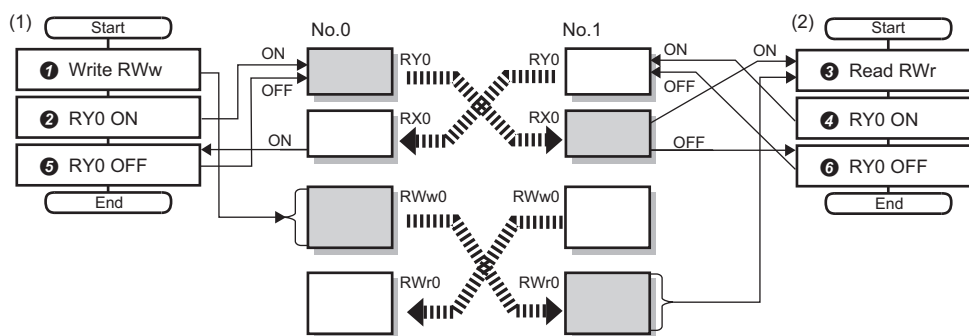
- Data flow

No.0   Sending station: Master station (station No.0): Board
No.1   Receiving station: Local station (station No.1): Board
(1)   User program for the master station
(2)   User program for the local station

- Program flow
❶ Sent data is written to RWw0 to RWw3.
❷ RY0 turns ON once the writing is completed.
❸ It is checked that RX0 is ON, then the contents of received data in RWr0 to RWr3 are read.
❹ RY0 turns ON once the reading is completed.
❺ It is checked that RX0 is ON, then RY0 turns OFF.
❻ It is checked that RX0 is OFF, then RY0 turns OFF.

# ■Data assurance by handshake of the remote registers

Handshaking by using some remote registers (RWw/RWr) prevents data inconsistency.

The following shows an example for sending RWw0 to RWw3 of the master station to RWr0 to RWr3 of the local station.

In this example, handshaking is performed by storing data indicating completion in RWr3F0 of the local station when storing sent data is completed.
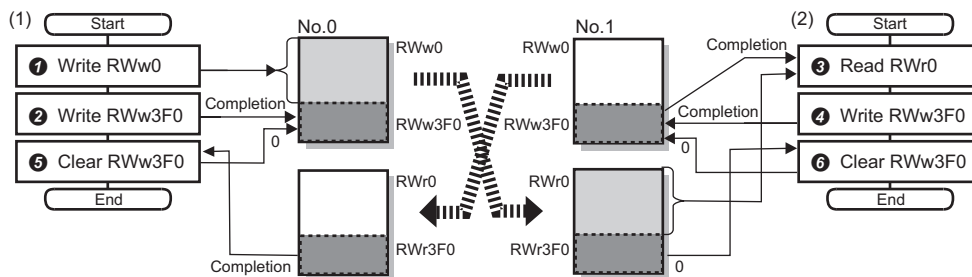
• Data flow

No.0   Sending station: Master station (station No.0): Board
No.1   Receiving station: Local station (station No.1): Board
(1)   User program for the master station
(2)   User program for the local station

• Program flow
❶ Sent data is written to RWw0 to RWw3.
❷ Data indicating the writing completion is written to RWw3F0.
❸ It is checked that the writing to RWr3F0 is completed, then the contents of received data in RWr0 to RWr3 are read.
❹ Data indicating the reading completion is written to RWw3F0.
❺ It is checked that the reading from RWr3F0 is completed, then RWw3F0 is cleared.
❻ It is checked that RWr3F0 is cleared, then RWw3F0 is cleared.

■Data assurance by handshake of the link relays

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 an example for sending LW0 to LW3 of the master station to LW0 to LW3 of the local station.

In this example, handshaking is performed by turning ON LB0 of the master station and LB100 of the local station when storing sent data is completed.
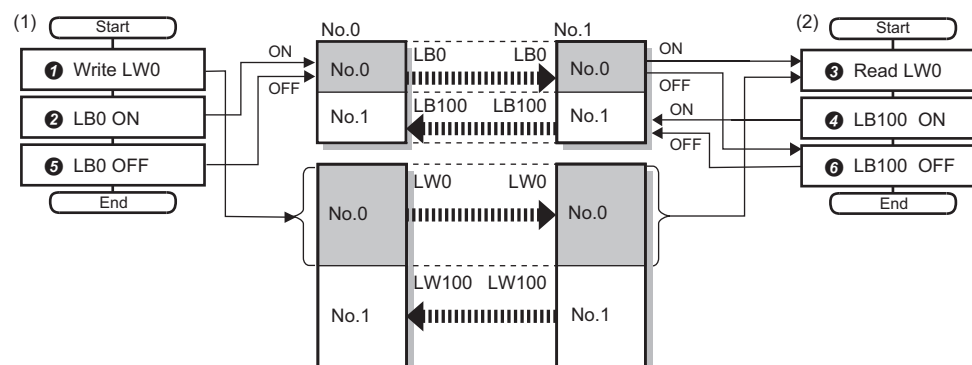
• Data flow

No.0   Sending station: Master station (station No.0): Board
No.1   Receiving station: Local station (station No.1): Board
(1)   User program for the master station
(2)   User program for the local station

• Program flow
❶ Sent data is written to LW0 to LW3.
❷ LB0 turns ON once the writing is completed.
❸ It is checked that LB0 is ON, then the contents of received data in LW0 to LW3 are read.
❹ LB100 turns ON once the reading is completed.
❺ It is checked that LB100 is ON, then LB0 turns OFF.
❻ It is checked that LB0 is OFF, then LB100 turns OFF.

Communication cycle coexistence

When device stations with different communication cycles are included in a 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 one with a low speed.
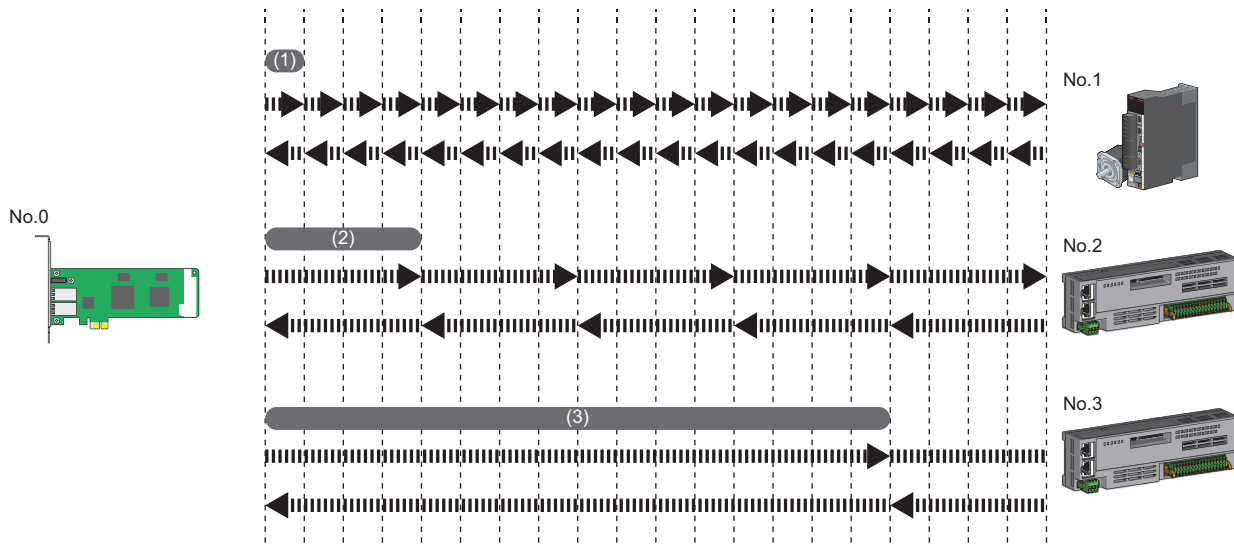
(1) Basic cycle
(2) Normal speed
(3) Low speed (×16)

Setting method

The master station communicates with device stations by using three communication cycles: the basic cycle set under "Basic Period Setting," and "Normal-Speed" and "Low-Speed" set under "Multiple Period Setting" in "Basic Settings." (⎘ Page 150 Communication period setting)

Select "Basic Period," "Normal-Speed," or "Low-Speed" for the communication cycle of each device station in "Network Configuration Settings" under "Basic Settings." (⎘ Page 148 Network configuration setting)

Precautions

When setting "Communication Mode" under "Application Settings" to "Multicast," set "Communication Period Setting" to "Basic Period" in "Network Configuration Settings" for the local station.

I/O maintenance setting

When an error occurs in cyclic transmission, whether to hold or clear an input from a station with the error can be selected.

Setting method

Set the I/O maintenance in "Supplementary Cyclic Settings" under "Application Settings." ()

Input data hold/clear operation on the receiving side

■If a stop error occurs on the sending side
- When the data link error station setting is set to "Hold," input data on the receiving side is held.
- When the data link error station setting is set to "Clear," input data on the receiving side is cleared.

■If the sending side is disconnected
- When the data link error station setting is set to "Hold," input data before the disconnection is held on the receiving side.
- When the data link error station setting is set to "Clear," input data on the receiving side is cleared.

Devices for which hold/clear setting is enabled

The following table shows the devices for which the data link error station setting is enabled.

Setting item	Hold/clear setting enabled	Hold regardless of the setting
Data Link Error Station Setting	• Master station RX • Local station RX • Local station RY (only input data from another station)	• Master station RWr • Local station RWr • Local station RWw (only input data from another station) • LB (only input data from another station) • LW (only input data from another station)

Input data hold/clear operation from a data link error station

The following shows the devices for which "Data Link Error Station Setting" is enabled when an error occurs in each station.

■Unicast mode
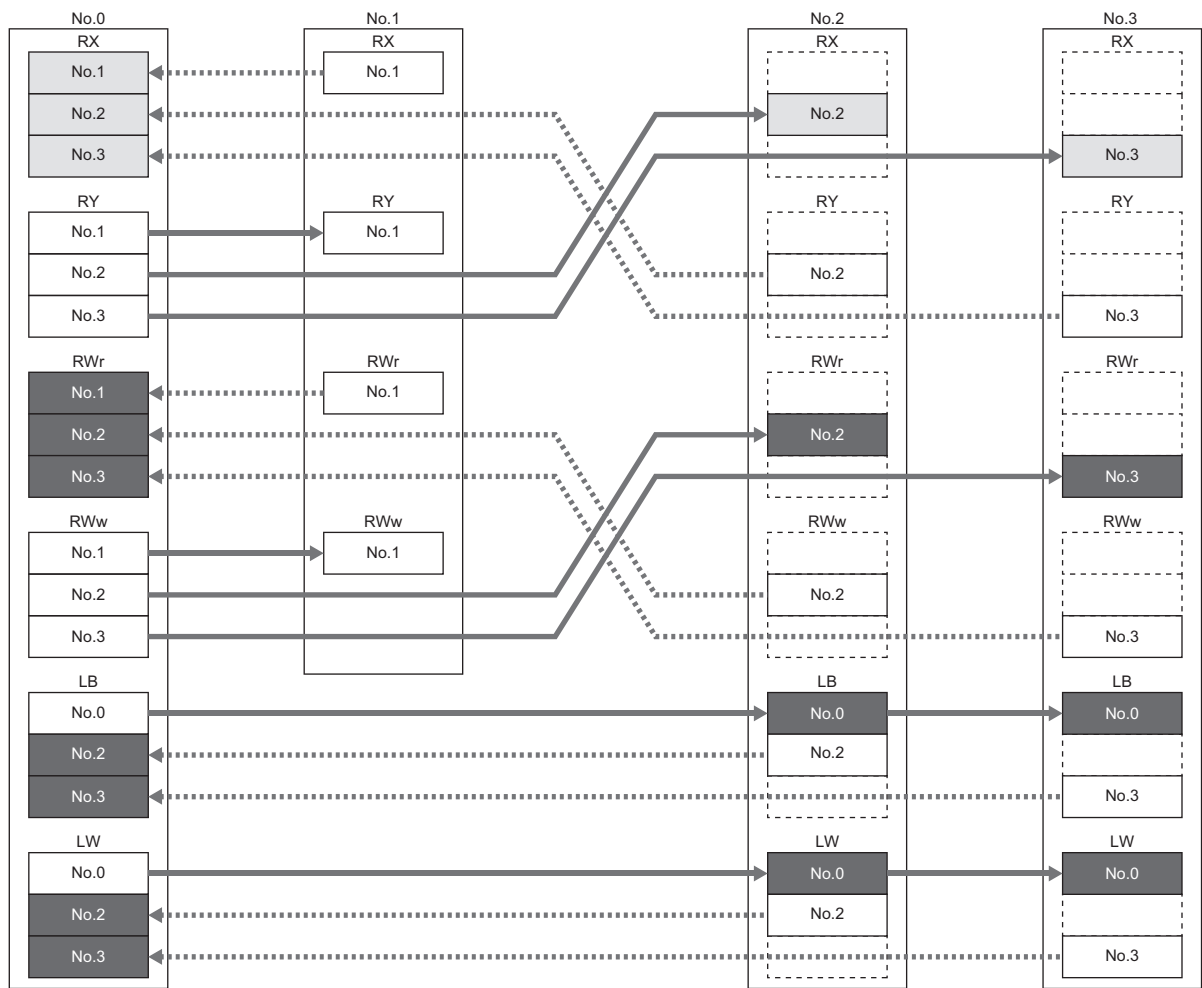
No.0, No.1, No.2, No.3: Station No.0 (master station: board), station No.1 (remote station), station No.2 (local station), station No.3 (local station)

☐ : Devices that are held or cleared according to the parameter setting

▨ : Devices that are held regardless of the parameter setting

■Multicast mode
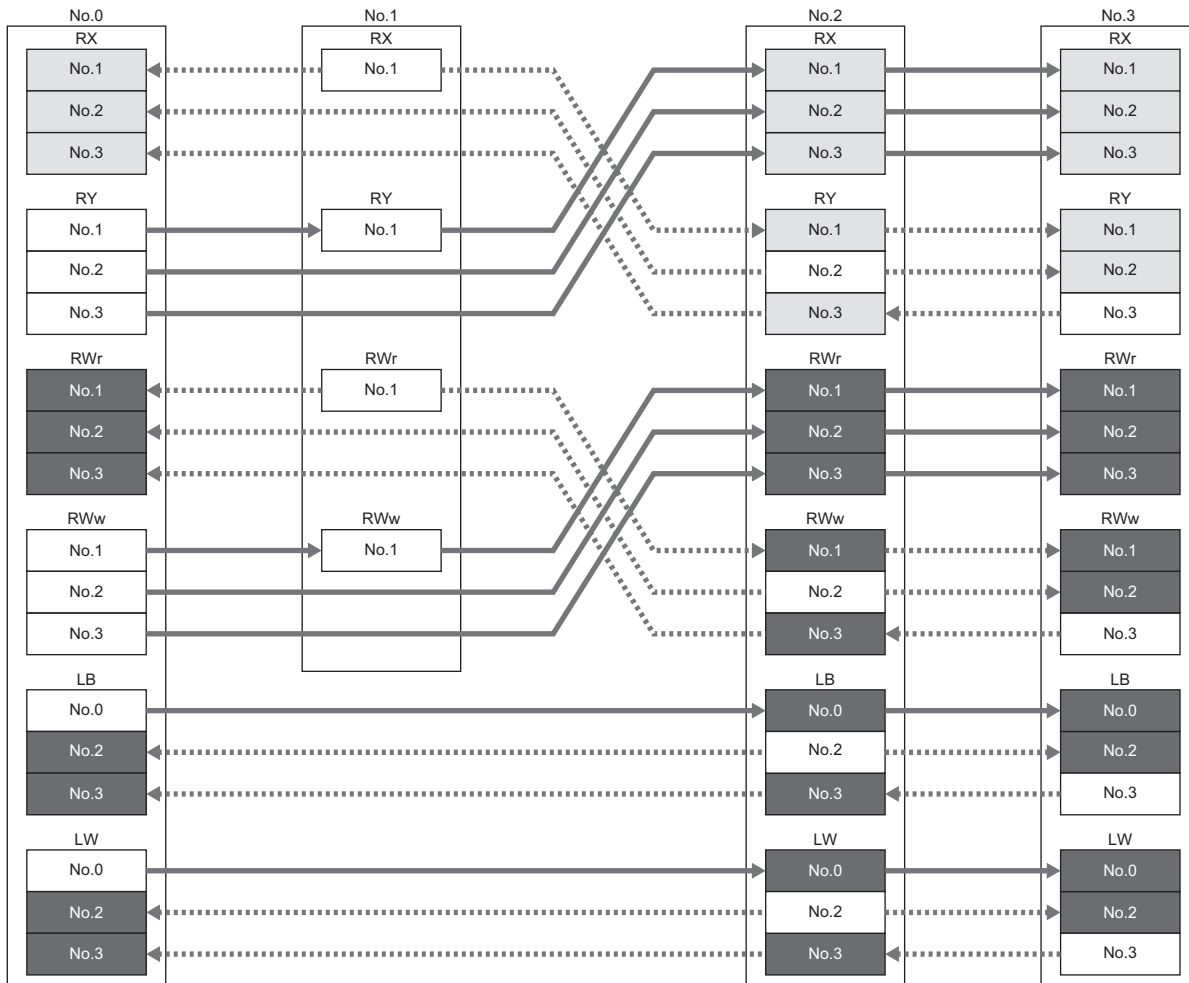
No.0, No.1, No.2, No.3: Station No.0 (master station: board), station No.1 (remote station), station No.2 (local station), station No.3 (local station)

▢ : Devices that are held or cleared according to the parameter setting

▨ : Devices that are held regardless of the parameter setting

7.3 Transient Transmission

This section shows the function used to communicate with other stations at any timing. Communication can also be established with different networks.

Communication within the same network

Other stations in the same network can be accessed.

Regardless of the network configuration, communication can be established with stations in the same network.

Communication with different networks

Communication can also be established with stations in different networks by using the routing function (Page 93 Routing function).

In addition, seamless communication with stations in different types of networks is available.

(1)   Relay station

Point
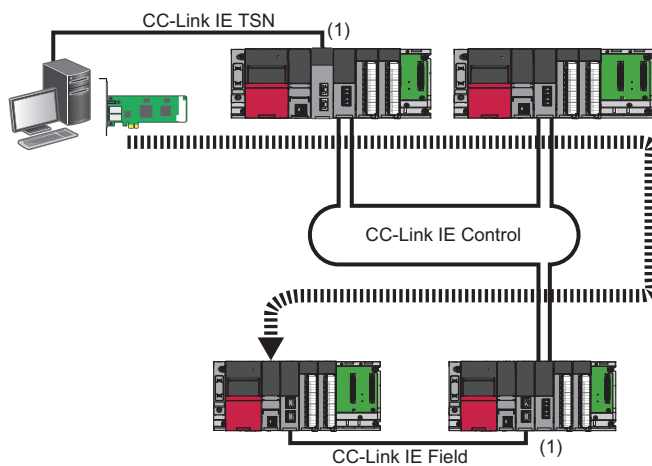
Communication can be established with stations within eight networks (number of relay stations: 7).

Considerations for transient transmission

■When the communication speed is different between the master station and a target station

• Perform transient transmission in the master station.

• Do not perform multiple transient transmissions simultaneously. Doing so may cause them not to be performed. When performing multiple transient transmissions, configure an interlock so that a transient transmission is performed after completion of another.

SEND/RECV function

The SEND/RECV function sends/receives data to/from the programmable controller on another station using the MELSEC data link library function. This function supports the SEND/RECV instruction of link dedicated instruction. For details on the function, refer to the following:

📖MELSEC Data Link Library Reference Manual

Channel

A channel is an area of a board where data handled by the SEND/RECV function is stored. By using multiple channels, it is possible to simultaneously access from the own station to other stations or concurrently read from and write to the same board.

■Number of channels

The number of channels that can be used for the SEND/RECV function is 8.

■Considerations

When executing the sending and receiving of multiple data simultaneously by the SEND/RECV function, make sure that the channels for the instructions are not duplicated. The sending and receiving for which the same channel is specified cannot be executed simultaneously. To use the same channel for multiple sending and receiving, execute one after completion of another.

SEND function

The SEND function sends data from the own station to the specified channel of the specified station using the mdSendEx function of MELSEC data link library.

Specify a channel used by the own station and a target station channel.
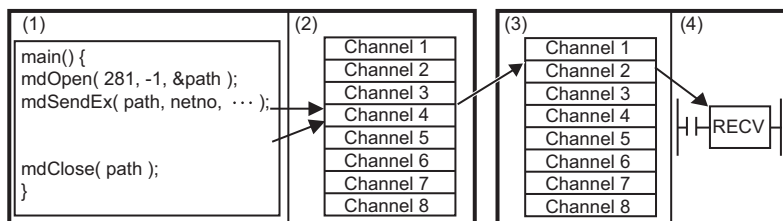
(1) User application
(2) Board (own station)
(3) Network module (target station)
(4) CPU module

■Considerations

 • When sending data to the same channel of the target station

Send the data after the target station has been read the specified channel data.

An error occurs if sending the data to the same channel of the target station before reading the specified channel data.
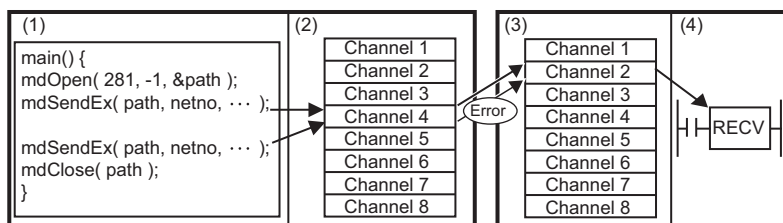
(1) User application
(2) Board (own station)
(3) Network module (target station)
(4) CPU module

 • When the multiple network modules are mounted on the target station

Specify the network number and station number of the network module which receives the request from the own station.

The following example specifies the station number 2 of the network number 1. (The station number 1 of the network number 2 cannot be specified.)
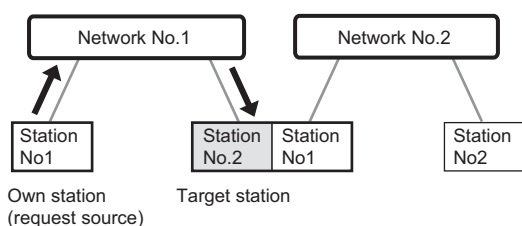
 • Only the even-number byte can be specified for the transmission data size.
 • A logical station number cannot be specified.
 • When performing the SEND function for all stations specification in a ring topology

Data of the SEND function is received twice in a target station if no loopback occurs.

To accurately acquire the number of times the SEND function is performed in a station where the RECV function is performed, store the number of times in sent data and check it when performing the RECV function.

■Execution type

Two execution types, "Without arrival acknowledgment" and "With arrival acknowledgment," are available for the SEND function. When sending data with "Without arrival acknowledgment" execution type, "All stations" and "Group Number" can be specified as target stations besides the station number.

 • Without arrival acknowledgment (When the target station is on the same network)

The process is completed when data is sent from the own station.

Request source — Target station — Completed
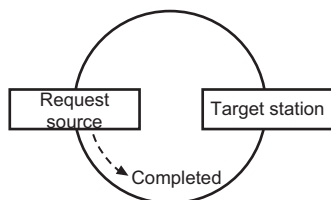
 • Without arrival acknowledgment (When the target station is on another network)

The process is completed when data arrives at the relay station on the same network.

Request source — Relay station — Target station — Completed
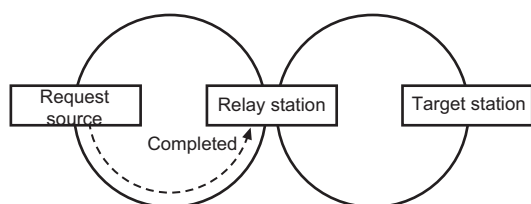
 • With arrival acknowledgment

The process is completed when data is stored in the specified channel of target station.

Request source — Relay station — Target station — Completed — Target station — Completed
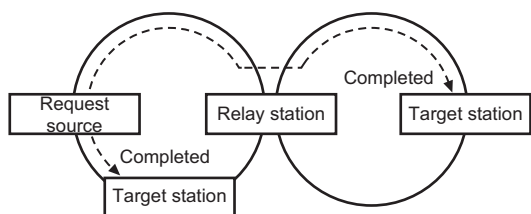
> **Point**
>
> When "Without arrival acknowledgment" is specified, the result is regarded as normal on the own station even if the sending to the target station fails as follows:
> • When communication ends normally even though sent data are abnormal
> • When data cannot be stored in the target station, because data is sent to the same station from multiple stations
>
> If the target station is a board, the data may not be received even if the sending set to "With arrival acknowledgment" is completed normally. For details, refer to the RECV function (☞ Page 91 RECV function).

■Transient transmission by specifying all stations or a group number

When performing the SEND function without arrival acknowledgment, data can be sent at a time to all stations in the same network or multiple stations set in advance.

Select the following as station numbers of access targets with the mdSendEx function of MELSEC data link library.

 • All stations: All stations in the same network can be set as target stations.

 • Group No.: All stations with the same group number can be set as target stations.

A network can be divided into up to 32 groups in the group number setting. (☞ Page 154 Transient transmission group number setting)

RECV function

The RECV function reads data received from another station using the mdReceiveEx function of MELSEC data link library.
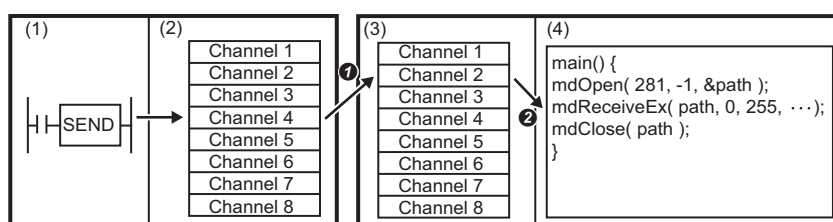
(1)   CPU module

(2)   Network module (other station of the send source)

(3)   Board (own station)

(4)   User application

❶ Data received from other stations is stored in a storage channel of the target station specified in the send source.

❷ Data of the specified channel number is read by using the mdReceiveEx function.

■RECV function receive buffer

The RECV function receive buffer is a receive buffer in the driver that is used for the RECV automatic execution function by the driver and for storing received data for each channel number.

To use the RECV function receive buffer, set it for "RECV Function Receive Buffer" in "Application Settings." (☞ Page 156 Driver setting)

 • When selecting "Not Use"

When not using the RECV function receive buffer, the operation is the same as the RECV function of link dedicated instruction for a CPU.

This setting is used for detecting errors in sent data, whose execution type of the SEND function is set to "With arrival acknowledgment," at the sending side.

 • When selecting "Use"

Data received from another station is stored in a specified channel number then the RECV function receive buffer automatically.

Use this for receiving data from multiple stations, such as data collection.
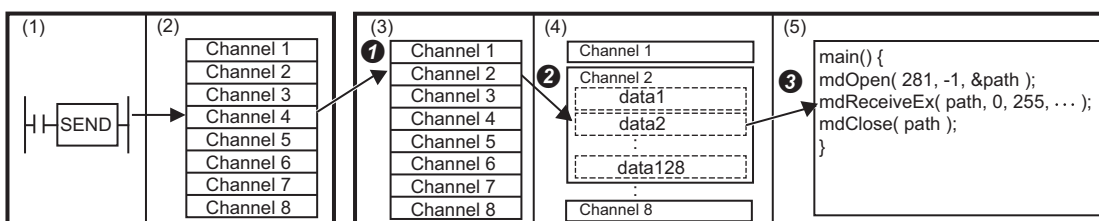
(1)   CPU module

(2)   Network module (other station of the send source)

(3)   Board (own station)

(4)   RECV function receive buffer

(5)   User application

❶ Data received from other stations is stored in a storage channel of the target station specified in the send source.

❷ The data received by the driver is stored in the receive buffer of each channel number from the storage channel of the target station.

❸ By using the mdReceiveEx function, data of the specified channel number is read from the receive buffer in order in which it is received.

A maximum of 128 reception data are stored in the RECV function receive buffer for each channel number.

When received data exceeds 128, the driver discards the received data automatically.

When the receive buffer is set, an error may occur under the following conditions.

Condition	Description	Corrective action
Data is read immediately after the send data completion at the sending station.	When executing the mdReceiveEx function immediately after the send data completion at the sending station, 'No reception data error' occurs because data has not yet been stored in the receive buffer of the driver.	• Retry the operation after 1 ms or more.
Data is sent consecutively from the sending station.	When attempting data send consecutively, "Channel busy (dedicated instruction) error" occurs at the sending station because the channel is being used by the driver and thus the sent data cannot be received.	• Retry the operation after 1 ms or more. • Change the storage channel of the target station.

■Considerations for using the RECV function receive buffer

- When 128 received data are stored in the RECV function receive buffer, the board receives data once, and then, the data are discarded. Therefore, a normal completion is established at the sending side when the data are sent with "With arrival acknowledgment."
- When receiving data to the multiple channels of the board, create a user program to read data from all channels that receive data. If a channel from which data are not read exists in the channel from which data are received, the received data of the channel from which data are not read are accumulated in the RECV function receive buffer and all area of 128 data are occupied. In this case, the received data of other channels cannot be read because the driver automatically discards subsequent data received by the board.

■Operational change according to the setting of the RECV function

- RECV execution request flag

When receiving data from another station, the RECV execution request flag status of link special relay is set as follows according to the setting.

RECV function receive buffer	'RECV execution request flag' (SB0030 to SB0037) when data from another station is received
Use	No change
Not use	Flag turns ON

- When data is not received at the execution of the mdReceiveEx function

The action is set as follows according to the setting.

RECV function receive buffer	Operation status of mdReceiveEx function
Use	The function ends with an error. (No reception data error)
Not use	The function waits for up to the time set for the transient timeout monitoring time. (☞ Page 156 Driver setting) When data is received: The function ends normally. When data is not received: The function ends with an error. (Response timer timeout (dedicated instruction))

Communication by specifying devices and buffer memory of another station

Data is read/written from/to devices of a CPU module in the master station or local station, or the buffer memory of a remote station by using the MELSEC data link library.

Stations in a different network can also be specified.

For details on available MELSEC data link library functions, refer to the following:

📖MELSEC Data Link Library Reference Manual

Communication using utilities

Each station can be set and monitored by using the following utilities:

- CC IE TSN utility (☞ Page 125 Diagnostics)
- Device monitor utility (📖MELSEC Data Link Library Reference Manual)

Access to other stations by using the device monitor utility is also performed in transient transmission using the MELSEC data link library.

Routing function

The routing function selects a communication route when accessing stations in different networks.

There are two types: dynamic routing in which a communication route is automatically selected, and static routing in which any communication route can be set.

Precautions

This board cannot be used as a relay station for the routing function.

To use this function, set a network module as a relay station.

Dynamic routing

A communication route is automatically selected.

A communication route on which few relay stations pass through is created and updated as necessary.

Dynamic routing can be used in a network system configured with devices supporting it.

Precautions

- When enabling dynamic routing, a data link must be available. Mounted modules are treated as routing targets even if a data link is not available. The data link status can be checked by performing a communication test.
- If there are networks with the same number in a network system, an access target may not be set correctly with dynamic routing. Avoid network number duplication in the network system.
- If there is any station with static routing set in a network system, a communication route with more than seven relay stations is created with dynamic routing and an error may occur in transient transmission. If any relay station does not support dynamic routing, set static routing for all the stations in the communication route. (☞ Page 156 Routing setting)

■Setting method
Check that "Dynamic Routing" under "Application Settings" is set to "Enable." (☞ Page 156 Routing setting)

Static routing

Any communication route can be set.

Use this for a system in which network modules supporting dynamic routing and those not supporting it are included or when setting a communication route clearly.

Communication can also be established with networks including stations not supporting dynamic routing.

■Setting method
Set a communication route in "Routing Setting" under "Application Settings." (☞ Page 156 Routing setting)

In order to turn to other networks, set the network/station number of passing local network (relay station) and the network number of final attainment destination (target station).

Up to 238 routing settings can be set.

> **Point**
>
> If there is MELSECNET/10 in a transfer or relay destination, set "Condition Setting of Relay/Target Network" to "MNET/10 Exists." (☞ Page 156 Routing setting)

Configuration containing a redundant system

When relaying a redundant system, use dynamic routing.

If using static routing, set the station in the control system as a relay station. If the system is switched, the relay station needs to be changed to the station in the new control system.

7.4 Security

This section shows security that can be provided according to the network environment by restricting access for each communication route.

IP filter

Unauthorized access can be prevented by identifying the IP address of an access source.

By setting the IP address of an access source in the CC IE TSN utility, IP packets are allowed or denied. (IP packets received from an access source are allowed or denied; those sent from the own station are ignored.)

Use of this function is recommended when using a board in an environment connected to a LAN line.
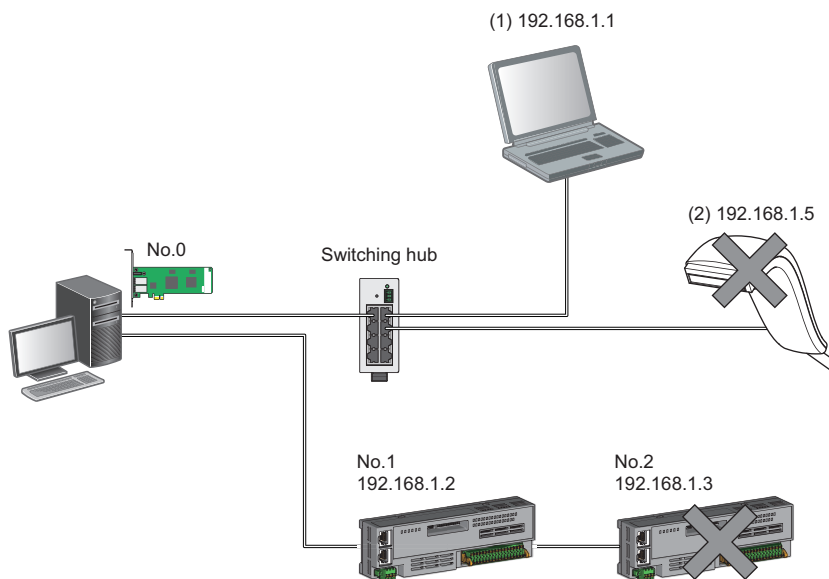
When setting the IP addresses with "Allow" selected to 192.168.1.1 and 192.168.1.2 by using the IP filter of the master station No.0:

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 it.

Restriction

This function can be used for access via Ethernet and CC-Link IE TSN only.

Point

The IP filter is one method of preventing unauthorized access (such as a program or data destruction) from an external device. It does not completely prevent unauthorized access. To maintain the security (availability, integrity, and confidentiality) 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 cyberattacks.

Examples of measures for unauthorized access are shown below.

- Installing a firewall or VPN
- Installing a personal computer as a relay station and controlling the relay of send/receive data with an application program
- Installing an external device for which the access rights can be controlled as a relay station (Contact the network service provider or equipment dealer for details on the external devices for which access rights can be controlled.)

Setting method

1. Set an IP address to be allowed or denied in "IP Filter Settings" in "Security" under "Application Settings." (☞ Page 155 IP filter settings)

A warning screen appears in the following cases:

- Denying the IP address of a device station set in "Network Configuration Settings" under "Basic Settings" was attempted.
- No device station is set in "Network Configuration Settings" under "Basic Settings," and no IP address is set to be allowed under "IP Address" in the "IP Filter Settings" screen (because the IP filter denies every IP address).

2. Write the parameters.

3. The IP filter is enabled when the reset is completed.

> **Point**
>
> Even if the connection is specified in "Network Configuration Settings" under "Basic Settings" or in a program, access from an external device is allowed or denied according to the setting in the "IP Filter Settings" screen.

Setting target

All IP addresses connected to the same network must be set to be allowed or denied. Also, set the IP address of a device station registered in "Network Configuration Settings" under "Basic Settings" to be allowed or denied.
Register the setting contents in the master station to allow or deny IP packets received from a device station with the registered IP address.

Operation

Even for a device station registered in "Network Configuration Settings" under "Basic Settings," a station with an IP address set to be denied is disconnected, and cyclic transmission and transient transmission are not performed. Such a station is also displayed as a disconnected station in the "CC-Link IE TSN Diagnostics" screen. However, Ethernet devices are not displayed in the "CC-Link IE TSN Diagnostics" screen.
When an IP packet is received from an IP address set to be denied, the denial is registered in the event history of the master station.

Precautions

- Do not set the IP address of the master station or device station to be denied. If setting a device station to be denied in a line topology, neither cyclic transmission nor transient transmission can be performed with device stations connected after the device station set to be denied.

No.0   No.1: 192.168.1.1   No.2: 192.168.1.2   No.3: 192.168.1.3
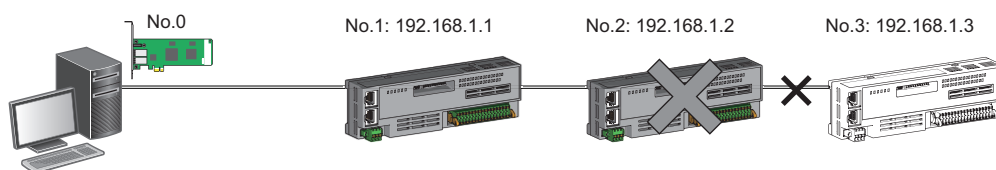
When the "Deny" IP address is set to 192.168.1.2 using the IP filter of the master station No.0:
Only the device station No.1 can access the master station, and the device stations No.2 and No.3 cannot access it.

- If there is a proxy server on the LAN line, deny the IP address of the proxy server. Otherwise, the access from the personal computers that can access the proxy server cannot be prevented.
- To deny access from an external device to another station, configure the IP filter setting to deny the IP address of the external device for a target station and a connected station (station connected directly to the external device).

7.5 RAS

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

Device station disconnection

NZ81GN11-SX ○　**NZ81GN11-T2** ○

A data link in a station where an error has occurred stops and continues with only stations operating normally.

Automatic return

NZ81GN11-SX ○　**NZ81GN11-T2** ○

A data link automatically restarts when a device station disconnected due to an error is reconnected.

Precautions

- When disconnecting the cable of a device station while the system is running, check that the device station is in cyclic transmission or disconnected.
- When disconnecting the cable of a board, check that the D LINK LED is ON or OFF in the board diagnostics screen. (☞ Page 126 Board information)

Loopback function

NZ81GN11-SX NZ81GN11-T2

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

Cable disconnection

■Ring topology

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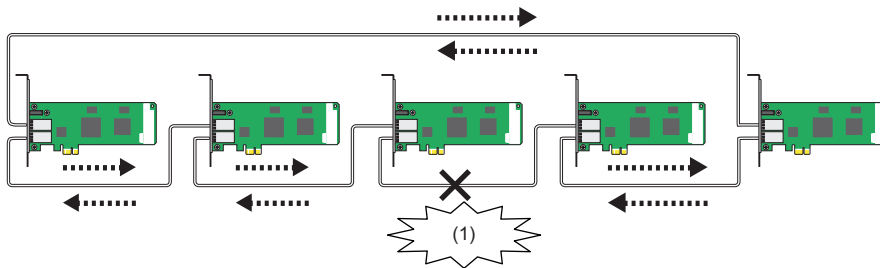
(1) Disconnected

■Line topology

Stations connected after the cable disconnection point are disconnected.
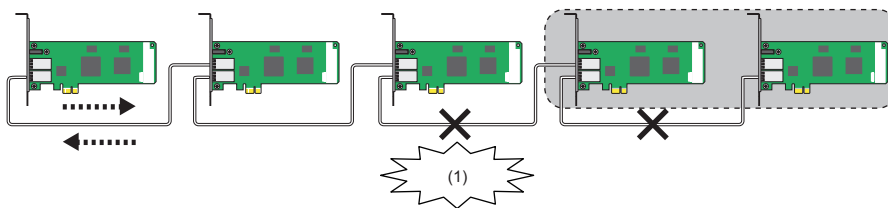
(1) Disconnected

Error occurrence in a station

■Ring topology

The system disconnects faulty stations and automatically performs a loopback to continue the data link.
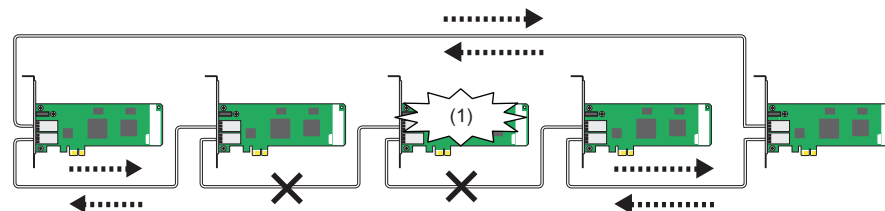
(1) Error

■Line topology

Stations connected after the faulty station are disconnected.
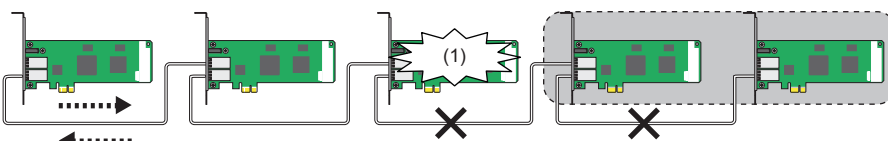
(1) Error

Setting method

1. Configure the network in a ring topology.

2. Set "Network Topology" to "Ring" under "Basic Settings" of the master station.

Operation according to the parameter setting and network configuration

Network topology setting[1]	Actual connection status		
	Ring topology	Line topology	Star topology, or coexistence of line and star topologies
Ring	Normal operation	Cyclic transmission starts. • For the LED display of the link-down port in the loopback station, the SD/RD LED turns OFF and the L ER LED or L ERR LED turns ON. • 'Loopback status' (SB0065) turns ON in the master station. • The station number of the loopback station is stored in 'Loopback station number 1' (SW0070) and 'Loopback station number 2' (SW0071). • In the network configuration diagram of CC-Link IE TSN diagnostics, the topology is displayed as a line topology.	Data link error • The ERR LED on the master station turns ON. • '60H: Illegal ring connection (master station only)' is stored in 'Cause of data link stop' (SW0049).
Line/Star	Data link error • The ERR LED on the master station turns ON. • '60H: Illegal ring connection (master station only)' is stored in 'Cause of data link stop' (SW0049).	Normal operation	Normal operation

*1

Point

If a station for which no parameters are set exists in a ring topology, the station does not perform a data link. In such a case, a loopback occurs in the adjacent station.

Considerations

■Supported version of a module

To use the loopback function, check that all stations support a ring topology.

■Loopback function setting and network configuration

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

■When a loopback occurs or a loopback is resolved

Due to the occurrence or resolution of a loopback, transient transmission may become temporarily impossible. The following shows the periods of time until transient transmission becomes possible again.

 • A period of time until transient transmission becomes possible after the occurrence of a loopback: Maximum 1.1 seconds
 • A period of time until transient transmission becomes possible after the resolution of a loopback: Maximum 1.3 seconds

Transient transmission performed at the time of the occurrence or resolution of a loopback may be completed with an error. In such a case, perform transient transmission again.

■Loopback detection

Loopback may not be detected properly in the following cases:

 • IP address duplication is detected in the master station.
 • A ring topology is incorrect.
 • A device station is being reset.
 • A device station on another network is connected.
 • A time synchronization error (event code: 00C62) or grandmaster switching (CC-Link IE TSN device) (event code: 00C63) is detected in a device station.

If a loopback cannot be detected correctly, any of the following information may not be correctly displayed or stored.

 • Icon indication in the network configuration diagram of "CC-Link IE TSN Diagnostics"
 • Indication of loopback occurrence (event code: 00C23)
 • Values of 'Loopback status' (SB0065), 'Loopback station number 1' (SW0070), and 'Loopback station number 2' (SW0071)

7

Master station duplication detection

Duplication is detected if there are multiple master stations in one network.

• If powering ON or connecting multiple master stations simultaneously or if resetting a board, master station duplication detection (error code: 300FH) is detected in all the master stations and cyclic transmission cannot be performed in all stations. (Transient transmission is available.)

No.0 No.1 No.2 No.0
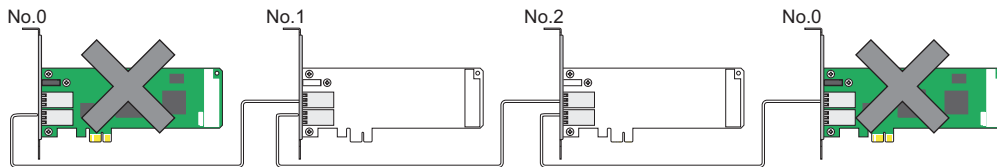
• If adding another master station to the network during a data link, master station duplication detection (error code: 300FH) is detected in the added master station and cyclic transmission cannot be performed. (Transient transmission is available.) The data link continues in the other stations.

No.0 No.1 No.2 No.0
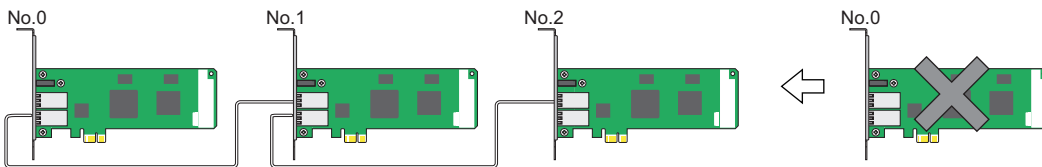
• If connecting networks during a data link, master station duplication detection (error code: 300FH) is detected in the master station in both or one of the networks and cyclic transmission cannot be performed in all stations in the network with master station duplication detected. (Transient transmission with IP address specified is available.)
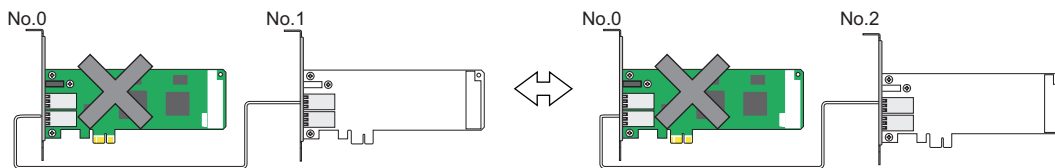
No.0 No.1 No.0 No.2

Point

If connecting multiple CC-Link IE TSN boards installed in the same personal computer to the same network, unintended duplication may be detected in the following cases:

• The parameter setting (writing to a board) or channel number setting is configured.
• A board with a duplicate channel number exists.

If duplication is detected, check if the channel number setting is duplicate and reset each board installed in the same personal computer.

IP address duplication detection

NZ81GN11-SX ○ NZ81GN11-T2 ○

Duplication is detected if there are stations with the same IP address in one network.

Detection timing

■When adding a station

If a station with the same IP address already exists when adding a device station, IP address duplication detection (error code: 2160H) is detected in the added station and a data link cannot be performed. (The data link continues in the other stations.)

192.163.3.0   192.163.3.1   192.163.3.2   192.163.3.1
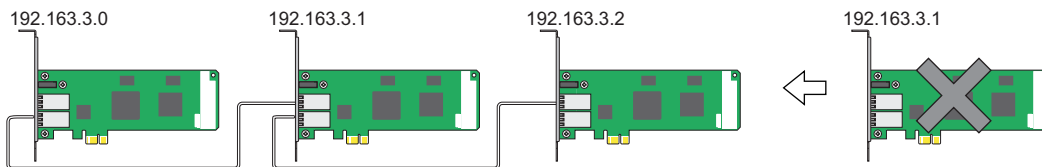
Precautions

When adding a device station already connected (linked up) with a TSN hub and the TSN hub is added to the network, IP address duplication is not detected in the added station. If IP address duplication detection (error code: 1802H) is detected in the master station, disconnect the device station from the network. Otherwise, multiple stations with the same IP address will exist in the same network and transient transmission may be sent to an unintended station.

> **Point**
>
> If connecting multiple CC-Link IE TSN boards installed in the same personal computer to the same network, unintended duplication may be detected in the following cases:
> - The parameter setting (writing to a board) or channel number setting is configured.
> - A board with a duplicate channel number exists.
>
> If duplication is detected, check if the channel number setting is duplicate and reset each board installed in the same personal computer.

■When starting cyclic transmission

Startup processing of cyclic transmission is performed when powering OFF and ON the master station, resetting a board, or connecting the master station in which cyclic transmission is not performed, etc. If there is a station with the same IP address in the network when startup processing of cyclic transmission is performed, device station IP address duplication (error code: 3021H) is detected in the master station and a data link cannot be performed.

192.163.3.0   192.163.3.1   192.163.3.2   192.163.3.1
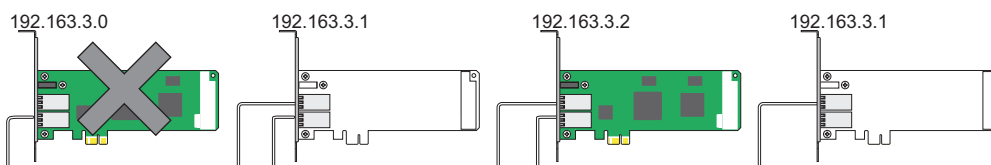
■Cyclic transmission in progress

During cyclic transmission, an IP address is periodically checked for duplication in the master station. If an IP address is duplicate, IP address duplication detection (error code: 1802H) is detected in the master station and cyclic transmission cannot be performed with the device station. (The data link continues in the other stations.)

> **Restriction**
>
> IP address duplication between an Ethernet device and a CC-Link IE TSN device or between Ethernet devices is not detected when starting cyclic transmission in the master station.

7

Method for recovering from IP address duplication

If IP address duplication detection (error code: 1802H) or device station IP address duplication (error code: 3021H) is detected in the master station, change the IP address of the relevant station and reset the master station.

Time synchronization

The time in a device station can be synchronized with that in a time synchronization source (CPU module or personal computer in the master station).
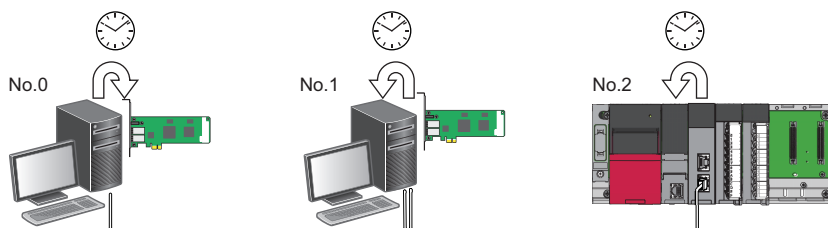
> **Point**
>
> When using this product as the master station, do not connect time synchronization devices with the time synchronization priority 0 to 15.
> A priority is a value that is assigned to a time synchronization device from the devices in a network to determine the grandmaster. The smaller the value, the higher the priority.
> For the methods for checking and setting the priority, refer to the manual for a time synchronization device.

Precautions

- When using this function, the time setting function (SNTP client) of an Ethernet-equipped module cannot be used. (MELSEC iQ-R Ethernet User's Manual (Application))
- The time cannot be synchronized by using SNTP for the personal computer in a local station.
- If multiple boards are installed in a personal computer, configure the time reflection setting to the personal computer for one board only. If it is configured for multiple boards, the time is overwritten by the time in a board synchronized later.
- This function cannot be used for MELSECWinCPU modules.

Setting method

■Buffer memory

Set the following buffer memories: ()

- Set an interval for distributing the time for 'Time distribution interval setting of the personal computer' (address 1275136 (137500H)) of the master station.
- Set 'Reflect the time to the personal computer (0001H)' for 'Time reflection setting to the personal computer' (address 1275137 (137501H)) of the local station.

■"Date & time" settings in Windows

Set the time zone, daylight saving time, and time for a personal computer in which a board is installed in "Date & time" in Windows.

- Set the time zone and daylight saving time to the same for a personal computer or CPU module in the master station and local station.
- To use this product as a local station and synchronize the time, set "Set time automatically" to "Off" in Windows.

For the date and time in Windows, refer to the following:

Related service application

NZCcietsn Time Synchronization Service is a service application for applying the time in a CPU module or personal computer distributed from the master station to the personal computer in a local station.

It is automatically installed or uninstalled when installing or uninstalling a software package.

No settings or operations are required for NZCcietsn Time Synchronization Service.

Precautions

Do not stop NZCcietsn Time Synchronization Service.

If it is stopped, start it in the service screen in Windows.

If the service cannot be started, reinstall the software package.

Time synchronization methods according to protocol versions

Supported standards for time synchronization methods differ depending on the combinations of protocol versions of devices.
- For configurations including CC-Link IE TSN Class A with protocol version 1.0, a board operates by using IEEE1588.
- For configurations not including CC-Link IE TSN Class A with protocol version 1.0, a board operates by using IEEE802.1AS.
- CC-Link IE TSN Class A devices with protocol version 2.0 operate without synchronizing the time.

Details on the time synchronization methods according to protocol versions of devices are as follows:
- With protocol version 1.0: Configuration including devices supporting protocol version 1.0
- Protocol version 2.0 only: Configuration including only devices supporting protocol version 2.0
- N/A: A device operates without synchronizing the time.
- —: No combination

Protocol version configuration for a device station		Time synchronization method for each device			
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	N/A	IEEE1588	IEEE1588
	Protocol version 2.0 only	IEEE1588	N/A	—	IEEE1588
Protocol version 2.0 only	With protocol version 1.0	—	N/A	IEEE802.1AS	IEEE802.1AS
	Protocol version 2.0 only	—	N/A	—	IEEE802.1AS

> **Point**
>
> This board is a CC-Link IE TSN Class B device supporting protocol versions 1.0 and 2.0.
>
> The protocol version can be set in 'Protocol setting' (address 1294018 (13BEC2H)) and can be checked in 'Protocol operating status' (address 1294016 (13BEC0H)) in the buffer memory. (☞ Page 259 Protocol information)

Event history function

Information such as errors detected by a board or ones occurred on a network is saved to a personal computer.

The saved information can be checked in chronological order of occurrence.

By using this function, the following are available:

- Investigation of the problems that have occurred in the equipment/devices
- Detection of any unauthorized access denied in the IP filter setting

> **Point**
>
> Events issued by the driver related to the operating status of a board are displayed in the event viewer of Windows.
>
> ☞ Page 196 Checking with Event Viewer

Event history file

The event history is saved as an event history file to the storage on a personal computer.

Item	Description
Save destination	"%ProgramData%\MELSOFT\BD\CCIETBDM\EVENTLOG" folder
File name	EVENT_(channel number of a board).LOG The same number of files are generated as the number of boards installed.
File format	Binary file format
Maximum storage capacity per file	2048 KB

■File size

If the size of a saved event history file exceeds 2048 KB, the records are deleted from the oldest one and the latest one is stored.

The size of an event history file can be obtained by the following formula:

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

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

[1] The size per event history record is variable because detailed information may differ for each event to be saved and a variable-length file name, etc. may be included in detailed information.

■File creation timing

If there is no event history file with the same name, a file is created at the following timings:

- Powering OFF and ON a personal computer (after starting the driver)
- Resetting a board
- Registering an event history

A file is not created for a channel number not used.

When a new event history file is created, "Event history file generation" (00420) is saved to the event history.

■Event history save timing

An event history is collected and saved regardless of the transmission status.

However, it may not be collected or saved if a board or personal computer fails.

Setting method

This function is available by default and is not required to be set.

When not collecting the event history of another station on the network, set "Event Reception from Other Stations" under "Application Settings" to "Disable" in the parameter of a board set as the master station. (☞ Page 154 Event reception from other stations)

Event history collection for devices on a network depends on the specifications of a connected network module. For the range of event history collection targets, etc., refer to the manual for each module.

■Parameter application timing

Changed parameters are enabled at the following timings:

- Turning the power OFF and ON
- Resetting a board

Event history loss

If events are detected frequently, or a personal computer is shut down or enters sleep or hibernation and a board is reset immediately after an event is detected, some events may be lost.

■Checking method

If an event is lost, "*HST LOSS*" is saved to the event history.

> *Point*
>
> If a personal computer is forcibly powered OFF by a method other than shutdown, event information loss may not be saved to the event history.

Precautions

If a PCIe bus error, hardware failure, board WDT error, or driver WDT error occurs, an event history may not be collected.

Displaying the event history

The event history can be displayed in the event history screen of the CC IE TSN utility. (☞ Page 128 Event history)

Clearing the event history

When clearing the event history in the event history screen, all event histories can be deleted. (☞ Page 128 Event history)

■Checking method

When clearing the event history, "Event history clear" (20200) is saved to the event history.

Event history save limit

If the number of minor events, such as link-up and link-down, exceeds its upper limit, event history saving is limited (stops). When the number of events with saving limited falls below its lower limit, event history saving restarts.

If turning OFF the power of a personal computer, restarting an operating system, or resetting a board, a save limit is removed. Once the number of events exceeds its upper limit again, the save limit restarts.

However, the codes for moderate and major errors occurred in a CPU module are saved to the event history even while saving is limited.

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

■Checking method

When saving is limited, "Event history logging restriction" (00421) is saved to the event history.

7.6 Diagnostics

Board communication test

The board communication test is for checking the hardware of a board.

☞ Page 50 Tests before Wiring (Board Communication Tests)

Board diagnostics

The board information, LED status, error details, etc. can be checked.

☞ Page 125 Diagnosing a board

Communication test

The communication test is for checking whether the communication route from the own station to a destination is correctly set for a transient transmission.

☞ Page 139 Communication test

CC-Link IE TSN diagnostics

The status of CC-Link IE TSN can be checked in the CC IE TSN utility.

The connection status of a cable and whether communication can be performed normally with set parameters can be checked.

☞ Page 131 Diagnosing a network

Diagnostics function details

◯: Available

Item	Description	Availability	
		Master station	Local station
Network configuration diagram monitoring	To monitor the network configuration for CC-Link IE TSN. The current status of a network is graphically shown, including the cable connection status, IP address duplication, and station disconnection status. ☞ Page 134 Network configuration diagram	◯	◯
Error history	To display the error history of a selected station. ☞ Page 143 Error history		
Production information	To display the production number of a selected station. ☞ Page 135 Icon		
Data link unperformed monitoring	To display a station set in the parameter but not displayed in the network configuration diagram monitor (that has never entered the network). ☞ Page 137 Data link unperformed monitoring	◯	◯
Selected station communication status monitoring	To display the details on the status of a module or board in a selected station. If an error occurs in a CC-Link IE TSN module or CC-Link IE TSN board, diagnostic information is displayed. ☞ Page 138 Selected station communication status monitor	◯	◯
Station information list	To display the model name, address, production information, etc. of a station where a data link is performed. ☞ Page 142 Station information list	◯	◯
Remote operation	To perform remote RESET when a selected station is a remote station. ☞ Page 142 Remote operation	◯	◯

7.7 Others

Driver WDT function

NZ81GN11-SX	NZ81GN11-T2
○	○

The driver WDT function monitors the operation of the software (operating system, driver) using the timer function on a CC-Link IE TSN board.

When the driver cannot reset the timer of the board within the specified driver WDT monitoring time, a CC-Link IE TSN board detects a driver WDT error. The driver WDT function detects driver operation delay due to the access error from the driver to the CC-Link IE TSN board or system high load.

Setting method

This function can be set in "Driver WDT Monitoring Time" in "Application Settings." (☞ Page 156 Driver setting)

Point

It is set to disabled by default.

If a driver WDT error occurs

When the driver WDT times out, a driver WDT error occurs.

Operations when a driver WDT error occurs are as follows:

- The RUN LED flashes and P2 SD/RD LED turns ON on the CC-Link IE TSN board.
- The driver stops accessing the CC-Link IE TSN board to avoid an incorrect output to the network. '-28158 (9202H) driver WDT error' is returned when accessing the CC-Link IE TSN board from an application program in which the CC IE TSN utility, device monitor utility, and MELSEC data link library function are used.

Considerations

When multiple application programs using the MELSEC data link library are running, a driver WDT error is returned to all the programs; however, only the CC-Link IE TSN board on which a driver WDT error has occurred is recognized as an error station on the network. When using the driver WDT function, set the monitoring time considering the margin of the personal computer load.

For the troubleshooting, refer to the following:

☞ Page 210 The driver WDT error has occurred

RECV automatic execution function

This function stores data received from another station in the receive buffer of each channel number in the driver when the SEND instruction is received and the RECV instruction is automatically executed by the driver.

☞ Page 91 RECV function receive buffer

Setting method

This function can be enabled by selecting "Use" for "RECV Function Receive Buffer" in "Application Settings." (☞ Page 156 Driver setting)

Reserved station specification

A reserved station is a device station included in the number of stations on a network and set in the parameter for future use. It is not actually connected to the network, and not detected as an error station. (☞ Page 158 CC-Link IE TSN Configuration Setting)

By setting a reserved station, link device assignment will not change even if a device station is connected (the reservation is canceled). Therefore, modification of a program is not required.

Error invalid station setting

An error invalid station is a device station set to be not detected as an error station by the master station.

It can also be set when replacing a device station during a data link. (☞ Page 158 CC-Link IE TSN Configuration Setting)

Data collection in CC-Link IE TSN Communication Software

NZ81GN11-SX	NZ81GN11-T2
—	○

Cyclic data in each station on CC-Link IE TSN is received in CC-Link IE TSN Communication Software.

For details on CC-Link IE TSN Communication Software, refer to the following:

📖CC-Link IE TSN Communication Software for Windows User's Manual
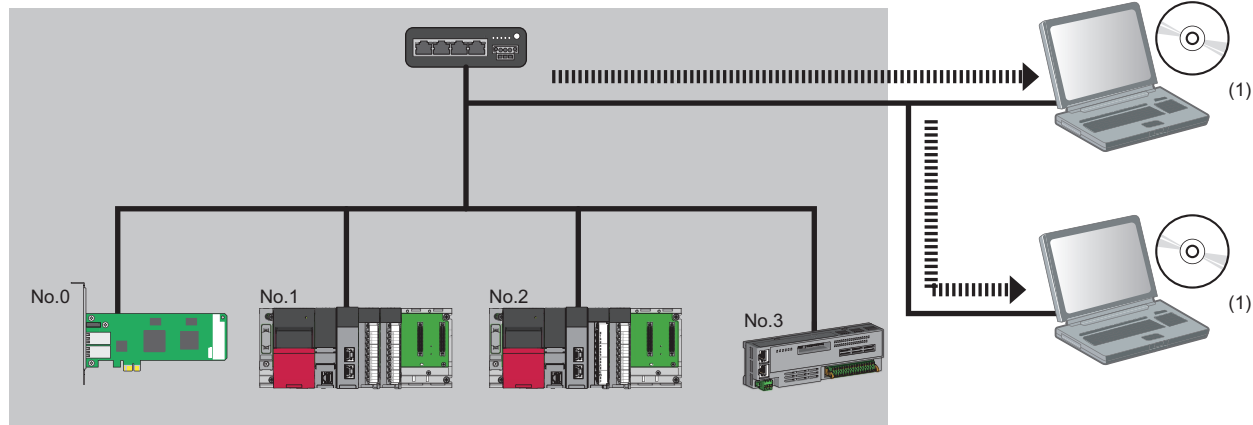
No.0: Master station
No.1, No.2: Local station
No.3: Remote station
(1) CC-Link IE TSN Communication Software (number of connectable personal computers: 2)

System configuration

For the system configuration, refer to the following:

☞Page 29 Configuration When Connecting CC-Link IE TSN Communication Software

Setting method

When connecting CC-Link IE TSN Communication Software, set the communication mode to multicast mode.

🖱 [Application Settings] ⇨ [Communication Mode] ⇨ [Multicast]

Considerations

■CC-Link IE TSN diagnostics

In CC-Link IE TSN diagnostics, information on CC-Link IE TSN Communication Software cannot be displayed.

Co-recording

NZ81GN11-SX	NZ81GN11-T2
○	○

Co-recording is a function that can be used to perform recording also on other recording devices by linking with recording in a recording device.

This product only supports the function to send a co-recording trigger received from a station to another station.

A co-recording trigger sent from a device station is received in the master station and sent to another device station.

For details on the co-recording function, refer to the following:

📖MELSEC iQ-R System Recorder Co-recording Function Reference Manual

Firmware update

The firmware update function updates the firmware of a TSN board installed in a personal computer.

Target models

- NZ81GN11-SX (firmware version 02 or later)
- NZ81GN11-T2 (firmware version 02 or later)

Usage method

This function is used by starting Firmware Update Tool from the CC IE TSN utility.

For details on the firmware update function, refer to the following:

Considerations

- Obtain a firmware update file corresponding to a model to be updated in advance. If the firmware update file does not match the target model, the firmware cannot be updated.
- Do not change the file name of a firmware update file.
- Stop user programs and separate a board from the system by disconnecting cables not to affect the system. Then, perform the firmware update again.
- Stop access to a target device the firmware of which is to be updated with the CC IE TSN utility, device monitor utility, or MELSEC data link library function. '-26334 (9922H) reset execution error/firmware update execution error' is returned when accessing the target device during a firmware update file is being transferred.
- Update the software package to the latest version when updating the firmware. (☞ Page 299 Update of software package)
- Check the system operation before and after the update. When there is any error for the system operation after the update, revert the firmware to a previous version. If the software package is also updated, revert it to a previous version.
- Do not forcibly terminate Firmware Update Tool while the firmware is being updated. Otherwise, the firmware update may be interrupted and the board may not operate properly. In this case, reset the board and perform the firmware update again.
- When the following operations are executed during the firmware update, the update may be completed with an error, resulting in failure of the board.
  - Turning OFF the power of a personal computer
  - Restarting an operating system
  - Resetting a board
  - Installing/uninstalling a board

If the firmware version of the target device remains the same as before the update, perform the firmware update again.

Perform the update carefully; otherwise, the board may not start up or the firmware update may not be performed again.

When an error occurs, refer to the following:

8 CC IE TSN utility

The CC IE TSN utility is a utility for setting parameters and diagnosing the operating statuses of a board and network.
For using this utility, install a dedicated software package on a personal computer where a CC-Link IE TSN interface board is used. For the installation method, refer to the following:
☞ Page 37 SOFTWARE PACKAGE INSTALLATION AND UNINSTALLATION

8.1 Basic Operating Procedures

This section explains the overview of basic operations of the CC IE TSN utility.
For the first startup procedure for a board, refer to the following:
☞ Page 21 PROCEDURE BEFORE OPERATION

Setting channel numbers

1. Start the CC IE TSN utility. (☞ Page 115 Starting the CC IE TSN utility)

👆 Windows Start ⇨ [MELSOFT] ⇨ [CC IE TSN Utility(Board)]
   The CC IE TSN utility starts, and the "Board Diagnostics" screen appears.

2. Check the channel number under "Board List." (☞ Page 126 Board list)

When multiple boards are installed, the channel numbers of boards can be checked with the LED display by displaying the "Channel No. Setting" screen.
Change the channel number as necessary.

👆 [Channel No. Setting] button
   The "Channel No. Setting" screen appears. (☞ Page 121 Channel number setting)
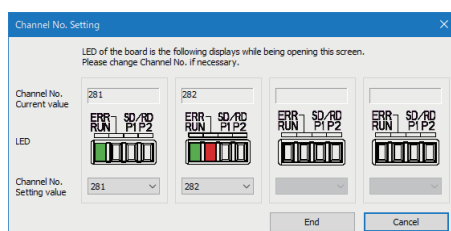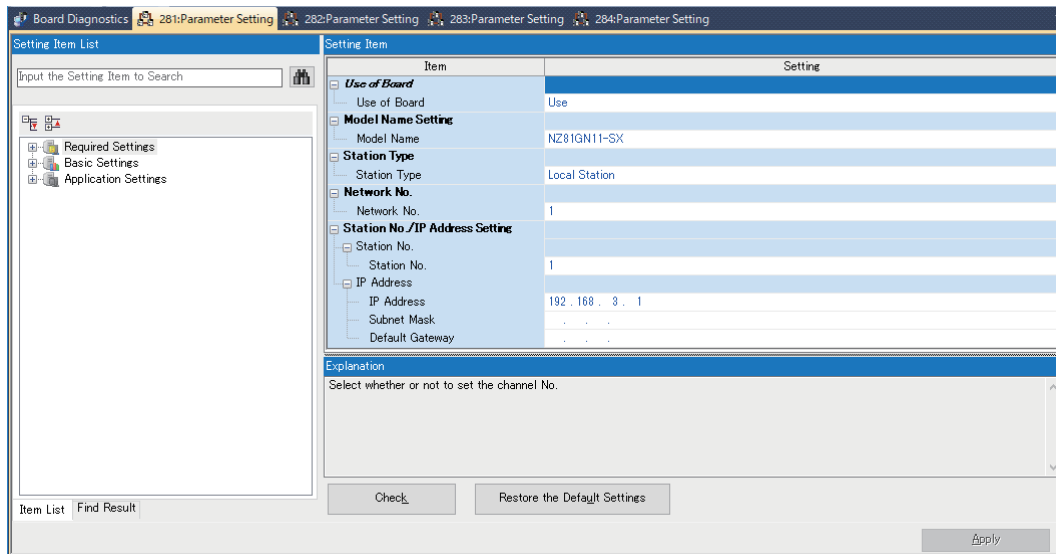
Setting parameters

The following shows the setting procedure for the first time after installing a board.

1. Set parameters.

   Click the parameter setting tab of a target channel number.

The parameter setting screen appears. (☞ Page 144 Parameter Setting)

   Edit parameters.

Click the [Apply] button to fix the edited contents.

2. Write the parameters to the board.

   [Online] ⇨ [Write to Board]

The parameters are written to the board, and the board is reset.

Changing parameters

The following shows the procedure for changing parameters set for a board.

1. Read parameters from a board.

   [Online] ⇨ [Read from Board]

2. Set parameters.

   Click the parameter setting tab of a target channel number.

The parameter setting screen appears. (☞ Page 144 Parameter Setting)

Edit the parameters.

Click the [Apply] button to fix the edited contents.

3. To check the changed parameters before writing, verify the parameters with the currently written ones.

   [Online] ⇨ [Verify with Board]

The "Verify Result [Verify with Board]" screen appears. (☞ Page 123 Parameter verification)

If the result is unintended, correct the parameters.

4. Write the parameters to the board.

   [Online] ⇨ [Write to Board]

The parameters are written to the board, and the board is reset.

Diagnosing a board

The following shows the procedure for checking the board installation status and checking if communication is normally established with set parameters.

1. Start the CC IE TSN utility. (☞ Page 115 Starting the CC IE TSN utility)

2. Check the following under "Board List" to check the status of an installed board. (☞ Page 125 Diagnosing a board)
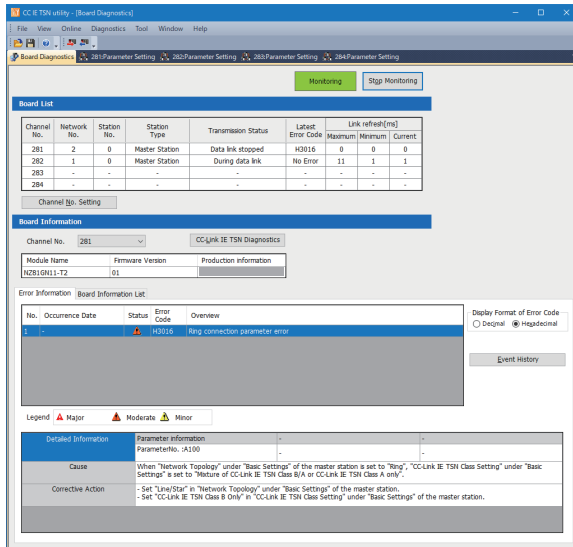
- Whether boards are displayed for the number of actually installed ones
- Whether "During data link" is displayed in "Transmission Status"
- Whether an error occurs on a board in "Latest Error Code"

3. If an error occurs, check the error in "Error Information." (☞ Page 127 Error information)

👉 Select a board to be displayed for "Channel No." under "Board Information."

4. If correcting the parameters, write them to the board.

👉 [Online] ⇨ [Write to Board]

Point🖢

- The LED status can be checked in the [Board Information List] tab under "Board Information." (☞ Page 130 Board information list)
- If an error occurs and its corrective action is not clear, refer to the troubleshooting (☞ Page 188 TROUBLESHOOTING).

Diagnosing a network

The following shows the procedure for checking the status of transmission with another station.

1. Start the CC IE TSN utility. (☞ Page 115 Starting the CC IE TSN utility)

2. Display the "CC-Link IE TSN Diagnostics" screen. (☞ Page 132 CC-Link IE TSN diagnostics)

👆 "Board Diagnostics" screen ⇨ [CC-Link IE TSN Diagnostics] button
   If multiple boards are installed in a personal computer, select a board to connect to a network to be diagnosed.

3. Check the data link status in the network configuration diagram.
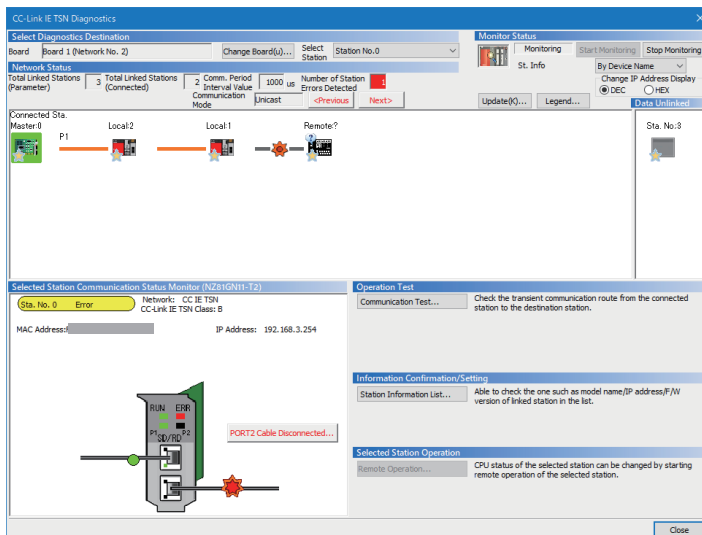
- An icon (such as ⊗) indicating a failure is displayed on a module in the station with the failure.
- The icon (–✳–) indicating a failure is displayed on a cable if a connection destination is disconnected.
- The black icon (🖳) indicating a disconnected station is displayed in the network configuration diagram for a station disconnected after a data link is performed once.
- A station that is set but has not yet performed a data link is displayed as "Stations without data link" on the rightmost of the screen.

4. Select a station to diagnose the details for "Select Station" or in the network configuration diagram.

5. Diagnose the details on a failure in "Selected Station Communication Status Monitor."
- The status of the selected station is displayed.
- If a failure occurs, a button indicating the failure is displayed.

👆 Click this button to check the details and corrective action for the failure.

6. Check the station information or error history as necessary.

👆 Right-click on the network configuration diagram in the "CC-Link IE TSN Diagnostics" screen ⇨ shortcut menu
   Station information for the entire network and the error history of the selected station can be displayed.

7. Perform a communication test to check if transient communication is available. (☞ Page 139 Communication test)

👆 Click the [Communication Test] button in the "CC-Link IE TSN Diagnostics" screen.
   Set the test contents in the "Communication Test" screen and click the [Execute Test] button.

Point 🔍

If an error occurs and its corrective action is not clear, refer to the troubleshooting (☞ Page 188 TROUBLESHOOTING).

8.2 Screen Configuration and Basic Operations

This section explains the screen configuration and basic operations of the CC IE TSN utility.

Start and end

The following explains the operation methods for starting and ending the utility.

Starting the CC IE TSN utility

Operating procedure

Select [MELSOFT] ⇨ [CC IE TSN Utility(Board)] from Windows Start.

> **Point**
>
> When the utility starts while User Account Control (UAC) is enabled, a message appears.
> For details on User Account Control (UAC), refer to the following:
> ☞ Page 290 Windows User Account Control

Ending the CC IE TSN utility

Operating procedure

Select [File] ⇨ [Exit CC IE TSN Utility].

Display language switching

SW1DNN-CCIETBDM-B supports multiple languages; therefore, the display language such as one on the menu can be switched on a personal computer.

Operating procedure

1. Select [View] ⇨ [Switch Display Language].

2. Select a language to display.

3. End the CC IE TSN utility.

4. The selected language is applied from the next startup.

Precautions

- If the display language differs from the one for the operating system, texts may not displayed properly in the screen. (Displayed texts may get cut.)
- In addition, buttons in messages, etc. may be displayed in the language for the operating system.
- When switching the display language, supplemental fonts of the target language are required. The fonts can be added by the following operation:
  Select [Apps] ⇨ [Apps & features] ⇨ [Optional features] ⇨ [Add a feature] in Windows settings.
- A character entered arbitrarily is not switched even if the display language is switched.

> **Point**
>
> - When reinstalling the utility after uninstallation, the previously set language is applied.
> - When starting the device monitor utility from the CC IE TSN utility, it is also displayed in a display language selected in the CC IE TSN utility.
> - When starting the device monitor utility from the Windows menu or execution file, the current Windows display language is applied. If it is other than Japanese, English is applied.

Help

The following explains the operation methods and version information.

Opening the user's manual

Use the manual to learn about operations and functions, and check error codes.

Operating procedure

Select [Help] ⇨ [Manual].
e-Manual Viewer starts and the manual appears.

Connecting to the Mitsubishi Electric FA website

Open the MITSUBISHI ELECTRIC FA Global website in a web browser.
Make sure your personal computer connect to the Internet in advance.

Operating procedure

Select [Help] ⇨ [Connection to MITSUBISHI ELECTRIC FA Global Website].

Version information

Display information such as the software version of a software package.

Operating procedure

Select [Help] ⇨ [Version Information].

Screen configuration

The following explains the screen configuration when starting the utility.
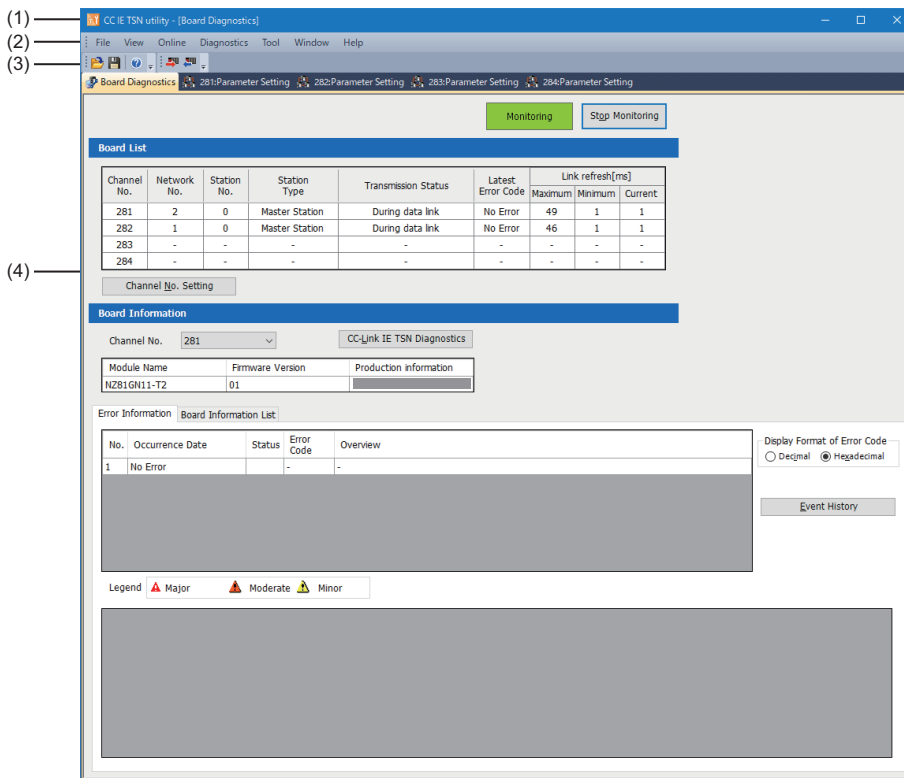
Displayed items

No.	Name	Description	Reference
(1)	Title bar	The utility name, etc. are displayed.	—
(2)	Menu bar	Menus for performing each function are displayed.	Page 118 Menu List
(3)	Toolbar	Tool buttons for performing each function are displayed.	Page 117 Customizing/resetting toolbars
(4)	Work window	A main screen used for operations such as board diagnostics and parameter setting. The display can be switched by selecting a tab.	Page 125 Diagnosing a board Page 144 Parameter Setting

Customizing/resetting toolbars

Set the types of tool buttons to be displayed on each toolbar.
The selected tool buttons on the list are displayed on the toolbar.

Operating procedure

■Customizing toolbar

1. Click ▼ on the rightmost of the toolbar, and select [Add or Remove Buttons] ⇨ [(toolbar name)].

2. Select the tool button to be displayed from the list.

■Resetting toolbar

Click ▼ on the rightmost of the toolbar, and select [Add or Remove Buttons] ⇨ [Reset Toolbar].

> **Point**
>
> The toolbar can be shown or hidden by selecting [View] ⇨ [Toolbar] ⇨ [(toolbar name)] from the menu.

8.3 Menu List

This section lists the items displayed on the menu.

Menu name			Reference
File	Open		Page 119 File reading
	Save As		Page 119 File saving
	Exit CC IE TSN Utility		Page 115 Start and end
View	Toolbar	Standard	Page 117 Screen configuration
		Parameter Common	
	Switch Display Language		Page 115 Display language switching
Online	Channel No. Setting		Page 121 Channel number setting
	Read from Board		Page 122 Parameter writing/reading
	Write to Board		
	Verify with Board		
	Reset Operation		Page 124 Reset
	Delete Board Parameters		Page 124 Board parameter deletion
Diagnostics	CC-Link IE TSN Diagnostics		Page 132 CC-Link IE TSN diagnostics
Tool	Device Monitor utility		Page 124 Device monitor utility
	Firmware Update Tool		Page 296 Firmware update
	Profile Management	Register	Page 120 Profile management
		Delete	
Window	(Displayed window information)		—
Help	Manual		Page 116 Help
	Connection to MITSUBISHI ELECTRIC FA Global Website		
	Version Information		

8.4 File Management on a Personal Computer

This section explains the functions for saving and managing data used for the CC IE TSN utility or related software on the hard disk of a personal computer or other data storage devices.

File saving/reading

The contents set in the CC IE TSN utility can be saved in a file format to the hard disk of a personal computer or other data storage devices.

File saving

Files can be saved to the hard disk of a personal computer or other data storage devices.

Operating procedure

Select [File] ⇨ [Save As].

Precautions

For unusable character strings for file names and path names, refer to the following:
☞ Page 293 Unusable Character Strings (Reserved Words)

File reading

Files can be read from the hard disk of a personal computer or other data storage devices.

Operating procedure

Select [File] ⇨ [Open].

Profile management

The registration status of a profile (such as CSP+[*1]) can be managed.

A profile is a file that defines specific information on a device (such as a model name) and information required for startup, operation, and maintenance.

*1 For CSP+, refer to the CC-Link Partner Association website (www.cc-link.org).

> **Point**
>
> A profile is managed by each personal computer, and shared with MELSOFT products such as GX Works3. Therefore, a profile registered in the CC IE TSN utility is applied to these products.

Before registering/deleting a profile, log on to a personal computer as a user with the administrator authority, and stop monitoring in advance.

For other MELSOFT products, close the project.

Before registering/deleting a profile in other MELSOFT products, end this utility.

Registration

A profile can be registered.

Operating procedure

1. Select [Tool] ⇨ [Profile Management] ⇨ [Register].

2. Select a file in the "Register Profile" screen, and click the [Register] button.

Precautions

A profile is a compressed file (such as *.zip, *.ipar, and *.cspp). Register a profile without decompressing.

Deletion

A registered profile can be deleted.

Operating procedure

1. Select [Tool] ⇨ [Profile Management] ⇨ [Delete].

2. Select the checkbox of a model name to be deleted in the "Profile Delete" screen, then click the [Delete] button.

8.5 Access to a Board

This section explains the operations for applying contents set in the CC IE TSN utility to an installed board and acquiring the board status.

Channel number setting

The channel number of a board can be checked/set.

Window

[Online] ⇨ [Channel No. Setting]
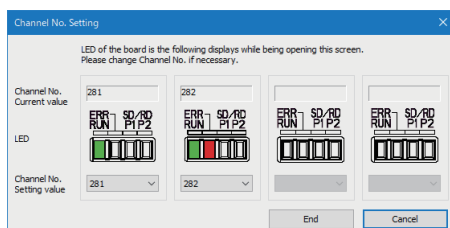
Operating procedure

1. Check the channel numbers set for installed boards with "Channel No. Current value" and "LED."

In this screen, boards are displayed in ascending order of channel numbers, not in order of installation on each slot.

For the channel numbers actually assigned to boards, check the LED display on each board.

While the "Channel No. Setting" screen is open, the LED lights according to the current channel number are as shown below.

2. Set a channel number to be changed for "Channel No. Setting value."

3. Click the [End] button.

The set channel number is written to the board, and all CC-Link IE TSN interface boards installed in the same personal computer are reset. Then, the set channel number is applied.

Precautions

• When installing multiple boards in the same personal computer, set channel numbers without duplication.
Channel number duplication may cause this product to malfunction.

When opening the "Channel No. Setting" screen while a channel number is duplicate, the LED displays of boards with the duplicate channel number will be the same. Set a different channel number for each board and check the assignment of boards and channel numbers.

• If a set channel number is not read correctly, the channel number is set to "281" and the board operates as if parameters were not set. Follow the error message to take corrective action, then set channel numbers for all boards again.

Point

Channel numbers set in the CC IE TSN utility are saved to the non-volatile memory in a board.

In addition, channel numbers being set are retained when performing any of the following operations:

• Restarting a personal computer
• Changing the board installation position
• Changing a personal computer to which a board is installed

Parameter writing/reading

Parameters set in the CC IE TSN utility can be written to the registry in an operating system for controlling boards.

Installed boards operate according to the parameters written to the registry in the operating system.

The parameters in the registry can be read to the CC IE TSN utility.

(1)	Writing parameters to boards
(2)	Reading parameters from boards
(3)	The installed boards operate according to the parameters corresponding to their respective channel numbers in the registry.
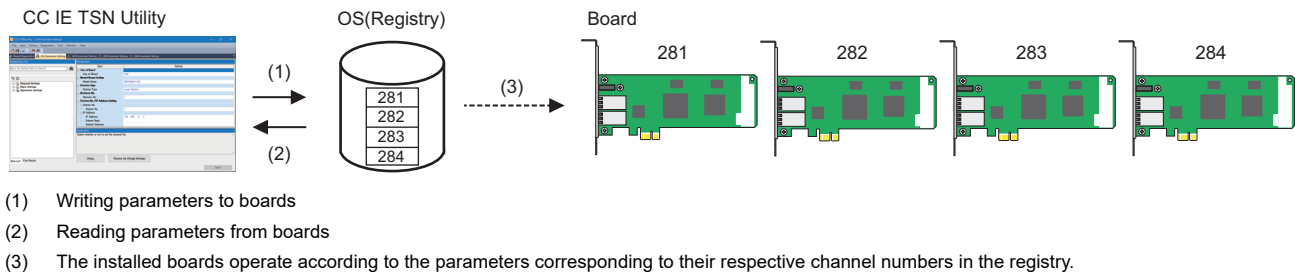
> **Point**
>
> Parameters are not written to a board itself.
>
> Set parameters are retained in the registry; therefore, they do not follow board changes even when performing the following operations:
> - Changing the board installation position
> - Changing a personal computer to which a board is installed

Writing parameters to a board

Parameters set in the CC IE TSN utility can be written.

Operating procedure

Select [Online] ⇨ [Write to Board].

After writing parameters, a board with changed parameters is reset and the parameters are applied.

Reading parameters from a board

Parameters can be read from the registry in an operating system for controlling boards.

Operating procedure

Select [Online] ⇨ [Read from Board].

Parameter verification

Parameters in the CC IE TSN utility can be compared with ones written to the registry in an operating system.

CC IE TSN Utility

OS(Registry)

(1)

| 281 |
| 282 |
| 283 |
| 284 |
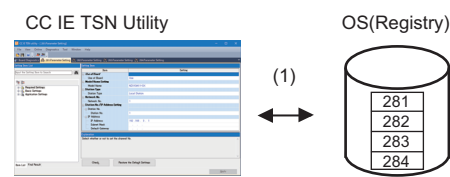
(1)   Verifying parameters with a board

Operating procedure

Select [Online] ⇨ [Verify with Board].

Checking a verification result

A verification result can be checked in the "Verify Result" screen.

| Board Diagnostics | 281:Parameter Setting | 282:Parameter Setting | 283:Parameter Setting | 284:Parameter Setting | Verify Result [Verify with Board] |

Verify Source: Data being Edited   Verify Destination: Board

Channel No.	Group Name	Category Name	Item Name	Verification Result	
281	Basic Settings	Refresh Setting	Refresh Settings	Mismatch	
281	Application Settings	Board Operation Mode	Board Operation Mode	Mismatch	
284	Required Settings	Use of Board	Use of Board	Source Only	
283	Required Settings	Use of Board	Use of Board	Dest. Only	

4 differences   Mismatched Line | Source Only | Dest. Only

Close

Displayed items

Item name	Description
Channel No.	The channel number of a compared board is displayed.
Group Name Category Name Item Name	The category and item name of a compared parameter are displayed.
Verification Result	A comparison result is displayed. • Mismatch: Values in the item do not match. • Source Only: The item exists only in the parameter being edited. • Dest. Only: The item exists only in the parameter set for the board. • No mismatch: All items match.
[Close] button	Click this to close the screen.

Point

By clicking each item name in the table header, the items can be sorted by their names.

Precautions

• When the same profiles are not registered to the verification destination and source, the verification result may be mismatched.

Restriction

When the number of parameter items increases or decreases after a version upgrade of the product, the following apply if the version of the CC IE TSN utility in which parameters in a board are set differs from the one for verification.
    • Added items cannot be verified in the CC IE TSN utility with a version not upgraded.
    • Deleted items cannot be verified in the CC IE TSN utility with a version upgraded.
As long as items that can be verified by the utility match, the result is a match.

Reset

A board can be reset.

Operating procedure

1. Select [Online] ⇨ [Reset Operation].
The "Reset Operation" screen appears.

2. Select the checkbox of a board to reset.

3. Click the [OK] button.
The board with the selected channel number is reset.

Board parameter deletion

Parameters of all channel numbers written to the registry in an operating system can be deleted in a batch.

Operating procedure

Select [Online] ⇨ [Delete Board Parameters].

Device monitor utility

The device monitor utility can be used to monitor values in devices and buffer memories.
For the device monitor utility, refer to the following:
📖MELSEC Data Link Library Reference Manual

Operating procedure

Select [Tool] ⇨ [Device Monitor utility].

8.6 Diagnostics

This section explains the methods for diagnosing the statuses of a board installed in a personal computer and a network connected to the board.

Diagnosing a board

The status of a board installed in a personal computer can be checked.

Board diagnostics

The following explains the method for displaying the board status and error information.

Window

The following initial screen appears at startup.
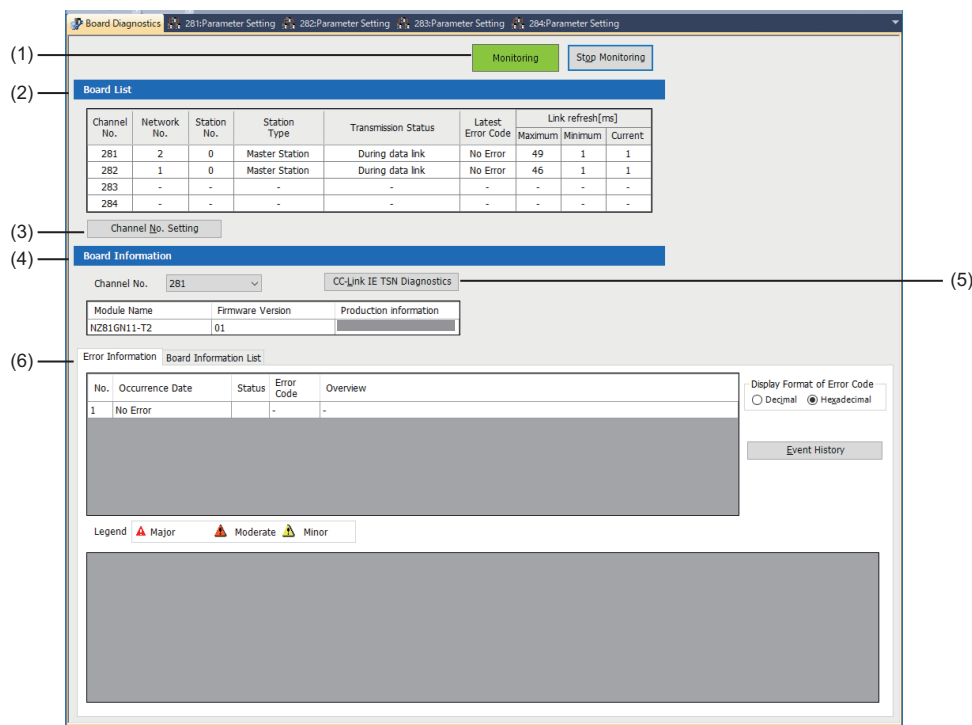
Displayed items

No.	Item	Description	Reference
(1)	Monitoring status	The monitoring status of this screen is displayed. Monitoring can be started and stopped.	—
(2)	Board List	Information on installed boards is displayed in ascending order of channel numbers.	Page 126 Board list
(3)	[Channel No. Setting] button	Click this to display the screen for changing channel numbers.	Page 121 Channel number setting
(4)	Board Information	Select a board to be diagnosed and check detailed information.	Page 126 Board information Page 127 Error information Page 130 Board information list
(5)	[CC-Link IE TSN Diagnostics] button	Click this to display the screen for CC-Link IE TSN diagnostics for a selected board.	Page 131 Diagnosing a network
(6)	[Error Information]/[Board Information List] tab	Information on a selected board is displayed.	Page 127 Error information Page 130 Board information list

■Board list

Board List

Channel No.	Network No.	Station No.	Station Type	Transmission Status	Latest Error Code	Link refresh[ms]		
						Maximum	Minimum	Current
281	2	0	Master Station	During data link	No Error	49	1	1
282	1	0	Master Station	During data link	No Error	46	1	1
283	-	-	-	-	-	-	-	-
284	-	-	-	-	-	-	-	-

The following information on an installed board is displayed.

Item	Description
Channel No.	The channel numbers of installed boards are displayed in ascending order.
Network No.	The contents set for the board corresponding to each channel number are displayed.
Station No.	
Station Type	
Transmission Status	Any of the following is displayed depending on the board status. • During data link • Data link stopped • Executing board communication test • Offline
Latest Error Code	The error code of the latest error occurred on a board is displayed.
Link refresh[ms]	The link refresh time is displayed.

■Board information

Board Information

Channel No. [281 ▾]   [CC-Link IE TSN Diagnostics]

Module Name	Firmware Version	Production information
NZ81GN11-T2	01	

Detailed information can be checked by selecting a board to be diagnosed.

Item	Description
Channel No.	Select the channel number of a board to be diagnosed.
Module Name	The model name of a selected board is displayed.
Firmware Version	The firmware version of a selected board is displayed as 00 to FF.
Production information	The production information is displayed in 16 digits.

Error information

Information on an error occurring on a board to be diagnosed is displayed.

Window

"Board Diagnostics" screen ⇨ [Error Information] tab

No.	Occurrence Date	Status	Error Code	Overview
1	-	⚠	H3016	Ring connection parameter error

Display Format of Error Code
○ Decimal ◉ Hexadecimal

Event History

Legend 🔺 Major ⚠ Moderate ⚠ Minor

Detailed Information	Parameter information	-	-
	ParameterNo. :A100	-	-
Cause	When "Network Topology" under "Basic Settings" of the master station is set to "Ring", "CC-Link IE TSN Class Setting" under "Basic Settings" is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A only".		
Corrective Action	- Set "Line/Star" in "Network Topology" under "Basic Settings" of the master station. - Set "CC-Link IE TSN Class B Only" in "CC-Link IE TSN Class Setting" under "Basic Settings" of the master station.		

Displayed items

Item		Description
Error history list	No.	The order of occurrence is displayed.
	Occurrence Date	The date and time (year/month/day hour:minute:second:millisecond) of error occurrence is displayed.[1]
	Status	A status is displayed as an icon. • Major: An error such as a hardware or memory failure. A board stops operating. • Moderate: An error such as a parameter error which affects board operation. A board stops operating. • Minor: An error such as a communication failure. A board continues operating.
	Error Code	The error code of an error occurred on a target board is displayed.
	Overview	The overview of an error is displayed.
Display Format of Error Code	Decimal/ Hexadecimal	Four digits in decimal or hexadecimal (unsigned 16-bit integer) can be selected to display error codes.
[Event History] button		Click this to display error information, operation history, and system information history. ☞ Page 128 Event history
Detailed Information		Detailed information on an error selected in the error history list is displayed. If there is no detailed information, "-" is displayed for each item.
Cause		An error cause is displayed.
Corrective Action		A corrective action for an error is displayed.

[1] "-" may be displayed if an error occurs immediately after power-ON or board reset. To check the occurrence date and time, click the [Event History] button to refer to the event history.

8

Event history

The history list of events occurred in the own station or on a network is displayed.

Window

"Board Diagnostics" screen ⇨ [Error Information] tab ⇨ [Event History] button

Displayed items

Item		Description
[Refresh] button		Click this to update the event history list. The total number of events in the event history is displayed to the right of the button.
[Refine] button		Click this to show or hide "Refine."
Refine		Set conditions for refining events to be displayed. ☞ Page 129 Event history refinement
Event history list	No.	A unique number assigned to event information collected by a board
	Occurrence Date	The date and time (year/month/day hour:minute:second:millisecond) of event occurrence is displayed.
	Event Type	The type of an event is displayed. There are three types: system, security, and operation. • System: An event related to status changes and failure occurrences detected by a system, and automatically performed operations • Security: An event related to the security function such as the IP filter function • Operation: An event related to operations such as clearing data
	Status	A status is displayed as an icon. • Major: An error such as a hardware or memory failure. A board stops operating. • Moderate: An error such as a parameter error which affects board operation. A board stops operating. • Minor: An error such as a communication failure. A board continues operating. • Warning: An event such as a failure in the communication status that warns of a state in which there is a problem not an error. • Information: An event such as performing operations or changing statuses that provides reference information
	Event Code	The event code of an event occurred on a target board is displayed.
	Overview	The contents of an event occurred are displayed.
	Source	The model name of a board on which an event occurred is displayed. If there is no board for an event, the model name is not displayed.
	Channel No.	The channel number of a board on which an event occurred is displayed.
[Clear All] button		Click this to clear the event history in a board.
Event detailed information	Detailed Information	Detailed information on an event selected in the event history list is displayed. If there is no detailed information, "-" is displayed for each item.
	Cause	An error cause is displayed.
	Corrective Action	A corrective action for an error is displayed.

■Event sorting in the event history

By clicking the title of each column in the event history list, displayed events can be sorted.

However, sorting is not available for "Status."

> **Point**
>
> If changing the Windows time in settings such as the "Date & time" settings in Windows, the order may no longer match between the event occurrence (No.) and the occurrence date and time.
>
> To check event history information chronologically, sort events by "No." instead of "Occurrence Date."

■Event history refinement

A target to display can be selected by specifying a condition.

Operating procedure

1. Set a condition.

Item name	Match condition	Description
• No. • Event Type • Event Code • Overview • Source • Channel No.	• "Including Next" • "Not Including Next" • "Matching with Next Time" • "Starting with Next Time" • "Ending with Next Time"	Specify a character string as a condition within 32 characters.
• Occurrence Date	• "Matching with Next Date" • "Before Next Date" • "After Next Date"	Set a date and time as a condition.
• Status	• Major • Moderate • Minor • Warning • Information	

Up to three conditions can be set.

2. When setting multiple conditions, select either of the following:
- Match All the Conditions: A target is searched for by the logical AND of conditions. Only targets satisfying all specified conditions are displayed.
- Match Any One of the Conditions: A target is searched for by the logical OR of a condition. Targets satisfying at least one of specified conditions are displayed.

3. Click the [Start Refine] button.

Ex.

When displaying a major event occurred between 9:00 and 12:00 on April 4

Set the conditions as follows.
- Match All the Conditions:

No.	Item name	Match condition	Description
1.	Occurrence Date	"After Next Date"	2024/04/04 09:00:00
2.	Occurrence Date	"Before Next Date"	2024/04/04 12:00:00
3.	Status	Major	

Board information list

Information such as the current LED information of a board to be diagnosed is displayed.

Window

"Board Diagnostics" screen ⇨ [Board Information List] tab

Item		Description
LED information		The LED status of a target board is displayed. ☞ Page 190 Checking the LED status
Logical LED information		The statuses of logical LEDs (MST and D LINK) not on a board can be checked. ☞ Page 190 Checking the LED status
Individual information	Board operating mode	The operating mode set for a target board is displayed. ☞ Page 155 Board operation mode setting
	Transient transmission group No.	The transient transmission group number set for a target board is displayed. ☞ Page 154 Transient transmission group number setting
	IP address	The IP address set for a target board is displayed. ☞ Page 147 Station number/IP address setting
	MAC address	The MAC address of a target board is displayed.
	P1 Communication Speed P2 Communication Speed	The communication speed set by using the auto-negotiation function is displayed.
Function setting information	LBLW link points extended setting	Whether the number of points is extended for a target board is displayed. ☞ Page 154 Link points extended setting For NZ81GN11-SX only
Module communication test	Board test status	It is displayed in the module communication test mode. The status of a board communication test is displayed.
	Board test error occurrence port	It is displayed in the module communication test mode. If a board communication test ends with an error, the port where the error occurred is displayed.
	Board test error details	It is displayed in the module communication test mode. If a board communication test ends with an error, the error description is displayed. For corrective actions for errors, refer to the following: ☞ Page 50 Tests before Wiring (Board Communication Tests)

Diagnosing a network

The status of a network connected to a selected board can be checked.

Connected station (own station) selection

The following explains the target selection for CC-Link IE TSN diagnostics.

Set any of the CC-Link IE TSN interface boards, which are installed in a personal computer where the CC IE TSN utility is used, as a connected station (own station).

If only one CC-Link IE TSN interface board is installed in a personal computer, it is automatically selected.

In CC-Link IE TSN diagnostics, the communication status can be checked between a connected station (own station) and another station connected to the same network.

Boards with no parameters set cannot be selected.

■Selecting a board to be set as a connected station (own station)

When two or more CC-Link IE TSN interface boards are installed in a personal computer, the "Select Diagnostics Destination" screen is displayed before starting diagnostics. Select a board to access, then click the [OK] button.
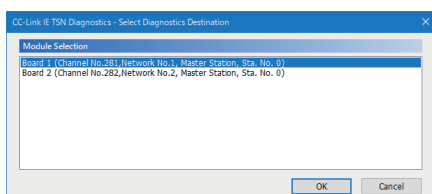
■Changing a board to be set as a connected station (own station)

To change a board to access during CC-Link IE TSN diagnostics, click the [Change Board] button in the "CC-Link IE TSN Diagnostics" screen. Then, the "Change Board" screen appears.

Select a board to access and click the [OK] button.
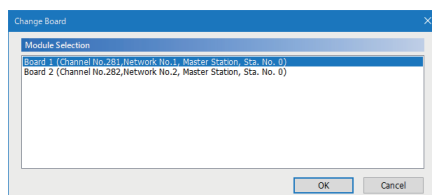
CC-Link IE TSN diagnostics

The following explains the CC-Link IE TSN diagnostics screen.

Window

"Board Diagnostics" screen ⇨ [CC-Link IE TSN Diagnostics] button

Displayed items

Item			Description	Reference
(1)	Select Diagnostics Destination	Board	The board number and network number of a board set as a connected station (own station) for diagnostics are displayed. A board can be selected from installed ones.	Page 131 Connected station (own station) selection Page 133 Select diagnostics destination
		[Change Board] button		
		Select Station	The number of a station selected in the network configuration diagram is displayed. It can be changed by selecting a station number.	
(2)	Monitor Status	Monitoring status [Start Monitoring] button [Stop Monitoring] button	The monitoring status in this screen is displayed. Click these buttons to start and stop monitoring.	—
		St. Info Change IP Address Display	The displayed contents of station information, which are displayed in the network configuration diagram and for a station where a data link is not performed, can be switched.	—
(3)	Network Status	Total Linked Stations (Parameter) Total Linked Stations (Connected)	Values in the parameter setting and the monitoring result of the implementation status for a network displayed in the network configuration diagram are displayed.	Page 133 Network status
		Comm. Period Interval Value		
		Communication Mode		
		Number of Station Errors Detected [<Previous]/[Next>] button		
(4)	Network configuration diagram	Network configuration diagram	A function for monitoring the network configuration for CC-Link IE TSN. The current status of a network is graphically shown, including the cable connection status, IP address duplication, and station disconnection status.	Page 134 Network configuration diagram
		[Update] button		
		[Legend] button		Page 135 Legend
(5)	Data Unlinked		A station set in the parameter but not displayed in the network configuration diagram monitor (that has never entered the network) is displayed.	Page 137 Data link unperformed monitoring

Item			Description	Reference
(6)	Selected Station Communication Status Monitor		A screen for displaying the details on the status of a module or board in a selected station. If a failure occurs in a CC-Link IE TSN module or CC-Link IE TSN interface board, diagnostic information is displayed. It is not displayed for a module not supporting the selected station communication status monitor of the CC IE TSN utility.	Page 138 Selected station communication status monitor
(7)	Operation Test	[Communication Test] button	Click this to check transient transmission to a specified communication destination from a connected station (own station).	Page 139 Communication test
(8)	Information Confirmation/Setting	[Station Information List] button	Click this to display the model name, IP address, production information, etc. of a station where a data link is performed.	Page 142 Station information list
(9)	Selected Station Operation	[Remote Operation] button	Click this to perform remote RESET when a selected station is a remote station.	Page 142 Remote operation

■Select diagnostics destination

A destination for CC-Link IE TSN diagnostics can be specified as follows:

Target	Description	Setting method
Connected station (own station)	A board accessed from the utility for diagnostics. Select a board from installed ones. A network including a connected station (own station) is displayed as a target for CC-Link IE TSN diagnostics.	If only one CC-Link IE TSN interface board is installed, it is automatically selected.
		If two or more boards are installed, select one when starting the "CC-Link IE TSN Diagnostics" screen.
		Click the [Change Board] button to select one in the "Change Board" screen.
Selected station	A station selected to display a detailed diagnostics result. Details on a selected station are displayed in the selected station communication status monitor.	Select one in the list box of "Select Station."
		Click the icon indicating a station in the network configuration diagram.
		Move the focus of the icon in the network configuration diagram with the right and left arrow keys, and then press the ⟦Space⟧ or ⟦Enter⟧ key.

■Network status

Values in the parameter setting and the monitoring result of the implementation status for a network displayed in the network configuration diagram are displayed.

Displayed items

Item	Description
Total Linked Stations (Parameter)	The total number of linked stations (device stations) set in "Network Configuration Settings" under "Basic Settings" is displayed.
Total Linked Stations (Connected)	The total number of linked stations (device stations) that are actually connected by data link on the currently displayed CC-Link IE TSN is displayed.
Comm. Period Interval Value	A communication period interval set for "Communication Period Setting" under "Basic Settings" of the master station is displayed. (Unit: μs)
Communication Mode	A communication mode set for "Communication Mode" under "Application Settings" of the master station is displayed.
Number of Station Errors Detected	The number of stations in which an error occurred on the currently displayed CC-Link IE TSN is displayed.
[<Previous]/[Next>] button	If there is a station with an error, click these to sequentially switch the display with the station as a selected station.

8

Network configuration diagram

A CC-Link IE TSN configuration and the status of each station are displayed.

If the status of each station is not displayed, check if there is master station or station number duplication.

Window

Displayed items

No.	Item	Description
(1)	"Connected Sta."	It is displayed for a connected station (own station). A connected station can be changed by clicking the [Change Board] button under "Select Diagnostics Destination."
(2)	Network type Station number	The network type and station number are displayed. If no station number is set, "?" is displayed. If the background of a text is colored, the station is set as a reserved station, etc. The content of a background color can be checked by clicking the [Legend] button. (☞ Page 135 Legend)
(3)	Icon	The type of a module and the status of a station are displayed. The content of an icon can be checked by clicking the [Legend] button. (☞ Page 135 Legend)
(4)	Port	A port with a cable connected is displayed.
(5)	Branch	A branch of star topology configured by using a network device such as a hub

---

Point

Click the [Update] button to update the network configuration diagram as follows:

If the actual network configuration and the network configuration diagram in the "CC-Link IE TSN Diagnostics" screen do not match, update the network configuration diagram to match. When updating it, all stations are reconnected to the network, which may cause a momentary data link error in all the stations, and outputs may turn OFF in the connected device stations. Set the outputs to be retained as necessary.

■Icon

The type of a module and the status of a station are displayed.

By clicking an icon, the station is set as a selected station and details are displayed in "Selected Station Communication Status Monitor."

The following can be performed from the shortcut menu displayed by right-clicking an icon.

Item	Description	Reference
Communication Test	Transient transmission to a specified communication destination from a connected station (own station) can be checked.	Page 139 Communication test
Station Information List	The model name, address, production information, etc. of a station where a data link is performed are displayed.	Page 142 Station information list
Remote Operation	Remote RESET can be performed when a selected station is a remote station.	Page 142 Remote operation
Error History	The error history of a selected station is displayed.	Page 143 Error history
Production Information	The production number of a selected station is displayed.	—

■Legend

The descriptions of the icons displayed in the diagnostics screen are displayed.

Window

👆 Click the [Legend] button.
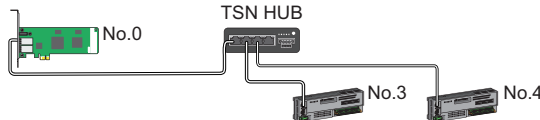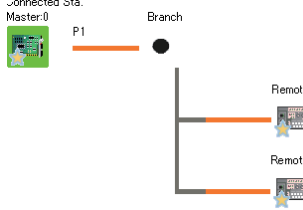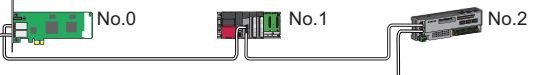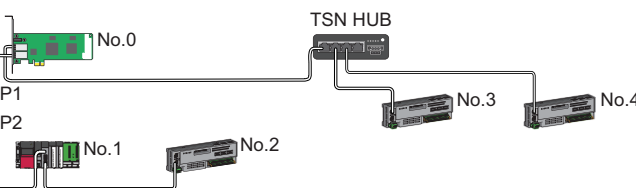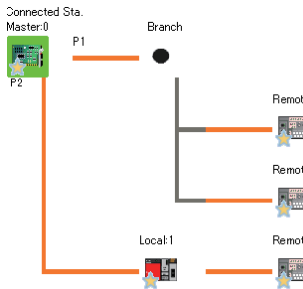
Point
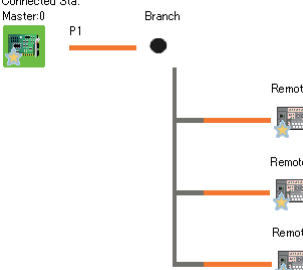
When using a module other than targets for CC-Link IE TSN diagnostics, it is displayed as "Other Modules" (▨).

■Network configuration display

Network configuration is displayed according to the connection status.

Network configuration	Actual system configuration	Network configuration diagram
Line topology		
Star topology		
Ring topology		
Coexistence of star and line topologies		

However, in the following cases, network configuration displayed in the network configuration screen differs from the actual configuration.

Network configuration	Actual system configuration	Network configuration diagram
Two stations are connected through a switching hub.		A branch is not displayed in the network configuration screen.
Switching hubs are in cascade connection.		Only one branch is displayed.

Precautions

- A station in offline mode is not displayed in the network configuration diagram. For a line topology, stations connected after this station are disconnected and not displayed.
- If there is any station for which connection configuration information cannot be acquired in a line topology, it is displayed in a star topology.
- Stations for which the connection order is not determined in a ring topology are displayed in ascending order of the IP addresses.

Data link unperformed monitoring

A disconnected station that is set in the network configuration diagram but has not yet performed a data link is displayed.

However, even if a disconnected station has ever performed a data link, it is displayed in the monitor in the following cases:

• A station that was reconnected to a network after cable disconnection/insertion or power-OFF and power-ON of the system and remains disconnected

• A station that was disconnected with the station icon deleted in the network configuration diagram by clicking the [Update] button

The ▮ icon indicates a station that has not yet performed a data link.

Icons other than ▮ indicate stations that had performed a data link before disconnection.

Selected station communication status monitor

The communication status of a selected station is displayed.

Window
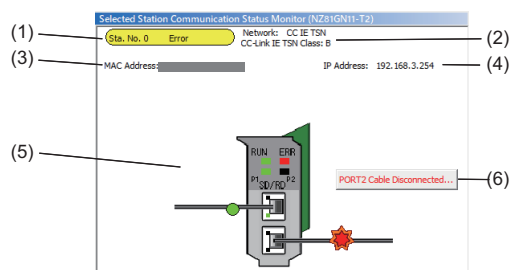
Point

If an error such as duplication of the master station or station number occurs, details cannot be displayed as a selected station.

Perform the board diagnostics on the error station to identify the error cause.

If the error station is a module, identify the error cause in the system monitor of GX Works3.

Displayed items

No.	Item	Description
(1)	Operating status	The station number and operating status are displayed. ■Normal • Sta. No. No error (light blue): Normal operation ■Error • Sta. No. Error (yellow): Error occurred (a data link continues) • Sta. No. Error (red): Error occurred (a data link stopped) ■Station number not set • Sta. No. Not set (red)
(2)	Network	Indicates that the network type is CC-Link IE TSN.
	CC-Link IE TSN Class	A CC-Link IE TSN Class is displayed.
(3)	MAC Address	The MAC address is displayed.
(4)	IP Address	The IP address is displayed (only when it is set).
(5)	LED display	The LED status is displayed.
	Communication status display	The communication statuses of PORT1 and PORT2 are displayed. The ✳ icon is displayed when the target station is disconnected.
(6)	Error button	Appears when an error occurs. Click this to check the error details. Follow the description displayed in "Error Factor" and "Troubleshooting" to take corrective action.

Point

• The flashing patterns (200 ms and 500 ms) of the ERR LED on a CC-Link IE TSN interface board are not distinguished in the selected station communication status monitor. The flashing interval is displayed in 500 ms.

• If a failure occurs on a board or module, the communication status may not be displayed properly in the selected station communication status monitor. Check the event contents displayed in the "Event History" screen to check for any failure on the system.

Communication test

Check if the communication route from the own station to a destination is correctly set for a transient transmission.

Whether to specify a communication destination with the network number and station number or the IP address can be selected, but the range that can be checked differs depending on the method.

 • Specification with the network number and station number

Stations within eight networks (number of relay stations: 7) can be checked.

☞ Page 140 Specifying a communication destination with the network number and station number

 • Specification with the IP address

Only access to stations in the same network can be checked.

☞ Page 141 Specifying a communication destination with the IP address

Precautions

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 performing this function, check if the security setting (such as a firewall) of the communication target is set to respond to PING.

In addition, if the target is set not to respond to PING in the security setting (such as a firewall), it may take some time until a timeout error occurs in the communication test.

8

■Specifying a communication destination with the network number and station number

Window

"Board Diagnostics" screen ⇨ [CC-Link IE TSN Diagnostics] button ⇨ [Communication Test] button
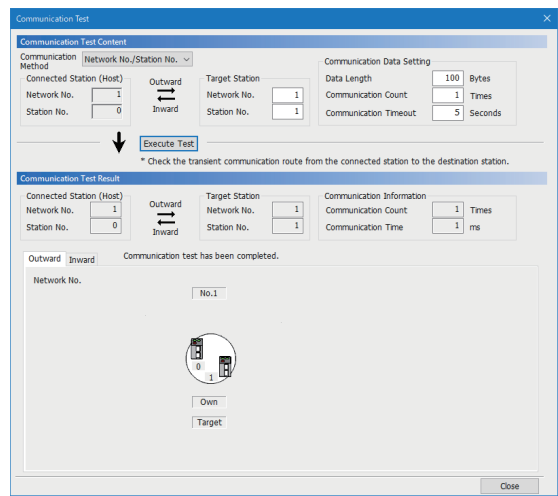
Operating procedure

1. Select "Network No./Station No." for the communication method.

2. Set the items in the screen.

Item		Description
Communication Test Content	Connected Station (Host)	The network number and station number of a communication source are displayed.
	Target Station	Set the network number and station number of a communication destination.
	Communication Data Setting	Set the data length (1 to 900 bytes), number of communications (1 to 100 times), and communication monitoring time (1 to 100 seconds) to perform the test.

3. Click the [Execute Test] button.

The communication test is performed according to the set contents.

4. Check the communication test result.

The result is displayed at the bottom of the screen.

Item		Description
Communication Test Result	Connected Station (Host)	The network number and station number of a communication source are displayed.
	Target Station	The network number and station number of a communication destination are displayed.
	Communication Information	The number of communications and communication time when performing the test are displayed.
	[Outward]/[Inward] tab	The network number and station number of a station routed between the connected station (own station) and a communication destination are displayed. If there is any difference between stations routed outward and inward, review the routing parameter setting.

If an error occurs, follow the error message to take corrective action.

Precautions

When setting a relay sending station for "Target Station," a communication test is completed with an error.
Set a relay receiving station for "Target Station."
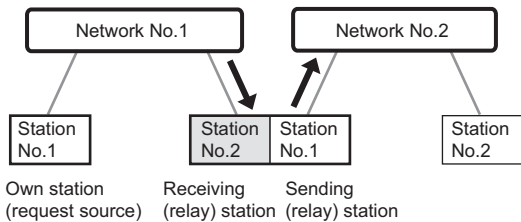
■**Specifying a communication destination with the IP address**

Window

👆 "Board Diagnostics" screen ⇨ [CC-Link IE TSN Diagnostics] button ⇨ [Communication Test] button ⇨ select "IP Address" for the communication method.

Operating procedure

1. Select "IP Address" for the communication method.

2. Set the items in the screen.

Item		Description
Communication Test Content	IP Address Input Form	Select decimal or hexadecimal for the display and input format for an IP address.
	Connected Station (Host)	The IP address of a communication source is displayed.
	Target Station	Set the IP address of a communication destination.
	Communication Data Setting	Set the data length (1 to 900 bytes), number of communications (1 to 100 times), and communication monitoring time (1 to 100 seconds) to perform the test.

3. Click the [Execute Test] button.

The communication test is performed according to the set contents.

4. Check the communication test result.

The result is displayed at the bottom of the screen.

Item		Description
Communication Test Result	Connected Station (Host)	The IP address of a communication source is displayed.
	Target Station	The IP address of a communication destination is displayed.
	Communication Information	The number of communications and communication time when performing the test are displayed.

If an error occurs, follow the error message to take corrective action.

Station information list

The model name, IP address, production information, etc. of a station where a data link is performed are displayed.

Window

"Board Diagnostics" screen ⇨ [CC-Link IE TSN Diagnostics] button ⇨ [Station Information List] button

Item	Description
Number of Stations	The total number of device stations displayed in the station information list is displayed.
Change IP Address Display	The display of an IP address in displayed station information can be switched.
Station Information List	The following values of a device station where a data link is performed are displayed: • Station No. • Model Name • IP Address • MAC Address • F/W Version • Production Information • Module Inherent Information If a value cannot be acquired or it is invalid, "—" is displayed.

Point

For a device other than targets for CC-Link IE TSN diagnostics, "Other Modules" is displayed under "Model Name."

Remote operation

Remote RESET can be performed when a selected station is a remote station supporting this function.

Operating procedure

"Board Diagnostics" screen ⇨ [CC-Link IE TSN Diagnostics] button ⇨ [Remote Operation] button

Error history

The error history of a selected station is displayed if the station supports this function.

Window

"Board Diagnostics" screen ⇨ [CC-Link IE TSN Diagnostics] button ⇨ right-click on a selected station icon ⇨ [Error History] in the shortcut menu
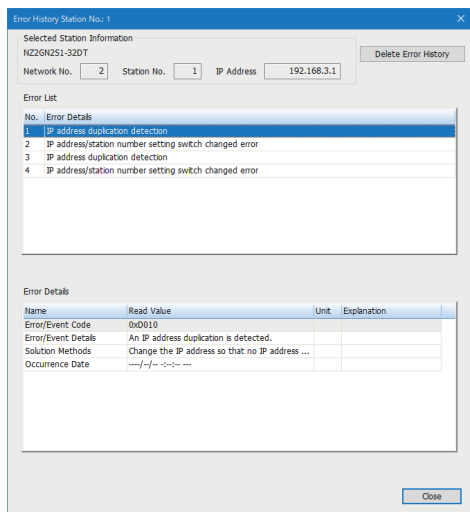
Displayed items

Item	Description
Selected Station Information	The following values of a station for which the error history is displayed are displayed. • Model name • Network number • Station number • IP address If a value cannot be acquired or it is invalid, "—" is displayed.
Error List	Errors occurred in a selected station are listed.
Error Details	Detailed information on an error selected in the error history list is displayed.
[Delete Error History] button	Click this to delete the error history.

Production information

Acquired production information is displayed if a selected station supports this function.

Operating procedure

"Board Diagnostics" screen ⇨ [CC-Link IE TSN Diagnostics] button ⇨ right-click on a selected station icon ⇨ [Production Information] in the shortcut menu

8.7 Parameter Setting

This section explains the parameter setting items and the method for operating the setting screen.

Window

"Board Diagnostics" screen ⇨ parameter setting tab of a target channel number
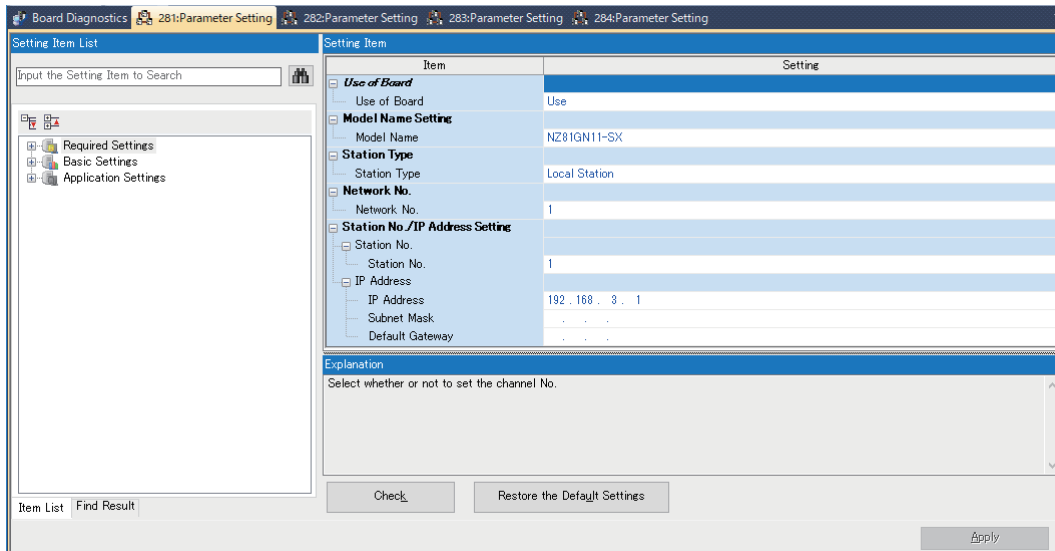
Common operations for parameter settings

Parameter items are displayed for each group.

Set each item by referring to the information displayed in "Explanation."

By entering a keyword, setting items and explanations can be searched for.

Whether there is an error or setting can be checked with the status icons in "Setting Item List."

Icon	Description
✅	There is any change from the default.
❌	There is any error.

Details on an item with an error and the setting status can be checked with a status color (text/background) in "Setting Item List."

Text	Background	Description	Example
Blue	White	Default setting	Blue/White
Black	White	Any change from the default	Black/White
White	Red	Any error	White/Red
Black	Gray	Setting not required	Black/Gray

Checking parameters

Whether there is any input error in parameters can be checked by clicking the [Check] button.

Shortcut menus for editing parameters

An input format and device assignment method can be selected from the following menus for some setting items.
- [Device Assignment Method] ⇨ [Start/End]/[Points/Start]
- [IP Address Input Format] ⇨ [Decimal]/[Hexadecimal]

Parameter list

○: Available, —: Not available

Item		Description	Availability		Reference
			Master station	**Local station**	
Required Settings	Use of Board	Select whether to use a CC-Link IE TSN interface board corresponding to the channel number.	○	○	Page 146 Use of board
	Model Name Setting	Set the model name of a CC-Link IE TSN interface board.	○	○	Page 146 Model name setting
	Station Type	Set the station type.	○	○	Page 146 Station type setting
	Network No.	Set the network number.	○	○	Page 147 Network number setting
	Station No./IP Address Setting	Set the station number or IP address.	○[*1]	○	Page 147 Station number/IP address setting
Basic Settings	Network Configuration Settings	Set parameters of device stations (the number of points and assignment of link devices) in the master station.	○	—	Page 158 CC-Link IE TSN Configuration Setting
	Refresh Setting	Assign link refresh ranges between the devices described below. • Link devices (RX, RY, RWr, RWw, LB, LW) ↔ CC-Link IE TSN driver buffer	○	○	Page 148 Refresh setting
	Network Topology	Select the network topology type according to the actual network configuration.	○	—	Page 150 Network topology setting
	Communication Period Setting	Set the basic cycle setting and multiple cycle setting.	○	—	Page 150 Communication period setting
	Connection Device Information	Set the CC-Link IE TSN Class of the connected device.	○	—	Page 152 Connection device information
	Device Station Setting	Set the number of consecutive communication failures until a device station is considered disconnected.	○	—	Page 152 Device station setting
Application Settings	Communication Speed	Set the communication speed of a CC-Link IE TSN interface board.	○	○	Page 153 Communication speed setting
	Supplementary Cyclic Settings	Set the station-based block data assurance and I/O maintenance settings.	○	○[*2]	Page 153 Supplementary cyclic setting
	Link points extended setting	Set whether to extend the number of points of LB/LW.	○[*3]	○[*3]	Page 154 Link points extended setting
	Transient Transmission Group No.	Set the transient transmission group number.	○	○	Page 154 Transient transmission group number setting
	Communication Mode	Set the communication mode of a CC-Link IE TSN interface board.	○	—	Page 154 Communication mode
	Parameter Name	Set a name for the parameter if desired.	○	○	Page 154 Parameter name
	Event Reception from Other Stations	Set whether to acquire events occurred in other stations.	○	—	Page 154 Event reception from other stations
	Board Operation Mode	Set the operation mode of a CC-Link IE TSN interface board.	○	○	Page 155 Board operation mode setting
	Security	Set the security measures for access to the Ethernet device.	○	○	Page 155 Security
	Routing Setting	Configure the settings for dynamic routing and static routing.	○	○	Page 156 Routing setting
	Driver Setting	Set the various functions of the driver.	○	○	Page 156 Driver setting
	Target Setting	Set a logical station number to access a multiple CPU system or redundant CPU system.	○	○	Page 157 Target setting

*1 Only "IP Address Setting" can be set.
*2 "Station-based Block Data Assurance" cannot be set.
*3 NZ81GN11-T2 is not supported.

Required settings

The network number, IP address, etc. can be set for a CC-Link IE TSN interface board.

Use of board

Select whether to use a CC-Link IE TSN interface board corresponding to the channel number.

When selecting "Use," parameters can be set.

Item	Description	Setting range	Default
Use of Board	Select whether to use a CC-Link IE TSN interface board corresponding to the channel.	• Not Use • Use	Not Use[*1]

*1   Even if clicking the [Restore the Default Settings] button, the setting is retained and does not return to the default.

Model name setting

Set the model name of a CC-Link IE TSN interface board.

Item	Description	Setting range	Default
Model Name	Set the model name.	• NZ81GN11-SX • NZ81GN11-T2	NZ81GN11-SX[*1]

*1   Even if clicking the [Restore the Default Settings] button, the setting is retained and does not return to the default.

Precautions

If the model name of a CC-Link IE TSN interface board corresponding to the channel number setting does not match the one in the parameter setting, the CC-Link IE TSN interface board starts in offline mode regardless of the parameter setting.

Station type setting

Set the station type of the own station of a CC-Link IE TSN interface board.

Item	Description	Setting range	Default
Station Type	Set whether to use a CC-Link IE TSN interface board as a master station or local station. Only one master station can be set in a network.	• Master Station • Local Station	Local Station[*1]

*1   Even if clicking the [Restore the Default Settings] button, the setting is retained and does not return to the default.

Network number setting

Set the network number of the own station of a CC-Link IE TSN interface board.

Item	Description	Setting range	Default
Network No.	Set the network number of a network to which a CC-Link IE TSN interface board is connected.	1 to 239	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 board to 3 causes an overlap, set another network number.

Station number/IP address setting

Set the station number, IP address, etc. of the own station of a CC-Link IE TSN interface board.

Item	Description	Setting range	Default
Station No.	Set the station number of a CC-Link IE TSN interface board. It can be set for local stations only. Set a station number different from those used in the same network.	• Master station: Fixed to 0 • Local station: 1 to 120	1
IP Address	Set the IP address of the own station. Set an IP address different from those used in other stations. (☞ Page 101 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	• Master station 192.168.3.253 • Other than the master station 192.168.3.1
Subnet Mask	Set the subnet mask. This setting is for defining the number of upper bits of the IP address used for a network address to identify the network. 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 based on the setting of "IP Address," and operations are performed with the subnet mask according to the address class. The subnet mask of 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 of 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 of each class is the '0' parts 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	Empty
Default Gateway	Set the default gateway. Set the IP address of a device (default gateway) passed through when accessing devices outside the network to which the own node belongs. The subnet addresses must be set to the same for a default gateway and the own station.	• Empty • 0.0.0.1 to 223.255.255.254	Empty

Precautions

The subnet masks of the master station and device station must be set to the same value.

The following types of IP addresses cannot be used. If setting these IP addresses, communication may not be available.

- The third and fourth octets are all 0 or all 1.
- The host address bits are all 0 or all 1.
- Reserved address

Basic settings

The network configuration setting, refresh setting, etc. can be configured for a CC-Link IE TSN interface board.
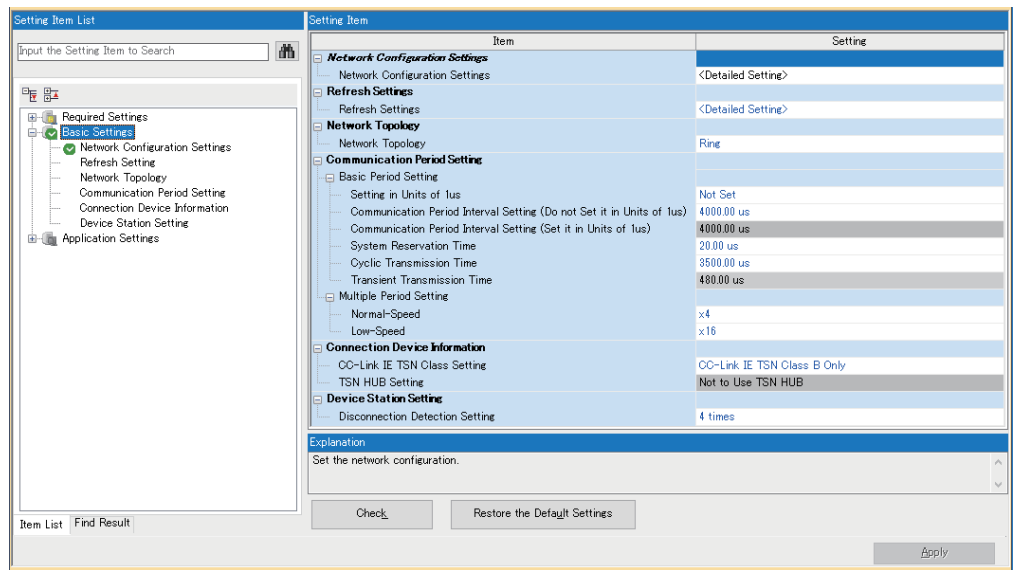
Network configuration setting

Set parameters of device stations, etc.

☞Page 158 CC-Link IE TSN Configuration Setting

Refresh setting

Assign link refresh ranges between the devices described below.

- Link devices (RX, RY, RWr, RWw, LB, LW) ↔ CC-Link IE TSN driver buffer

■Setting method

Configure the refresh setting by the following procedure:

1. Set each item.

> *Point*
>
> Right-click in the setting screen and select a link device assignment method in "Device Assignment Method."
> - Start/End: Enter the start and end numbers of link devices.
> - Points/Start: Enter the numbers of points and start numbers of link devices.

2. Click the [Apply] button to end the refresh setting.

■Setting items

Item			Description	Setting range	Default
1 to 256	Link Side	Device Name	Set the link refresh ranges of link devices (RX, RY, RWr, RWw, LB, LW). Up to 256 ranges can be set. (☞ Page 76 Link refresh)	• RX, RY, RWr, RWw, LB, LW	Empty
		Points		• RX/RY: 16 to 16384 (set in increments of 16 points) • RWr/RWw: 4 to 8192 (set in increments of 4 points) • LB (Not to extend): 16 to 32768 (set in increments of 16 points) • LB (Extend): 16 to 131072 (set in increments of 16 points) • LW (Not to extend): 1 to 16384 (set in increments of 1 point) • LW (Extend): 1 to 524288 (set in increments of 1 point)	
		Start		• RX/RY: 0 to 3FF0H (set in multiples of 16 including 0) • RWr/RWw: 0 to 1FFCH (set in multiples of 4 including 0) • LB (Not to extend): 0 to 7FF0H (set in multiples of 16 including 0) • LB (Extend): 0 to 1FFF0H (set in multiples of 16 including 0) • LW (Not to extend): 0 to 3FFFH • LW (Extend): 0 to 7FFFFH	
		End		• RX/RY: F to 3FFFH (set in multiples of 16 - 1) • RWr/RWw: 3 to 1FFFH (set in multiples of 4 - 1) • LB (Not to extend): F to 7FFFH (set in multiples of 16 - 1) • LB (Extend): F to 1FFFFH (set in multiples of 16 - 1) • LW (Not to extend): 0 to 3FFFH • LW (Extend): 0 to 7FFFFH	
	PC Side		Displayed according to the setting on the link side.	—	—

Precautions

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

■When changing link device assignment in "Network Configuration Settings" under "Basic Settings"
Review the setting range in "Refresh Setting" under "Basic Settings."

Network topology setting

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

Item	Description	Setting range	Default
Network Topology	Select the network topology type according to the actual network configuration. To use the loopback function, select "Ring." (⛥ Page 97 Loopback function)	■NZ81GN11-SX • Ring ■NZ81GN11-T2 • Line/Star • Ring	■NZ81GN11-SX Ring ■NZ81GN11-T2 Line/Star

Point

If the setting is configured in "Network Configuration Settings" under "Basic Settings," change the network topology by selecting [CC-Link IE TSN Configuration] ⇨ [Change Transmission Path Method] from the menu in the "CC-Link IE TSN Configuration" screen.

Communication period setting

Set the basic cycle setting and multiple cycle setting.
- The communication period interval and cyclic transmission time must be calculated for the basic period setting. (⛥ Page 281 Communication cycle intervals)
- Multiple cycle setting is used when communication cycles coexist. (⛥ Page 83 Communication cycle coexistence)

Item		Description	Setting range	Default
Basic Period Setting	Setting in Units of 1μs	Select whether to set the basic cycle in increments of 1 μs.	• Set • Not Set	Not Set
	Communication Period Interval Setting (Do not Set it in Units of 1μs)	Select a communication period interval.	• 125.00 μs • 250.00 μs • 500.00 μs • 1000.00 μs • 2000.00 μs • 4000.00 μs • 8000.00 μs	■NZ81GN11-SX 4000.00 μs ■NZ81GN11-T2 1000.00 μs
	Communication Period Interval Setting (Set it in Units of 1μs)	Select the setting range of the communication cycle interval.	125.00 μs to 10000.00 μs (in increments of 1 μs)	■NZ81GN11-SX 4000.00 μs ■NZ81GN11-T2 1000.00 μs
	System Reservation Time	Necessary time for the system to guarantee the communication cycle interval. The value obtained by subtracting a value set for the system reservation time from one set for the communication period interval setting can be used as the time for actual data communication. For the NZ81GN11-T2, when "Communication Speed" of the master station is set to 100 Mbps, select 200 μs.	• 20.00 μs • 200.00 μs	20.00 μs
	Cyclic Transmission Time	Set the time to be allocated to cyclic transmission in communication cycle intervals.	5.00 μs to 9966.00 μs (in increments of 1 μs)	■NZ81GN11-SX 3500.00 μs ■NZ81GN11-T2 500.00 μs
	Transient Transmission Time	The value obtained by subtracting values set for "Cyclic Transmission Time" and "System Reservation Time" from a value set for "Communication Period Interval Setting" is displayed.	14.00 μs to 9975.00 μs (in increments of 1 μs)	480.00 μs

Item		Description	Setting range	Default
Multiple Period Setting	Normal-Speed	Select the "Normal-Speed" cycle for a basic cycle.	■NZ81GN11-SX • ×2 • ×4 • ×8 ■NZ81GN11-T2 • ×4	×4
	Low-Speed	Select the "Low-Speed" cycle for a basic cycle.	• ×16 • ×32 • ×64 • ×128	×16

Point

- When using a TSN hub, set the timeslot information according to the setting values in "Basic Period Setting." The timeslot information can be checked in the buffer memory. (☞ Page 252 Timeslot information)
- Set "Communication Period Setting" according to the communication cycle supported by the device stations.

8

Connection device information

Set the information of the connected device.

Item	Description	Setting range	Default
CC-Link IE TSN Class Setting	Set the CC-Link IE TSN Class of the connected device.	■NZ81GN11-SX • CC-Link IE TSN Class B Only ■NZ81GN11-T2 • CC-Link IE TSN Class B Only • Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only	CC-Link IE TSN Class B Only
TSN HUB Setting	Set whether to use a TSN hub for a configuration including CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices. Set "Use TSN HUB" when connecting a TSN hub.	■NZ81GN11-SX • Not to Use TSN HUB ■NZ81GN11-T2 • Not to Use TSN HUB • Use TSN HUB	Not to Use TSN HUB

Precautions

- A board can be used even if setting "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only" while only CC-Link IE TSN Class B devices are connected. To connect CC-Link IE TSN Class A devices or Ethernet devices by connecting a general-purpose hub to the end of the CC-Link IE TSN Class B devices in the future, select an applicable setting in advance.
- When setting "Network Topology" to "Ring," set "CC-Link IE TSN Class Setting" in "Connection Device Information" to "CC-Link IE TSN Class B Only." If setting "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only," an error code (3016H) is output.
- For a configuration including CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices, set "TSN HUB Setting" to "Use TSN HUB" when connecting a TSN hub.
- When setting "TSN HUB Setting" to "Not to Use TSN HUB" and connecting a TSN hub for a configuration including CC-Link IE TSN Class B devices and CC-Link IE TSN Class A devices, a data link may not be performed in a device station.
  (☞ Page 215 CC-Link IE TSN Class A device does not perform data link)

Device station setting

Set the item related to a device station.

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

Application settings

The supplementary cyclic settings, transient transmission group number, etc. can be set for a CC-Link IE TSN interface board.

Communication speed setting

Set the communication speed.

Item	Description	Setting range	Default
Communication Speed	Select the communication speed of a CC-Link IE TSN interface board.	■NZ81GN11-SX • 1Gbps ■NZ81GN11-T2 • 1Gbps • 100Mbps	1Gbps

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

Supplementary cyclic setting

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

Item		Description	Setting range	Default
Station-based Block Data Assurance		Set whether to assure data for each station in link refresh between the CC-Link IE TSN driver buffer and a CC-Link IE TSN interface board. (☞ Page 79 Cyclic data assurance)	• Enable • Disable	Enable
I/O Maintenance Settings	Data Link Error Station Setting	Set whether to clear or hold an input from a disconnected station on the receiving side. (☞ Page 84 I/O maintenance setting)	• Clear • Hold	Clear

8

Link points extended setting

Set whether to extend the maximum number of link points of LB/LW per network.

Item	Description	Setting range	Default
LB/LW Points Extended Setting	Set whether to extend the maximum number of link points of LB/LW per network. The setting must match between the master station and local station. When setting the communication mode to unicast, select "Not to Extend."	■NZ81GN11-SX • Extend • Not to Extend ■NZ81GN11-T2 —	Extend

Transient transmission group number setting

Set the transient transmission group number.

This is a number for transient transmission of identical data to multiple stations at a time.

By specifying a group of stations as a transient transmission target, data can be sent to the stations of the same group number.

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

Communication mode

Set the communication mode.

Item	Description	Setting range	Default
Communication Mode	Set the communication mode.	• Unicast • Multicast	■NZ81GN11-SX Multicast ■NZ81GN11-T2 Unicast

Parameter name

Set a name for the parameter if desired.

Item	Description	Setting range	Default
Parameter Name	Set a name for the parameter if desired.	Up to 8 characters in Unicode (UTF16-LE)	Empty

Event reception from other stations

Set whether to acquire events occurred in other stations.

Item	Description	Setting range	Default
Event Reception from Other Stations	Set whether to acquire events occurred in other stations.	• Enable • Disable	Enable

Board operation mode setting

Set the operation mode of a CC-Link IE TSN interface board.

Item	Description	Setting range	Default
Board Operation Mode	Set the board operation mode. ■Online To connect a board to a network and perform a data link with another station. ■Offline To disconnect a board from a network and not to perform a data link with another station. ■Module Communication Test To check the hardware of a board. If communication is unstable, check the hardware for errors. (⮫ Page 50 Tests before Wiring (Board Communication Tests))	• Online • Offline • Module Communication Test	Online

Restriction 🖐

When setting "Board Operation Mode" to "Offline" or "Module Communication Test," the following functions cannot be used. (⮫ Page 57 FUNCTIONS)

- Cyclic transmission
- Transient transmission
- RAS

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

Security

Set the security measures for access to the Ethernet device.

Item		Description	Setting range	Default
IP Filter Settings	IP Filter	Set whether to use the IP filter.	• Disable • Enable	Disable
	IP Filter Settings	Set the IP addresses to be allowed or denied.	⮫ Page 155 IP filter settings	

■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	Default
Access from IP address below	Set whether to allow or deny the access from a specified IP address.	• Allow • Deny	Allow
Range Setting	Select the checkbox when specifying a range of IP addresses.	• Unselected • Selected	Unselected
IP Address	Set the IP addresses to be allowed or denied. When selecting the checkbox under "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	Empty
IP Address Excluded from Range	When selecting the checkbox under "Range Setting," set an IP address to exclude from the range under "IP Address." Up to 32 IP addresses can be set.	0.0.0.1 to 223.255.255.254	Empty

Routing setting

Configure the setting when performing transient transmission to a station on another network in a multiple network system.
(☞ Page 93 Routing function)

This setting is used when communicating with a station connected to another network via a relay station connecting multiple networks.

Item	Description	Setting range	Default
Dynamic Routing	Set whether to enable or disable automatic generation of a communication route by dynamic routing (the dynamic routing function). If static routing is already set, it is prioritized.	• Enable • Disable	Enable
Routing Setting	Set details when using static routing. ☞ Page 156 Static routing setting (detailed setting)	"Detailed Setting"	
Condition Setting of Relay/ Target Network	If there is MELSECNET/10 in a transfer or relay destination, set this to "MNET/10 Exists."	• MNET/10 Exists • No MNET/10	MNET/10 Exists

■Static routing setting (detailed setting)

Configure this in the parameters of a request source and relay station for transient transmission for a system in which network modules not supporting dynamic routing are included or when setting a communication route clearly.

Item		Description	Setting range	Default
Relay Station	Network No.	Set the network number of the first relay station passed through to reach the network number of a target station.	1 to 239	Empty
	Station No.	Set the station number of the first relay station passed through to reach the network number of a target station.	0 to 120	Empty
Target Station	Network No.	Set the network number of a final destination. A network number cannot be set for multiple settings.	1 to 239	Empty

Driver setting

Set the driver WDT monitoring time, transient timeout monitoring time, link refresh cycle, and RECV function receive buffer.

Item		Description	Setting range	Default
Driver WDT Monitoring Time	Whether to Use the Driver WDT	Set whether to use the driver WDT.	• Use • Not Use	Not Use
	Driver WDT Monitoring Time	Set the driver WDT monitoring time in 10 ms units.	10 to 327670	2000
Transient Timeout Monitoring Time	Transient Timeout Monitoring Time	Set the transient timeout monitoring time.	1 to 360	15
Link Refresh Cycle	Link Refresh Cycle	Set the link refresh cycle.	1 to 1000	1
RECV Function Receive Buffer	RECV Function Receive Buffer	Set the RECV function receive buffer.	• Use • Not Use	Not Use

Target setting

Set a logical station number to access a multiple CPU system or redundant CPU system.

Item	Description	Setting range	Default
Logical station No.	Set a logical station number.	0 to 239	Empty
Network No.	Set the network number of an access target.	1 to 239	Empty
Station No.	Set the station number of an access target network module.	0 to 120	Empty
Multiple CPU	Set the CPU number of an access target CPU in a multiple CPU system.	• No specification • CPU No.1 • CPU No.2 • CPU No.3 • CPU No.4	Empty
Redundant CPU	Specify the system of an access target CPU in a redundant system.	• No specification • Control system • Standby system • System A • System B	Empty

Point

- If an access target CPU module does not support a network module on the route, an error occurs and access is not available.
- When directly accessing another station on the network or a CPU module controlling a network module on the station, specify the station number of the station directly instead of using a logical station number.

8.8 CC-Link IE TSN Configuration Setting

This section shows the parameter setting, etc. for a device station.

👉 CC IE TSN utility ⇨ parameter setting tab of a target channel number ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]

Parameter setting for a device station

The following shows the procedure for setting the number of link device points, assigning link devices, etc. for a device station in the parameter setting of the master station.

1. Select a module in "Module List," then drag and drop it onto the station list or network configuration diagram.
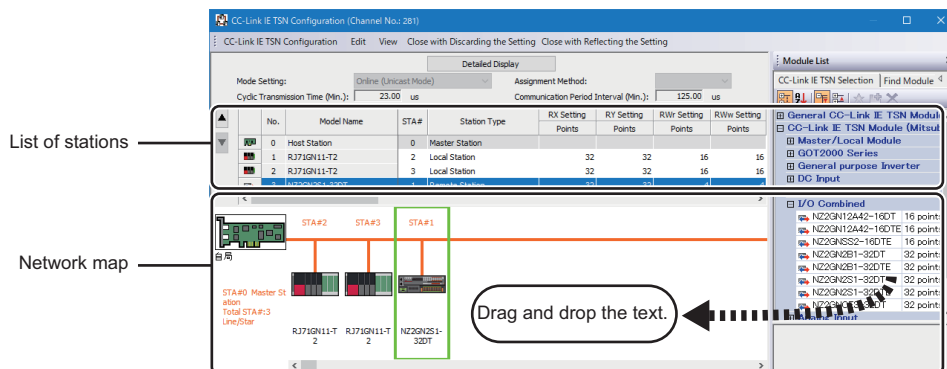
2. Set each item.
👉 Page 159 Setting items

3. Check the system configuration.

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

If an error or warning appears in the output window, refer to the following:
📖 MELSOFT Navigator MessageNo.

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

Precautions

In the system configuration check, the restrictions may not be checked.
Configure a network configuration diagram after checking the system configuration details in the following:
👉 Page 24 CC-Link IE TSN Configuration

> **Point** 🔎
>
> The network topology can be checked in the network configuration diagram.
> - Double line: Ring
> - Single line: Line/Star
>
> The network topology can be changed by selecting [CC-Link IE TSN Configuration] ⇨ [Change Transmission Path Method].

Setting items

NZ81GN11-SX
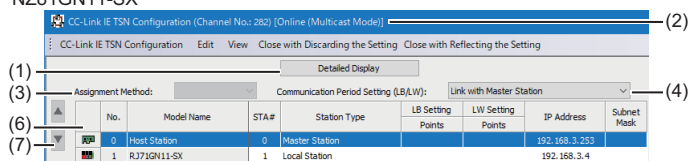
NZ81GN11-T2

No.	Item	Description
(1)	[Simple Display] button [Detailed Display] button	Click this to switch the display in the station list. • Simple Display: Click the [Simple Display] button to display a narrow portion of items. Use this for operation with default settings or the minimum required settings. (Default) • Detailed Display: Click the [Detailed Display] button to display all items.
(2)	Mode Setting	The settings for "Board Operation Mode" and "Communication Mode" are displayed. For details on the settings, refer to the following: • Board Operation Mode: ☞ Page 155 Board operation mode setting • Communication Mode: ☞ Page 154 Communication mode
(3)	Assignment Method	Select a link device assignment method. • Point/Start: Enter the numbers of points and start numbers of link devices. • Start/End: Enter the start and end numbers of link devices.
(4)	Communication Period Setting (LB/LW)	■NZ81GN11-SX only Select a setting method for "Communication Period Setting (LB/LW)." • Link with Master Station: "Communication Period Setting (LB/LW)" of stations other than the master station links with the setting for the master station. • Set for Each Station: "Communication Period Setting (LB/LW)" of stations other than the master station can be set arbitrarily. When setting "LB/LW Points Extended Setting" in "Application Settings" to "Not to Extend," it is grayed out and fixed to "Link with RX/RY/RWr/RWw."
(5)	Cyclic Transmission Time (Min.)	■NZ81GN11-T2 only 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][2] The displayed value can be checked in 'Cyclic transmission time (calculation value)' (SW0073). ☞ Page 266 Link special register (SW) list The displayed value differs depending on the setting for "TSN HUB Setting" in "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 281 Communication cycle intervals It can be used for "Cyclic Transmission Time" in "Communication Period Setting" under "Basic Settings" in the 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 minimum value of the calculated cyclic transmission time • When the communication speed of the master station is set to 1 Gbps: Number of device stations × 2 μs • When the communication speed of the master station is set to 100 Mbps: Number of device stations × 20 μs
	Communication Period Interval (Min.)	■NZ81GN11-T2 only The communication cycle 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][2] Check the displayed value in 'Communication cycle interval (calculation value)' (SW0072). ☞ Page 266 Link special register (SW) list The displayed value differs depending on the setting for "TSN HUB Setting" in "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 281 Communication cycle intervals
(6)	Station list	Set parameters for a device station. ☞ Page 160 Station list
(7)	Row move buttons	Click these to move the order of a target station selected in the station list.

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.

■Station list

Setting item (detailed display)	Description	Setting range	Default
No.	The number of device stations set in the "CC-Link IE TSN Configuration" screen is displayed.	—	—
Object Name	The object name of a device is displayed when selecting [View] ⇨ [Object Name Display] in the basic menu.	—	—
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 the method for registering a profile, refer to the following: ☞ Page 120 Profile management	—	—
STA#	Set the station number of a device station connected to a network. Station numbers do not need to be set consecutively, but must be unique.	• Master station: Fixed to 0 • Device station: 1 to 120	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	Varies depending on the set module.
RX Setting[3] RY Setting[3]	Assign RX/RY points in increments of 16. (☞ Page 63 Communication 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	Varies depending on the set module.
RWw Setting[3] RWr Setting[3]	Assign RWw/RWr points in increments of 4. (☞ Page 63 Communication 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	Varies depending on the set module.
LB Setting	Assign LB and LW points in increments of 16 and 1, respectively. (☞ Page 69 Communication 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)	■The number of points is not extended. • Number of points: 16 to 32768 • Start: 0H to 7FF0H • End: FH to 7FFFH ■The number of points is extended (NZ81GN11-SX only). • Number of points: 16 to 131072 • Start: 0H to 1FFF0H • End: FH to 1FFFFH	Varies depending on the set module.
LW Setting		■The number of points is not extended. • Number of points: 1 to 16384 • Start: 0H to 3FFFH • End: 0H to 3FFFH ■The number of points is extended (NZ81GN11-SX only). • Number of points: 1 to 524288 • Start: 0H to 7FFFFH • End: 0H to 7FFFFH	
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)	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.	• 0.0.0.1 to 255.255.255.255 (00.00.00.01 to FF.FF.FF.FF) • Empty	Empty[4]

Setting item (detailed display)		Description	Setting range	Default
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	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	No setting, master station is fixed as empty
Communication Period Setting		■NZ81GN11-T2 When setting multiple communication periods, set the period for each device station. (☞ Page 83 Communication cycle coexistence) ■NZ81GN11-SX Settings for RX/RY/RWr/RWw and LB/LW are available.	• Basic Period • Normal-Speed • Low-Speed	Basic Period
Communication Period Setting	RX/RY/RWr/RWw	■NZ81GN11-SX only When setting multiple communication periods, set the period for each device station. (☞ Page 83 Communication cycle coexistence)		
	LB/LW	■NZ81GN11-SX only Set the communication period for LB/LW. This setting is not required when setting "LB/LW Points Extended Setting" in "Link Points Extended Setting" under "Application Settings" to "Not to Extend." It is same as the communication period setting for RX/RY/RWr/RWw. If changing "LB/LW Points Extended Setting" from "Not to Extend" to "Extend," "Basic Period" is automatically set. • When setting "LB/LW Points Extended Setting" in "Link Points Extended Setting" under "Application Settings" to "Not to Extend," all data is sent once every N[*5] cycle for LB/LW. • When setting it to "Extend," data is sent by 1/N[*5] every cycle (data size per cycle: 1/N[*5]). (☞ Page 74 Communication period setting)		
Station Information	Alias	Enter the name of a device if required. The entered device name is displayed for "Network Status" in the "CC-Link IE TSN Diagnostics" screen.	Up to 32 characters	Empty
	Comment	Information entered in "Comment1" in the "Properties" screen displayed by right-clicking a module and selecting [Properties] in the station list or the network configuration diagram is displayed.	Up to 32 characters	Empty
	Station-specific mode setting	Set the station-specific mode of the device station. (Only when the device station supports the station-specific mode.)	Varies depending on the set module.	Varies depending on the set module.
CC-Link IE TSN Class		Set the CC-Link IE TSN Class of the device for each device station.[*3]	• CC-Link IE TSN Class B • CC-Link IE TSN Class A	Varies depending on the device.

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

*2   When setting the minimum values for "Communication Period Interval Setting" and "Cyclic Transmission Time" for a general CC-Link IE TSN module with "CC-Link IE TSN Class A" set under "CC-Link IE TSN Class" which is added to the station list in the network configuration setting, cyclic transmission may not be performed. In this case, select an actual device to be used from "Module List" and add it to the station list, or refer to the manual for a device used to check the maximum response time during time-managed polling, and calculate and set the communication period interval and cyclic transmission time.

*3   If the number of assigned link device points exceeds its available number in a CC-Link IE TSN Class A station, a link device points error (error code: 3160H) occurs. For the number of points that can be assigned to a CC-Link IE TSN Class A device station, refer to the following:
☞ Page 161 Number of link device points that can be assigned to a CC-Link IE TSN Class A device station

*4   If a value is set for "Subnet Mask" in "Station No./IP Address Setting" under "Required Settings," the same value is set as default.

*5   A value of N for 'N times' set for "Multiple Period Setting" in "Communication Period Setting" under "Basic Settings"

■**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) ≤ 1912

• (Number of points of "RX Setting" ÷ 8) + (Number of points of "RWr Setting" × 2) ≤ 1872

Parameter processing of a device station (NZ81GN11-T2 only)

Parameters can be read from a device station and saved, and written to the device station.

It is available only for device stations where parameters can be processed by a profile.

☞ CC IE TSN utility ⇨ parameter setting tab of a target channel number ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]
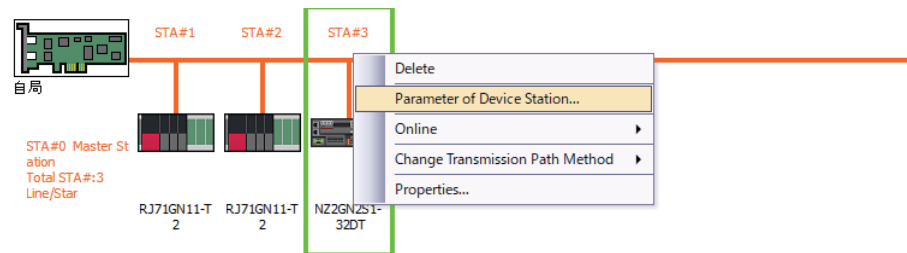
Select and right-click a device station, and select "Parameter of Device Station" to display the "Parameter of Device Station" screen.

Item		Description
Target Module Information		Information on a selected device station is displayed.
Method selection		Select processing to be performed for a selected device station. • Parameter read: To read parameters from a selected device station. • Parameter write: To write parameters to a selected device station.
Parameter Information	[Clear All "Read Value"] button	Click this to clear all settings read by selecting "Parameter read."
	[Clear All "Write Value/Setting Value"] button	Click this to clear all settings written by selecting "Parameter write."
Process Option		When there is an option for processing selected for "Method selection," a setting item is displayed.
[Import] button		Click this to read the contents of parameter processing created in a CSV file.
[Export] button		Click this to output the contents of parameter processing set in this screen in a CSV file.

Procedure for clearing saved parameters

To return saved parameters of an unnecessary device station to the unset state, perform the following procedure:

1. When saving saved parameters, click the [Export] button to output them to a CSV file.

2. Delete an unnecessary device station from the station list.

3. Select the same module as the deleted device station in "Module List," then drag and drop it onto the station list or network configuration diagram.

Conditions for clearing saved parameters

Saved parameters of a device station can be cleared under the following conditions.
When they are cleared, select "Parameter read" in the "Parameter of Device Station" screen to read the parameters of the device station.

Item	Operation	Description
"CC-Link IE TSN Configuration" screen	Open the "CC-Link IE TSN Configuration" screen.	When there is no device station with a station number that matches the saved parameters in the "CC-Link IE TSN Configuration" screen, the saved parameters of the target device station are skipped. Skipped parameters of the device station are cleared.
	Apply the setting and close the screen.	Saved parameters of a device station that is not in the actual system configuration are cleared.
	Change the function version in the "Properties" screen.	When closing the "Properties" screen, the saved parameters are cleared.
"Parameter of Device Station" screen	Open the "Parameter of Device Station" screen.	Saved parameters that mismatch the target device station are skipped. Clicking the [Close with Reflecting the Setting] button in the above state clears the skipped saved parameters.
Parameter setting	Manually delete "Network Configuration Settings" to apply.	Parameters of "Network Configuration Settings" return to default.
	Change "Station Type" or set parameters that do not exist.	

Command execution to device stations (NZ81GN11-T2 only)

Commands (error clear request and error history clear request) can be executed to a device station.

It is available only for device stations where commands can be executed by a profile.

☞ CC IE TSN utility ⇨ parameter setting tab of a target channel number ⇨ [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]
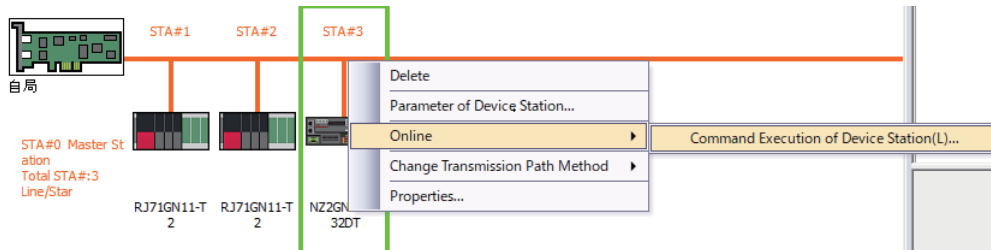
Select and right-click a device station, and select "Command Execution of Device Station" from "Online" to display the "Command Execution of Device Station" screen.

Item	Description
Target Module Information	Information on a selected device station is displayed.
Method selection	Select processing to be performed for a selected device station. • Error clear request • Error history clear request
Command Setting	When there are command settings for processing selected for "Method selection," setting items are displayed.
Execution Result	Execution results of processing selected for "Method selection" are displayed.
[Save in the CSV file] button	Click this to output the contents of this screen in a CSV file.
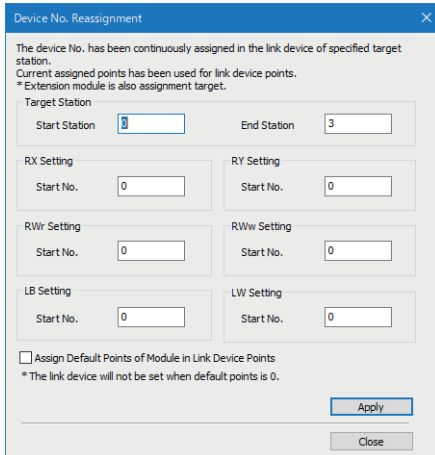
Device number reassignment

Device numbers can be assigned consecutively to the link devices of a specified target station.
The number of points assigned in the station list in the "CC-Link IE TSN Configuration" screen are used for the number of link device points.

1. Display the "Device No. Reassignment" screen.

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

2. Enter values in the "Device No. Reassignment" screen, 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 a module displayed in the station list in the "CC-Link IE TSN Configuration" screen is displayed.

🖱 [View] ⇨ [Object Name Display]
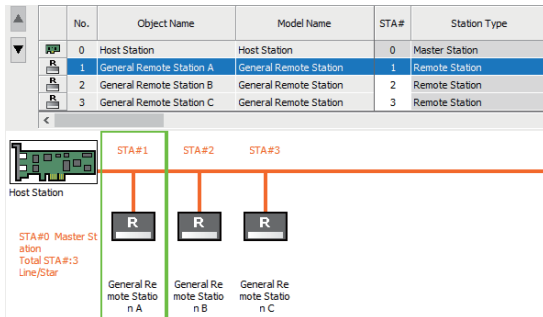
Change of an object name

Object names can be changed to any desired names.

By changing object names to any ones, each module can easily be identified in the "CC-Link IE TSN Configuration" screen.

1. In the network configuration diagram in the "CC-Link IE TSN Configuration" screen, right-click a module for changing its object name and click "Properties."
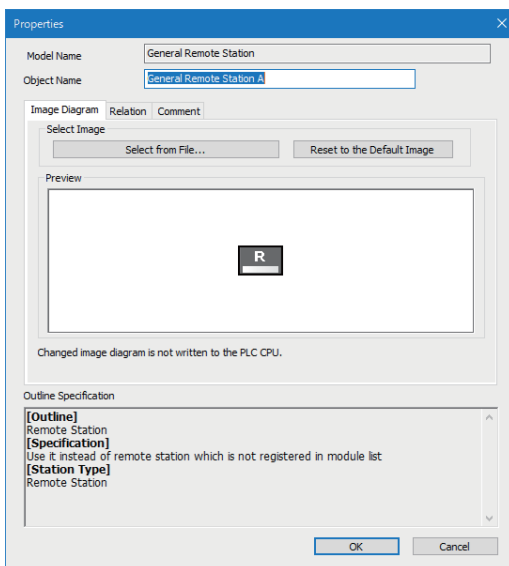
2. Change the object name.

3. Click the [OK] button.

9 PROGRAMMING

This chapter shows the MELSEC data link library functions used in a user program to access a board.

For available operating systems and programming languages, refer to the following:

☞ Page 33 Operating Environment

9.1 MELSEC Data Link Library

This section explains the features of the functions provided by the library.

These functions are used when creating a user program to communicate with a programmable controller CPU.

With these functions, a user can communicate without being aware of hardware types or communication protocols on the target.

The following table shows the list of functions provided with the software package.

Function name	Description	Remarks
mdOpen	Opens a communication line.	—
mdClose	Closes a communication line.	—
mdSendEx	Writes devices in a batch.	Extended function[*1]
	Sends data. (SEND function)	Extended function[*1]
mdReceiveEx	Reads devices in a batch.	Extended function[*1]
	Receives data. (RECV function)	Extended function[*1]
mdRandWEx	Writes devices randomly.	Extended function[*1]
mdRandREx	Reads devices randomly.	Extended function[*1]
mdDevSetEx	Sets a bit device.	Extended function[*1]
mdDevRstEx	Resets a bit device.	Extended function[*1]
mdRemBufWriteEx	Writes data to the buffer memory of a remote device station or remote station.	Extended function[*1]
mdRemBufReadEx	Reads data from the buffer memory of a remote device station or remote station.	Extended function[*1]
mdRemBufWriteIPEx	Writes data to the buffer memory of a remote station. (Target station IP address specified)	Extended function[*1]
mdRemBufReadIPEx	Reads data from the buffer memory of a remote station. (Target station IP address specified)	Extended function[*1]
mdTypeRead	Reads the type of a programmable controller CPU.	—
mdControl	Performs a remote operation (RUN/STOP/PAUSE) for a programmable controller CPU.	—
mdBdRst	Resets a board.	—
mdBdModSet	Sets the mode of a board.	—
mdBdModRead	Reads the mode of a board.	—
mdBdLedRead	Reads the LED information of a board.	—
mdBdSwRead	Reads the switch status of a board.	—
mdBdVerRead	Reads the version information of a board.	—
mdInit	Initializes the programmable controller information table.	—

*1 A function in which the access range is extended according to the extension of the device points at the access target. It is accessible to all device numbers.

Point

For details on the MELSEC data link library functions, refer to the following:
📖MELSEC Data Link Library Reference Manual

9.2 Considerations for Programming

This section explains the considerations for creating programs.

Cyclic transmission programs

For cyclic transmission programs, interlock with the following link special relay (SB) and link special register (SW).
- 'Data link error status of own station' (SB0049) (☞ Page 261 Link Special Relay (SB) List)
- 'Data link status of each station' (SW00B0 to SW00B7) (☞ Page 266 Link Special Register (SW) List)

Transient transmission programs

For transient transmission programs, interlock with the following link special relay (SB) and link special register (SW).
- 'Data link error status of own station' (SB0049) (☞ Page 261 Link Special Relay (SB) List)
- 'Data link status of each station' (SW00B0 to SW00B7) (☞ Page 266 Link Special Register (SW) List)

Considerations for utilizing user programs

The following changes are required for utilizing a user program used for a CC-Link IE Controller Network, CC-Link IE Field Network board, etc. for this product.
- Change the channel number specified when opening a communication line to the number of a board used.
- Change a conventional compatible function to an extended function if used.

10 COMMUNICATION EXAMPLES

This chapter shows communication examples for a board.

10.1 Examples of Communication between the Master Station and Local Stations

This section explains examples of communication between the master station and local stations in the following system configuration.

System configuration

The following system configuration is used for the explanation.

• Board: NZ81GN11-T2 (channel No.281)

Install a board on a PCI Express slot of the personal computer (Windows), and install the software package.
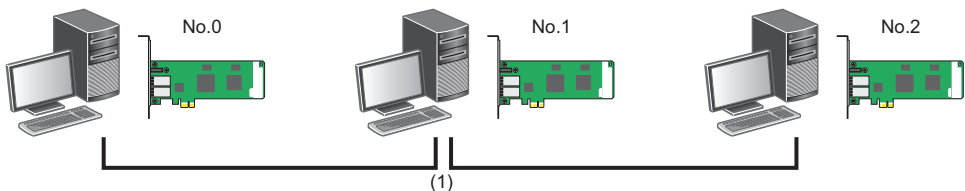
No.0	Master station (station No.0)
No.1	Local station (station No.1)
No.2	Local station (station No.2)
(1)	Network No.1

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

In this communication mode, a local station cannot receive cyclic data from another station.

■RX and RY assignment

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

No.0 is the master station, and No.1 and No.2 are local stations.

→ No.1, → No.2: Range of sending to station No.1, range of sending to station No.2

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

■RWr and RWw assignment

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

No.0 is the master station, and No.1 and No.2 are local stations.

→ No.1, → No.2: Range of sending to station No.1, range of sending to station No.2

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

■LB and LW assignment

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

No.0 is the master station, and No.1 and No.2 are local stations.

→ No.0: Range of sending from station No.0

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

Multicast mode

In this communication mode, a local station can receive cyclic data from another station.

■RX and RY assignment

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

No.0 is the master station, and No.1 and No.2 are local stations.

→ No.1, → No.2: Range of sending to station No.1, range of sending to station No.2

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

■RWr and RWw assignment

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

No.0 is the master station, and No.1 and No.2 are local stations.

→ No.1, → No.2: Range of sending to station No.1, range of sending to station No.2

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

■LB and LW assignment

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

No.0 is the master station, and No.1 and No.2 are local stations.

→ No.0: Range of sending from station No.0

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

Parameter setting

Start the CC IE TSN utility on the personal computer where a board is installed and set parameters.

Operating procedure

1. Set parameters for each station.

2. Write the set parameters to a board.

👆 [Online] ⇨ [Write to Board]

Setting contents

―: Cannot be set

Item			Master station	Local station	
			No.0	No.1	No.2
Required Settings	Use of Board	Use of Board	Use	Use	Use
	Model Name Setting	Model Name	NZ81GN11-T2	NZ81GN11-T2	NZ81GN11-T2
	Station Type	Station Type	Master Station	Local Station	Local Station
	Network No.	Network No.	1	1	1
	Station No./IP Address Setting	Station No.	0	1	2
		IP Address	192.168.3.253	192.168.3.1	192.168.3.2
		Subnet Mask	Empty	Empty	Empty
		Default Gateway	Empty	Empty	Empty
Basic Settings	Network Configuration Settings	☞ Page 173 Network configuration setting		―	―
	Refresh Setting	☞ Page 173 Refresh setting			
	Others		Default		
Application Settings	Communication Mode	Communication Mode	• Unicast • Multicast	―	―
	Others		Default		

■Network configuration setting

Set the network configuration by the following procedure:

1. [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]

2. Select [Network Interface Board] ⇨ [NZ81GN11-T2] in "Module List," then drag and drop it onto the station list or the network configuration diagram.

3. Click the [Detailed Display] button.

4. Set the following items:

No.	Station type	RX setting			RY setting			RWr setting			RWw setting		
		Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
0	Master station	—	—	—	—	—	—	—	—	—	—	—	—
1	Local station	256	0000	00FF	256	0000	00FF	256	0000	00FF	256	0000	00FF
2	Local station	256	0100	01FF	256	0100	01FF	256	0100	01FF	256	0100	01FF

No.	Station type	LB setting			LW setting		
		Points	Start	End	Points	Start	End
0	Master station	512	0000	01FF	512	0000	01FF
1	Local station	512	0200	03FF	512	0200	03FF
2	Local station	512	0400	05FF	512	0400	05FF

5. Set the IP address of each station under "IP Address."

6. Check the system configuration.

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

7. Select [Close with Reflecting the Setting] to close the "CC-Link IE TSN Configuration" screen.

> **Point**
>
> In this example, default values are used for parameters that are not shown above.

■Refresh setting

Configure the refresh setting by the following procedure:

1. [Basic Settings] ⇨ [Refresh Setting] ⇨ [Detailed Setting]

When configuring the setting on the link side, that on the personal computer side is displayed accordingly.

Device name	Points	Start	End
RX	512	00000	001FF
RY	512	00000	001FF
RWw	512	00000	001FF
RWr	512	00000	001FF
LB	1536	00000	005FF
LW	1536	00000	005FF

2. Click the [Check] button.

3. Click the [Apply] button.

Checking the network status

After setting parameters for the master station and local stations, check if data properly links among them using the CC-Link IE TSN diagnostic function of the CC IE TSN utility.

1. Start the CC IE TSN utility on the personal computer where a board is installed.

2. Click the [CC-Link IE TSN Diagnostics] button in the board diagnostics screen (startup screen).

The status in the following screen indicates normal data link.

When an icon indicating an error is displayed, identify the cause of the error and take actions. (☞ Page 132 CC-Link IE TSN diagnostics)

Program examples

The following shows program examples.

Master station (station No.0)

The following devices are used in a program.

Device	Description
SB0049	Data link error status of own station
SW00B0.0	Data link status of each station (station No.1)
SW00B0.1	Data link status of each station (station No.2)
RWw0 to FF	Data to be sent to station No.1
RWw100 to 1FF	Data to be sent to station No.2
RWr0 to FF	Data received from station No.1
RWr100 to 1FF	Data received from station No.2

The overview of program processing is as follows:

1. When 'Data link error status of own station' (SB0049) is OFF and 'Data link status of each station' (station No.1) (bit 0 of SW00B0) is OFF, the following are performed:
- Data to be sent to station No.1 is written to devices starting from RWw0 for 256 points.
- Data received from station No.1 is read from devices starting from RWr0 for 256 points.

2. When 'Data link error status of own station' (SB0049) is OFF and 'Data link status of each station' (station No.2) (bit 1 of SW00B0) is OFF, the following are performed:
- Data to be sent to station No.2 is written to devices starting from RWw100 for 256 points.
- Data received from station No.2 is read from devices starting from RWr100 for 256 points.

3. Repeat the above processing.

Point

If no response is received for several cycles, 'Data link status of each station' (SW00B0 to SW00B7) is determined to be a cyclic transmission faulty station.

Local station (unicast mode)

The following shows a program example when setting "Unicast" for "Communication Mode" under "Application Settings."

■Local station (station No.1)

The following devices are used in a program.

Device	Description
SB0049	Data link error status of own station
RWw0 to FF	Data to be sent to the master station
RWr0 to FF	Data received from the master station

The overview of program processing is as follows:

1. When 'Data link error status of own station' (SB0049) is OFF, the following are performed:

• Data to be sent to the master station is written to devices starting from RWw0 for 256 points.

• Data received from the master station is read from devices starting from RWr0 for 256 points.

2. Repeat the above processing.

■Local station (station No.2)

The following devices are used in a program.

Device	Description
SB0049	Data link error status of own station
RWw100 to 1FF	Data to be sent to the master station
RWr100 to 1FF	Data received from the master station

The overview of program processing is as follows:

1. When 'Data link error status of own station' (SB0049) is OFF, the following are performed:

• Data to be sent to the master station is written to devices starting from RWw100 for 256 points.

• Data received from the master station is read from devices starting from RWr0 for 256 points.

2. Repeat the above processing.

Restriction

> When "Communication Mode" is set to "Unicast," 'Data link status of each station' (SW00B0 to SW00B7) cannot be used as an interlock in a local station. Perform communications with other stations, taking into consideration of the operating status in stations to be communicated.

Local station (multicast mode)

The following shows a program example when setting "Multicast" for "Communication Mode" under "Application Settings."

■Local station (station No.1)

The following devices are used in a program.

Device	Description
SB0049	Data link error status of own station
SW00B0.1	Data link status of each station (station No.2)
RWw0 to FF	Data to be sent to the master station
RWr0 to FF	Data received from the master station
RWr100 to 1FF	Data received from station No.2

The overview of program processing is as follows:

1. When 'Data link error status of own station' (SB0049) is OFF, the following are performed:
- Data to be sent to the master station is written to devices starting from RWw0 for 256 points.
- Data received from the master station is read from devices starting from RWr0 for 256 points.

2. When 'Data link error status of own station' (SB0049) is OFF and 'Data link status of each station' (station No.2) (bit 1 of SW00B0) is OFF, the following is performed:
- Data received from station No.2 is read from devices starting from RWr100 for 256 points.

3. Repeat the above processing.

■Local station (station No.2)

The following devices are used in a program.

Device	Description
SB0049	Data link error status of own station
SW00B0.0	Data link status of each station (station No.1)
RWw100 to 1FF	Data to be sent to the master station
RWr0 to FF	Data received from station No.1
RWr100 to 1FF	Data received from the master station

The overview of program processing is as follows:

1. When 'Data link error status of own station' (SB0049) is OFF, the following are performed:
- Data to be sent to the master station is written to devices starting from RWw100 for 256 points.
- Data received from the master station is read from devices starting from RWr0 for 256 points.

2. When 'Data link error status of own station' (SB0049) is OFF and 'Data link status of each station' (station No.1) (bit 0 of SW00B0) is OFF, the following is performed:
- Data received from station No.1 is read from devices starting from RWr0 for 256 points.

3. Repeat the above processing.

10.2 Examples of Communication with a CC-Link IE TSN Class A Remote Station

This section explains examples of communication between a CC-Link IE TSN Class A remote station and the master station/local station in the following system configuration.

System configuration

The following system configuration is used for the explanation.
- Board: NZ81GN11-T2 (channel No.281)
- Remote station: NZ2GN2S1-32DT

Install a board on a PCI Express slot of the personal computer (Windows), and install the software package.
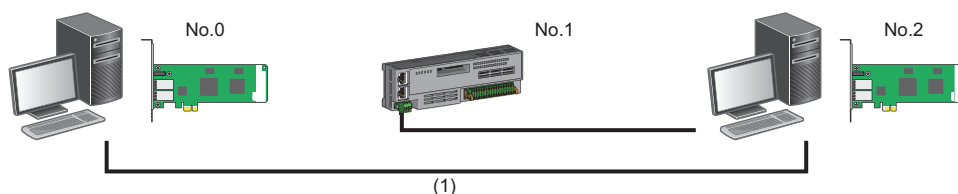
No.0   Master station (station No.0)
No.1   Remote station (station No.1)
No.2   Local station (station No.2)
(1)   Network No.1

Link device assignment

For RX, RY, RWr, and RWw, 256 points are assigned to each remote station.

For RX and RWr, and RY and RWw, 256 and 512 points are assigned to each local station, respectively.

In addition, for LB and LW, 512 points are assigned to each master station and local station.

Multicast mode

In this communication mode, a local station can receive cyclic data from another station but cannot receive data sent from RX or RWr of a CC-Link IE TSN Class A remote station.

By writing data, which was output from the remote station to the master station, to the range of sending to the local station in a program, the local station can receive the data from RX or RWr.

■RX and RY assignment

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

No.0, No.1, and No.2 are the master, remote, and local stations, respectively.
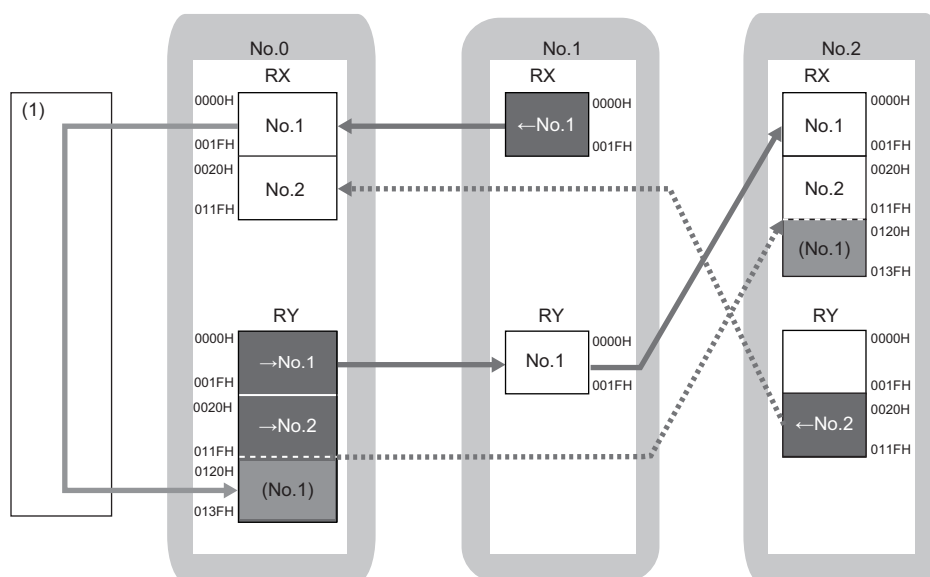
→ No.1, → No.2: Range of sending to station No.1, range of sending to station No.2

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

(1) Program

(No.1): Data in station No.1 written to the range of sending to station No.2 by the program

■RWr and RWw assignment

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

No.0, No.1, and No.2 are the master, remote, and local stations, respectively.
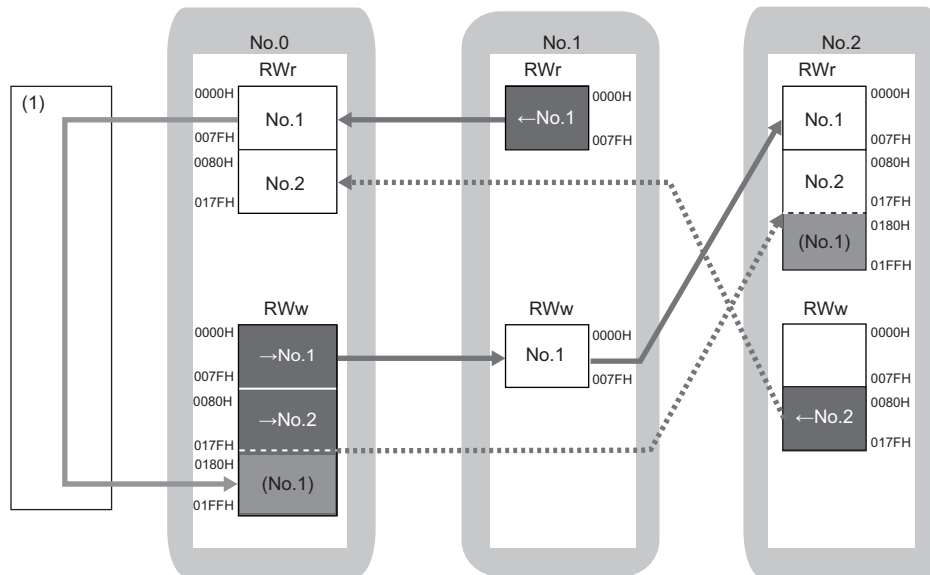
→ No.1, → No.2: Range of sending to station No.1, range of sending to station No.2

← No.1, ← No.2: Range of sending from station No.1, range of sending from station No.2

(1) Program

(No.1): Data in station No.1 written to the range of sending to station No.2 by the program

Parameter setting

Start the CC IE TSN utility on the personal computer where a board is installed and set parameters.

Operating procedure

1. Set parameters for each station.

2. Write the set parameters to a board.

☞ [Online] ⇨ [Write to Board]

Setting contents

—: Cannot be set

Item			Master station	Remote station	Local station
			No.0	**No.1**	**No.2**
Required Settings	Use of Board	Use of Board	Use	—	Use
	Model Name Setting	Model Name	NZ81GN11-T2	—	NZ81GN11-T2
	Station Type	Station Type	Master Station	—	Local Station
	Network No.	Network No.	1	—	1
	Station No./IP Address Setting	Station No.	0	—	2
		IP Address	192.168.3.253	192.168.3.1[*1]	192.168.3.2
		Subnet Mask	Empty	—	Empty
		Default Gateway	Empty	—	Empty
Basic Settings	Network Configuration Settings	☞ Page 173 Network configuration setting		—	—
	Refresh Setting	☞ Page 173 Refresh setting			
	Communication Period Setting	Basic Period Setting	Setting in Units of 1μs	Not Set (default)	—	—
			Communication Period Interval Setting (Do not Set it in Units of 1μs)	4000.00 μs	—	—
			Communication Period Interval Setting (Set it in Units of 1μs)	1000.00 μs (default)	—	—
			System Reservation Time	200.00 μs	—	—
			Cyclic Transmission Time	3100.00 μs	—	—
			Transient Transmission Time	700.00 μs	—	—
	Connection Device Information	CC-Link IE TSN Class Setting	Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A Only	—	—
	Others		Default		
Application Settings	Communication Speed	Communication Speed	100Mbps	—	100Mbps
	Communication Mode	Communication Mode	Multicast	—	—
	Others		Default		

*1   Set this for the corresponding items in the network configuration setting of the master station and parameter of a remote station.

■Network configuration setting

Set the network configuration by the following procedure:

1. [Basic Settings] ⇨ [Network Configuration Settings] ⇨ [Detailed Setting]

2. Select [I/O Combined] ⇨ [NZ2GN2S1-32DT] in "Module List," then drag and drop it onto the station list or the network configuration diagram.

3. Select [Network Interface Board] ⇨ [NZ81GN11-T2] in "Module List," then drag and drop it onto the station list or the network configuration diagram.

4. Click the [Detailed Display] button.

5. Set the following items:

No.	Station type	RX setting			RY setting			RWr setting			RWw setting		
		Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
0	Master station	—	—	—	—	—	—	—	—	—	—	—	—
1	Remote station	32	0000	001F	32	0000	001F	128	0000	007F	128	0000	007F
2	Local station	256	0020	011F	288	0020	013F	256	0080	017F	384	0080	01FF

No.	Station type	LB setting			LW setting		
		Points	Start	End	Points	Start	End
0	Master station	512	0000	01FF	512	0000	01FF
1	Remote station	—	—	—	—	—	—
2	Local station	512	0400	05FF	512	0400	05FF

6. Set the IP address of each station under "IP Address."

7. Check the system configuration.

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

8. Select [Close with Reflecting the Setting] to close the "CC-Link IE TSN Configuration" screen.

> **Point**
>
> In this example, default values are used for parameters that are not shown above.

■Refresh setting

Configure the refresh setting by the following procedure:

1. [Basic Settings] ⇨ [Refresh Setting] ⇨ [Detailed Setting]

When configuring the setting on the link side, that on the personal computer side is displayed accordingly.

• Master station

Device name	Points	Start	End
RX	288	00000	0011F
RY	320	00000	0013F
RWw	512	00000	001FF
RWr	384	00000	0017F
LB	1024	00000	003FF
LW	1024	00000	003FF

• Local station

Device name	Points	Start	End
RX	320	00000	0013F
RY	288	00000	0011F
RWw	384	00000	0017F
RWr	512	00000	001FF
LB	1024	00000	003FF
LW	1024	00000	003FF

2. Click the [Check] button.

3. Click the [Apply] button.

Checking the network status

After setting parameters for the master station and local stations, check if data properly links among them using the CC-Link IE TSN diagnostic function of the CC IE TSN utility.

1. Start the CC IE TSN utility on the personal computer where a board is installed.

2. Click the [CC-Link IE TSN Diagnostics] button in the board diagnostics screen (startup screen).

The status in the following screen indicates normal data link.

When an icon indicating an error is displayed, identify the cause of the error and take actions. (☞ Page 132 CC-Link IE TSN diagnostics)

Program examples

The following shows program examples.

Master station (station No.0)

The following devices are used in a program.

Device	Description
SB0049	Data link error status of own station
SW00B0.0	Data link status of each station (station No.1)
SW00B0.1	Data link status of each station (station No.2)
RWw0 to 7F	Data to be sent to station No.1
RWw80 to 17F	Data to be sent to station No.2
RWw180 to 1FF	Data to be sent to station No.2 (Data received from station No.1 is used as it is and sent to station No.2.)
RWr0 to 7F	Data received from station No.1
RWr80 to 17F	Data received from station No.2

The overview of program processing is as follows:

1. When 'Data link error status of own station' (SB0049) is OFF and 'Data link status of each station' (station No.1) (bit 0 of SW00B0) is OFF, the following are performed:
- Data to be sent to station No.1 is written to devices starting from RWw0 for 128 points.
- Data received from station No.1 is read from devices starting from RWr0 for 128 points.

2. When 'Data link error status of own station' (SB0049) is OFF and 'Data link status of each station' (station No.2) (bit 1 of SW00B0) is OFF, the following are performed:
- Data to be sent to station No.2 is written to devices starting from RWw80 for 256 points.
- Data received from station No.2 is read from devices starting from RWr80 for 256 points.

3. Data to be sent to station No.2 is written to devices starting from RWw180 for 128 points by using received data read from station No.1.

4. Repeat the above processing.

Point
> If no response is received for several cycles, 'Data link status of each station' (SW00B0 to SW00B7) is determined to be a cyclic transmission faulty station.

Local station (station No.2)

The following devices are used in a program.

Device	Description
SB0049	Data link error status of own station
RWw80 to 17F	Data to be sent to the master station
RWr0 to 7F	Data received from station No.1
RWr80 to 17F	Data received from the master station
RWr180 to 1FF	Data received from the master station (data received by the master station from station No.1, used as it is, and sent to station No.2)

The overview of program processing is as follows:

1. When 'Data link error status of own station' (SB0049) is OFF, the following are performed:
- Data to be sent to the master station is written to devices starting from RWw80 for 256 points.
- Data received from the master station is read from devices starting from RWr80 for 256 points.
- Data received from the master station (data received by the master station from station No.1, used as it is, and sent to station No.2) is read from devices starting from RWr180 for 128 points.

2. Repeat the above processing.

11 MAINTENANCE AND INSPECTION

This chapter shows items that must be maintained or inspected daily or periodically to properly use a board in optimal condition at all times.

11.1 Daily Inspection

This section shows items that should be inspected daily.

Item	Inspection item		Inspection method	Judgment criteria	Corrective action
1	Installation status	Looseness and rattling	Touch the board to check if there is rattling caused by loose screws.	The board must be fixed securely.	Securely fix the board in order to prevent looseness and rattling.
2	Connection status	Connector looseness	Check for looseness of the cable connector.	The connector must not be loose.	Connect the connector with no loosening securely.
3	LED status	RUN LED	Check the lighting status.	ON	If the LEDs indicate the statuses other than the ones described in the judgment criteria, refer to the following and take corrective action. ☞ Page 190 Checking the LED status
		ERR LED	Check the lighting status.	OFF	

11.2 Periodic Inspection

This section shows items that should be inspected once or twice every six months to a year.

Periodic inspection is required when the equipment has been relocated or modified, or wiring layout has been changed.

Item	Inspection item		Inspection method	Judgment criteria	Corrective action
1	Ambient environment[*1]	Ambient temperature	Measure the temperature with a thermometer.	0 to 55℃	Create the environment that satisfies the judgment criteria.
		Ambient humidity	Measure the humidity with a hygrometer.	5 to 95 %RH	
		Atmosphere	Measure corrosive gases, flammable gases, and conductive dust.	No corrosive gases, flammable gases, less conductive dust.	
2	Installation status	Looseness and rattling	Touch the board to check if there is rattling caused by loose screws.	The board must be fixed securely.	Securely fix the board in order to prevent looseness and rattling.
		Attachment of dirt and foreign matter	Check visually.	Dirt and foreign matter must not be attached.	Remove any dirt or foreign matter, or clean the board.
3	Connection status	Connector looseness	Check for looseness of the cable connector.	The connector must not be loose.	Connect the connector with no loosening securely.

*1 The environment within the control panel in which the board is installed

MEMO

12 TROUBLESHOOTING

This chapter explains the identification of the causes and corrective actions when an error occurs.
Perform the troubleshooting in the following order in case of trouble.

Basic checking procedure

Check if there is a corresponding error symptom written in "Troubleshooting by Symptom" (☞ Page 202 Troubleshooting by Symptom).
If the corresponding error could not be found, check the cause by following the procedure shown below.

Operating procedure

1. Check if all boards installed on a personal computer are displayed in the utility.
- ☞ Page 198 Checking channel numbers

2. Check the LED display of the board.
- ☞ Page 190 Checking the LED status

3. Check the error occurring in the utility.
- ☞ Page 198 Checking with errors on board diagnostics
- ☞ Page 198 Checking with the event history
- ☞ Page 198 Checking with tests
- ☞ Page 198 Checking with CC-Link IE TSN diagnostics

4. Check the access target device.
Check whether the system is performing as set on the parameters and programs by checking the performance of link device communication, or transient transmission/reception in the device monitor utility.
- ☞ Page 199 Checking by monitoring devices

5. Check the user program.
- ☞ Page 194 Checking the operation environment
- To check the arguments of the MELSEC data link library: 📖MELSEC Data Link Library Reference Manual
- To check the return values of the MELSEC data link library: ☞ Page 218 Error Code List

When the problem persists

If the problem is not solved by the corrective actions described in this manual, refer to the following:
☞ Page 217 Information Required for Inquiries

12.1 Checking Methods

The checking methods are as follows:

Item	Description	Reference
Checking the installation environment and the board	Check if the installation and wiring are performed within the range of the specification.	Page 189 Checking installation environment Page 189 Checking board installation Page 189 Checking cables and wiring
	The board status and network status can be checked by LED.	Page 190 Checking the LED status
Checking with a personal computer and operating system	The driver operation status can be checked with Device Manager or Event Viewer.	Page 194 Checking the personal computer and operating system Page 194 Checking the operation environment Page 195 Checking with Device Manager Page 196 Checking with Event Viewer
Checking with the utility	The statuses of the board and network can be checked with the utility.	Page 198 Checking channel numbers Page 198 Checking with errors on board diagnostics Page 198 Checking with the event history Page 198 Checking with tests Page 198 Checking with CC-Link IE TSN diagnostics Page 199 Checking by monitoring devices

Checking installation environment

Check if the installation environment is within the general specification or clear from noise.

Check item	Corrective action
Is the ambient temperature within the specified range?	Keep the ambient temperature within the specified range by taking action such as removing heat source.
Is there any noise influence?	Check the wire and cable lengths and grounding condition of each device, and take measures against noise.

Checking board installation

Check if there is any problem for the board installation.

Check item	Corrective action
Is the board installed properly?	• Remove the board and reinstall it. • Fix the board firmly with screws.
Is the applicable number of boards installed?	Remove the board which exceeds the maximum number of applicable boards.
Is the board installation position correct?	• Check the manual for the personal computer or motherboard. If a board is installed in the slot with restrictions (such as a graphics card slot), change the board installation position. • Change the board installation position.

Checking cables and wiring

Check if there is an error in cables, disconnected connectors, or improper wiring.

Check item	Corrective action
Is a cable compliant with the specifications used?	Replace the cable with a cable which is compliant with the specifications.
Is the station-to-station distance within the specifications?	Change the station-to-station distance within the specifications. ☞ Page 45 Performance Specifications of CC-Link IE TSN 📖Manual of the device used
Is the installation situation (bend radius) within specifications?	Refer to the manual for the cable, and correct the bend radius.
Is any cable disconnected?	Replace the cable.
Is the switching hub being used operating correctly?	• Use a switching hub satisfying the standards. • Power OFF and then ON the switching hub.
Is a cable connected to a port securely?	Lightly pull the cable connector to check that it is securely connected. If not, remove the connector once and insert it into the port until it clicks.

Checking the LED status

Check the LED status and take the corresponding corrective actions.

Lighting status			Description	Reference
RUN	**ERR**	**P1 SD/RD** **P2 SD/RD**		
ON	OFF	ON	The board is operating normally. (Data is being sent/received at a port turned ON.)	No corrective action required
ON	ON	ON/OFF	An error has occurred, or an error is being detected in all stations.	Page 191 ERR LED is ON or flashing
ON	Flashing	ON/OFF	An error has occurred, or a data link faulty station is being detected.	
Flashing	ON	OFF	The PCI Express bus error has occurred.	Page 210 The PCI Express bus error has occurred
Flashing	OFF	P1: OFF P2: ON	The driver WDT error has occurred.	Page 210 The driver WDT error has occurred
OFF	ON	OFF	An error has occurred.	Page 191 ERR LED is ON or flashing
OFF	Flashing	OFF		
OFF	OFF	OFF	A hardware failure has occurred.	Page 207 The hardware failure has occurred
			The driver is not started.	Page 210 The driver does not start
			The firmware update is being performed. ☞ Page 296 Firmware update	No corrective action required

The LED status of a board shows the channel number while the "Channel No. Setting" screen is open. (☞ Page 121 Channel number setting)

> **Point**
>
> The LED status can also be checked by the following operations, other than checking the board visually.
> - "Selected Station Communication Status Monitor" in the "CC-Link IE TSN Diagnostics" screen (☞ Page 138 Selected station communication status monitor)
> - [Board Information List] tab in the "Board Diagnostics" screen (☞ Page 130 Board information list)

- Ethernet port LED

LED	Lighting status	Description	Reference
P1 LINK P2 LINK	ON	Link-up is in progress.	No corrective action required
	OFF	Link-down is in progress.	Page 193 LINK LED is OFF
P1 L ERR P2 L ERR	OFF	Data is received normally, and loopback is not performed.	No corrective action required
	ON	Data is not received normally, or loopback is being performed.[1][2]	Page 193 L ERR LED or L ER LED is ON or flashing
	Flashing		

[1] The L ER LED of a station the station number of which is not set does not turn ON when loopback is being performed.
[2] The L ER LED of a loopback station does not turn ON if a station the station number of which is not set is connected to a ring topology network.

- Logical LED

Check the following logical LEDs in the [Board Information List] tab in the "Board Diagnostics" screen.
☞ Page 130 Board information list

Logical LED	Lighting status	Description	Reference
MST	ON	Operating as a master station.	No corrective action required
	OFF	Operating as a local station.	
D LINK	ON	Cyclic transmission is in progress.	No corrective action required
	Flashing	Cyclic transmission is stopped.	Page 192 D LINK LED is OFF or flashing
	OFF	Disconnected.	
P1 L ERR P2 L ERR	OFF	Data is received normally, and loopback is not performed.	No corrective action required
	ON	Data is not received normally, or loopback is being performed.[1][2]	Page 193 L ERR LED or L ER LED is ON or flashing
	Flashing		

[1] The L ERR LED of a station the station number of which is not set does not turn ON when loopback is being performed.
[2] The L ERR LED of a loopback station does not turn ON if a station the station number of which is not set is connected to a ring topology network.

If the LED does not turn ON in synchronization with the utility display or the execution status of a function, LED failure may occur. In this case, replace the board.

If the board operates normally on another personal computer, there may be a problem with the computer. In this case, repair or replace the computer. If the board does not operate normally on another personal computer, replace the board.

ERR LED is ON or flashing

When the ERR LED is ON or flashing, any of the following errors has occurred.
- Stations with same station number exist on the network.
- Parameters are corrupted.
- Parameters do not match the installation status. (Reserved station specification, number of connected stations, network number etc.)
- Loopback is performed in the own station.
- A cable is disconnected or inserted incorrectly.
- A communication error or hardware failure has occurred in a network board.

> **Point**
>
> For local stations, the ERR LED may turn ON after the first cyclic transmission at startup of the system until refreshing with drivers performs normally and 'Data link error status of own station' (SB0049) is turned OFF (normal); however, it is not an error.

Check the following:

Check item	Corrective action
Has a board error occurred?	Check the board diagnostics. (☞ Page 198 Checking with errors on board diagnostics)
Have the following events occurred in an event history of the master station? • 00C72 • 00C80 • 00C81	Check the event history of the master station. (☞ Page 198 Checking with the event history)
Are other stations connected to the board normal?	Check the network status in CC IE TSN diagnostics. (☞ Page 132 CC-Link IE TSN diagnostics)
Is the master station "Online"?	The board operation mode can be checked in the [Board Information List] tab in the "Board Diagnostics" screen. Set "Board Operation Mode" (or "Module Operation Mode" for a module) in "Application Settings" of the master station to "Online." (☞ Page 155 Board operation mode setting)
Is the parameter set according to the actual board installation status?	Check the parameter settings. (☞ Page 144 Parameter Setting)
Are the communication cables normal?	Check the cables and wiring. (☞ Page 189 Checking cables and wiring)
Is the board hardware operating normally?	Perform the board tests. (☞ Page 198 Checking with tests)

If the RUN LED is flashing when the ERR LED is ON, refer to the following:

☞ Page 210 The PCI Express bus error has occurred

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

D LINK LED is OFF or flashing

The D LINK LED is an LED which does not exist on a board.

Check the status in the [Board Information List] tab in the "Board Diagnostics" screen. (☞ Page 130 Board information list)

- When it is OFF, both cyclic transmission and transient transmission of the board are stopped.
- When it is flashing, the cyclic transmission of the board is stopped, or communication route is consecutively built because the network communication route is unstable.

Check item	Corrective action
Is the master station operating normally?	If an error has occurred in the master station, solve the error.
Is the master station connected to the network?	Connect the master station to the network?
Is the transmission status "During data link"? (☞ Page 130 Board information list)	• Match the board name corresponding to "Channel No." and "Model Name" of the parameter setting. • Set "Board Operation Mode" under "Application Settings" to "Online." (☞ Page 155 Board operation mode setting)
Is "Board Operation Mode" set to "Online"?	Set "Board Operation Mode" under "Application Settings" to "Online." (☞ Page 155 Board operation mode setting)
Are other stations connected to the board normal?	• Check the network status in CC-Link IE TSN diagnostics. (☞ Page 132 CC-Link IE TSN diagnostics) • Check the operating status of other stations. (📖User's manual for a device used)
Has any other station been reset?	• Avoid unnecessary reset, since a station is disconnected while resetting. • Startup the other station.
Is the other station powered OFF?	Power ON the other station.
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 150 Network topology setting)
Is there any other station that is not set in "Network Configuration Settings" under "Basic Settings" of the master station?	Set the connected device station to "Network Configuration Settings" under "Basic Settings" of the master station.
Is a network topology with restrictions used for connection?	Correct the wiring.
Are 121 or more device stations connected?	Change the connection of the device stations to 120 stations or less.
Is the station number duplicated with that of another station?	Change the duplicated station number.
Is there any other station the IP address of which is not set?	Set the IP address for the device station the IP address of which has not been set.
Does the IP address of each station match "Network Configuration Settings" under "Basic Settings" of the master station?	Correct the IP address setting of the master station. (☞ Page 147 Station number/IP address setting, Page 158 Parameter setting for a device station) • Make sure that the IP addresses are not duplicated. • Set the same value for the subnet masks of the master station and device station. • Do not set the third to fourth octets to all 0 or all 1. • Do not set the host address of the IP address to all 0 or all 1. • Do not set a reserved address.
Is the IP address set properly?	
Are cables and wiring normal?	Check the cables and wiring. (☞ Page 189 Checking cables and wiring)
Is a switching hub connected in a ring topology?	Do not connect a switching hub in a ring topology.
Is the TSN hub connected to the board operating correctly?	Power OFF and ON the TSN hub.
	Set the TSN hub parameters as follows: • Enable each port of the TSN hub. • Set the communication speed and port type to Auto. • Match the settings of the time synchronization and communication cycle of the TSN hub 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 manual for the TSN hub used.
Are Ethernet devices properly connected to a network line?	Correct the mixed structure of the Ethernet device.

If any of the following functions is enabled, check the following:

Function	Check item	Corrective action
Time synchronization	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 powered OFF?	
	Is the time synchronization source station operating normally?	Refer to the manual for a module used in the time synchronization source station.
	Are time synchronization devices with the 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)

Function	Check item	Corrective action
IP filter	Is the IP address of the device station blocked by the IP filter setting of the master station?	Correct the setting in "IP Filter Settings" under "Application Settings." (☞ Page 155 IP filter settings)
	Is the IP address of the master station blocked by the IP filter setting of the device station?	

L ERR LED or L ER LED is ON or flashing

The L ERR LED of NZ81GN11-SX is an LED which does not exist on a board.

Check the status in the [Board Information List] tab in the "Board Diagnostics" screen. (☞ Page 130 Board information list)

If it is ON, either of the following errors has occurred.

- Data has not been received normally.
- Loopback has occurred.

For NZ81GN11-T2, the L ER LED for PORT that detected an error.

L ER LED

The lightning status of L ER LED can also be checked in CC-Link IE TSN diagnostics. (☞ Page 138 Selected station communication status monitor)

Check item	Corrective action
Are cables and wiring normal?	Check the cables and wiring. (☞ Page 189 Checking cables and wiring)
Are other stations connected to the board normal?	Check the network status in CC IE TSN diagnostics. (☞ Page 132 CC-Link IE TSN diagnostics)
Is the installation environment within the specifications? Is there any noise influence?	Check the installation environment. (☞ Page 189 Checking installation environment)
Is "Network Topology" of the master station set to "Ring"?	When "Ring" is set, loopback has occurred due to the link-down of connection for PORT the L ER LED of which is ON. Configure the ring topology correctly.
Is the board hardware operating normally?	Perform the board tests. (☞ Page 198 Checking with tests)

LINK LED is OFF

This indicates that the communication with a target device cannot be established (link-down status) due to a communication cable that is disconnected or not connected.

LINK LED

Check item	Corrective action
Are cables and wiring normal?	Check the cables and wiring. (☞ Page 189 Checking cables and wiring)
Are other stations connected to the board normal?	Refer to the manual for a module used in other stations, and take corrective action. (📖User's manual for a 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 100 Mbps for the master station and local station to connect a device with communication speed of 100 Mbps, is the auto-negotiation of the device valid?	Enable the auto-negotiation of the connected device. Or, connect a device with auto-negotiation enabled.
Is the board hardware operating normally?	Perform the board tests. (☞ Page 198 Checking with tests)

Checking the personal computer and operating system

Check if the personal computer or operating system has any problem.

Check item	Corrective action
Is the power supply ensured?	Check the power outlet and power cable of the personal computer.
Does the board operate normally if the other optional boards are uninstalled?	• Change the board installation position. • Check the resource acquisition status of other boards and change the resource in the BIOS setting screen or Device Manager. • Reinstall the drivers of the other optional boards. • Replace the other optional boards.
Does the board operate normally on another personal computer?	• After formatting the HD, install the operating system again. • Repair or replace the personal computer.

For problems of a personal computer or operating system, contact the manufacturer of the personal computer or operating system.

Checking the operation environment

Check the operating environment if the supported operating system and functions are used.

☞ Page 33 Operating Environment

Check item	Corrective action
Is a personal computer which satisfies the specifications written in 'Operating Environment' used?	• Expand the memory in the personal computer. • Check the bus specifications of a slot where a board is installed.
Is the operating system written in 'Operating Environment' used?	Use a personal computer on which the supported operating system is installed.
Is a programming language written in 'Operating Environment' used for a user program containing the MELSEC data link library?	• Create a user program using a supported programming language. • For considerations when using the MELSEC data link library, refer to the following: 📖MELSEC Data Link Library Reference Manual
Are the functions written in 'Unavailable functions' in 'Operating Environment' set?	Change the settings for the unavailable functions.
Is the administrator authority used for logging on to a personal computer?	Log on as a user with the administrator authority.

Checking with Device Manager

Check if the board is normally recognized in Windows Device Manager.

Check item	Corrective action
Is the driver name of the board not displayed in the Device Manager screen?	The board or driver is not installed. • If the board is not installed, install the board. If the board is already installed, check the board installation status and reinstall the board. • Check the manual for the personal computer or motherboard. If a board is installed in the slot with restrictions (such as a graphics card slot), change the board installation position. • Reinstall the software package. • If the board operates normally on another personal computer, there may be a problem with the computer. In this case, repair or replace the computer. • If the board does not operate normally on another personal computer, replace the board.
Is '!' displayed next to the icon in the Device Manage screen?	The driver installation failed, or the driver did not start normally. • Reinstall the software package. • Check the board installation status and reinstall the board. • When five or more boards are installed in the same personal computer, reduce the number of them to four or less. • If the board operates normally on another personal computer, there may be a problem with the computer. In this case, repair or replace the computer. • If the board does not operate normally on another personal computer, replace the board.

If the problem persists, refer to the following:

Point

• Do not uninstall or disable the driver of the board in Device Manager when the board is normally recognized. If it is uninstalled or disabled, the operating system may shut down (blue screen).

• "?" is displayed next to the icon, however, the board is recognized normally.

Checking with Event Viewer

Check the operations of the board with Windows Event Viewer.

Error event

Errors occurred in the driver are displayed in the system log of Event Viewer.

For errors related to this board, the following are displayed in the source field of Event Viewer.

- Driver: NZCcietsn
- Time-Service: NZCcietsn Time Synchronization Service

The following explains error messages and corrective actions.

> **Point**
>
> When multiple errors occur, check the occurrence order (occurrence time) in the screen of Event Viewer and take corrective actions in order from the first error.

Event ID		Error message	Corrective action
258	0102H	There is no response from the hardware.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 207 The hardware failure has occurred)
279	0117H	An error occurred when Registry Database wrote out.	• Restart the personal computer after installing the software package, and check if the error does not occur. • Increase the system memory and disk capacity. • When the error has occurred at upgrading or updating the operating system, reinstall the software package supporting the operating system.
280	0118H	Own station received the transient data which was not processable from another station.	• Check both the board which is commanding the process and programs in the programmable controller. • Change "Transient Timeout Monitoring Time" on this board. • Check the load on the destination system when processing transient transmission to other stations.
286	011EH	Failed to allocate the Memory Area.	Expand the memory in the personal computer.
287	011FH	The parameters are nothing or has abnormal data.	• Set parameters correctly. • Match the board name corresponding to "Channel No." and "Model Name" of the parameter setting. • Check the error of the board by executing board diagnostics using CC IE TSN utility.
288	0120H	The Driver WDT error had occurred.	Refer to the troubleshooting when the driver WDT error occurred. (☞ Page 210 The driver WDT error has occurred)
295	0127H	The Board WDT error had occurred.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 207 The hardware failure has occurred)
305	0131H	Shift to the sleep, the hibernate, or the fast startup was detected. Because the board supports neither the sleep nor the hibernate nor the fast startup, it does not operate normally.	Change the power option not to entering the sleep mode, hibernation mode, or enabling fast startup and restart the personal computer.
306	0132H	Detect "surprise removal". Please make sure of the installation of the interface board and the state of computer.	Check the board installation status. (☞ Page 189 Checking board installation) • Check the personal computer operating status, and repair or replace the personal computer in case of an abnormal operation.
307	0133H	The link refresh error had occurred.	• Reset the board. • The memory may be insufficient. Please close other applications running. • Restart the personal computer. • Check the free space of the memory. • Refer to the troubleshooting when the hardware error occurred. (☞ Page 207 The hardware failure has occurred)
308	0134H	Failed to initialize the RECV function.	• Reset the board. • The memory may be insufficient. Please close other applications running. • Restart the personal computer. • Check the free space of the memory.
309	0135H	The time zone setting error had occurred.	Set the Windows time within the range of -12 hours to +13 hours.
310	0136H	The Daylight saving time setting error had occurred.	• Turn OFF the following Windows setting: "Adjust for daylight saving time automatically" • After changing the "time zone" to any setting in [Date and Time] of Windows, set it again. Then reset the board.

Event ID		Error message	Corrective action
311	0137H	An error occurred when read the time zone information registry.	• After changing the "time zone" to any setting in [Date and Time] of Windows, set it again. Then reset the board. • Reinstall the operating system.
312	0138H	Failed to initialize the event history function.	• Reset the board. • Check if the channel numbers are duplicated. • Reinstall the software package.
313	0139H	Failed to acquire hardware resource.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 207 The hardware failure has occurred)
314	013AH	Failed to read the channel numbers.	Set the channel numbers again for all boards.
512	0200H	The bus error had occurred.	Refer to the troubleshooting when the hardware error occurred. (☞ Page 207 The hardware failure has occurred)
539	021BH	The breakdown of hardware was detected.	• Change the power option not to entering the sleep mode, hibernation mode, or enabling fast startup and restart the personal computer. • Restart the personal computer. • Refer to the troubleshooting when the hardware error occurred. (☞ Page 207 The hardware failure has occurred)
8192	2000H	Failed to start the service.	• Reinstall the software package. • Check the free space of the memory.
8193	2001H	Failed to set the time to Windows with the time synchronization function.	• Reset the board. • Restart the personal computer. • Take measures to reduce noise.

Information event

The following information event logs other than errors are displayed in the system log of Event Viewer. The corrective actions are not required for the following events.

Event ID		Description	Output timing
1024	0400H	Driver started normally.	At driver startup
1025	0401H	Board reset was executed.	At board reset (Except for board reset at driver startup)
1026	0402H	Parameter was updated.	At parameter transmission by the master station
1027	0403H	Discarded an I/O request that was not processable.	At reception of an I/O request that cannot be processed in the driver
1028	0404H	Firmware update using the CC IE TSN Utility was performed and completed successfully.	On success of the firmware update
1029	0405H	Firmware update using the CC IE TSN Utility was performed and was not completed successfully.	On failure of the firmware update
9216	2400H	Started the service.	At service operation startup
9217	2401H	Terminated the service.	At service operation termination

Checking channel numbers

Check if the channel numbers are properly assigned to the boards in the "Board Diagnostics" screen of the CC IE TSN utility.
☞ Page 125 Board diagnostics

Check item	Corrective action
Are all installed boards displayed?	• Check the Device Manager screen. (☞ Page 195 Checking with Device Manager) • Check the Event Viewer screen. (☞ Page 196 Checking with Event Viewer)
Are channel numbers duplicated?	Set channel numbers so that they are not duplicated.

Checking with errors on board diagnostics

Check the contents in the board list displayed in the "Board Diagnostics" screen of the CC IE TSN utility.
☞ Page 125 Board diagnostics

1. If an error occurs, check the error in "Error Information." (☞ Page 127 Error information)

Select a board to be displayed for "Channel No." under "Board Information."

Click the error row in "Error Information" to check the details.

Check "Cause" and take "Corrective Action." (☞ Page 218 Error Code List)

2. If correcting the parameters, write them to the board.

Checking with the event history

Check error and event information in the "Event History" screen of the CC IE TSN utility.
☞ Page 128 Event history

Check item	Corrective action
Has an error occurred?	Check "Cause" and take "Corrective Action" with the same procedure as "Error Information." (☞ Page 198 Checking with errors on board diagnostics)
Has the event code 00C72 occurred in the master station?	Update the device station firmware with the IP address displayed in the detailed information of event history to the latest version.
Has the event code 00C81 occurred in the master station?	Match the following: • CC-Link IE TSN Class of a device station the IP address of which is displayed in the detailed information of event history • CC-Link IE TSN Class setting of a device station in "Network Configuration Settings" under "Basic Settings" of master station (☞ Page 158 Parameter setting for a device station)
Has the event code 00C80 occurred in the master station?	When "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" of the master station, take one of the following actions: • Check 'Station protocol version 2.0 support status' (SW01A0 to SW01A7) and update the firmware of all device stations to a version that supports the protocol version 2.0. Alternatively, replace with device stations that support protocol version 2.0. • Set 'Protocol setting' (address 1294018 (13BEC2H)) of the master station to '1: Protocol version 1.0 fixed.' (☞ Page 259 Protocol information (address 1294016 to 1294031 (13BEC0H to 13BECFH))) • After powering ON the device stations and the devices on the communication path, power ON the master station.
Has a warning or unexpected information event occurred?	Check if there is any error from the descriptions of events. (☞ Page 232 Event List)

Checking with tests

Check if an error occurs or not by performing a test in the CC IE TSN utility.

Item	Description	Reference
Board communication test	To check internal circuits including a data exchange circuit of the network function and the cables.	Page 50 Tests before Wiring (Board Communication Tests)
Communication test	To check if the communication route from the own station to a destination is correctly set for a transient transmission.	Page 139 Communication test

Checking with CC-Link IE TSN diagnostics

Check the network status in the "CC-Link IE TSN Diagnostics" screen.
☞ Page 132 CC-Link IE TSN diagnostics

Checking by monitoring devices

Monitor the link device and access target device in the device monitor utility.

Check whether the system is performing as set on the parameters and programs by checking the performance of link device communication, or transient transmission/reception.

Check item	Corrective action
Is an error message displayed?	• Take corrective actions according to the message. • Check the error code and take the corrective actions described in the error code list. (📖MELSEC Data Link Library Reference Manual)
Is an unexpected value set to the link device?	Take the corrective actions for when an unexpected value is set to the link device. (☞ Page 214 An unexpected value is set to the specific link device)
Is the device able to be written by using the device monitor utility?	Check the user program when the access can be performed normally by using the device monitor utility.

For the operation methods of the device monitor utility, refer to the following:

📖MELSEC Data Link Library Reference Manual

Checking the CC-Link IE TSN system configuration and parameter setting

Check if the configuration and parameter setting of a device connected to the network are correct.

Check item		Corrective action
In a line topology, does "Communication Speed" for each station match one another?		Correct the setting in "Communication Speed" under "Application Settings" for each station to match the communication speed of each station.
When "Network Topology" under "Basic Settings" of the master station is set to "Ring"	Is a switching hub used?	Disconnect the switching hub.
	Is a device not supporting ring topology connected?	Disconnect the device not supporting ring topology, and connect a device supporting ring topology.
	Is the communication speed of the master station the same as the communication speed of device station?	Ensure that the communication speed of the master station and the communication speed of device station match.
Is the minimum value for communication cycle interval set to the communication cycle interval setting in "Communication Period Setting" under "Basic Settings"?		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.
Is the minimum value for cyclic transmission time set to "Cyclic Transmission Time" in "Communication Period Setting" under "Basic Settings" of the module parameter?		• 10% of the minimum value of the calculated cyclic transmission time • When the communication speed of the master station is set to 1 Gbps: Number of device stations × 2 µs • When the communication speed of the master station is set to 100 Mbps: Number of device stations × 20 µs
When "Communication Speed" of the master station is 1 Gbps, 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 communication speed of 100 Mbps at the boundary between the CC-Link IE TSN Class B device with communication speed of 1 Gbps (except for the master station) and the one with communication speed of 100 Mbps?		• Restrict the number of the connected stations so that the cyclic data size of the devices with communication speed of 100 Mbps does not exceed 2K bytes in total. • Connect the device with communication speed of 100 Mbps to the master station.

CC-Link IE TSN Class B only

When "CC-Link IE TSN Class B Only" is set for "Connection Device Information" under "Basic Settings" of the master station, check the following:

Check item	Corrective action
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.

Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A only

When "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" of the master station, check the following:

Check item	Corrective action
Is the 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 the master station connected with CC-Link IE TSN Class B devices 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 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 CC-Link IE TSN Class A remote station. • Set unicast mode.
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.

Check item	Corrective action
Is an Ethernet device connected to a place 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).
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 to match.
If the device stations being used support protocol version 2.0, is an master station that does not support protocol version 2.0 being used?	Update the master station to a firmware version that supports protocol version 2.0. Alternatively, replace with a master station that supports protocol version 2.0.
Is the event code 00C72 registered in the event history?	Update the device station firmware with the IP address displayed in the detailed information of event history to the latest version.

■When connected devices are protocol version 2.0

Check item		Corrective action
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 device stations to a version that supports the protocol version 2.0. Alternatively, replace with device stations that support protocol version 2.0. • Set 'Protocol setting' (address 1294018 (13BEC2H)) of the master station to '1: Protocol version 1.0 fixed.' (☞ Page 259 Protocol information) • After powering ON the device stations and the devices on the communication path, power ON the master station.
Is '2: Operating with the protocol version 2.0' stored in 'Protocol operating status' (address 1294016 (13BEC0H))?	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 device stations to a version that supports the protocol version 2.0. Alternatively, replace with device stations that support protocol version 2.0. • Set 'Protocol setting' (address 1294018 (13BEC2H)) of the master station to '1: Protocol version 1.0 fixed.' (☞ Page 259 Protocol information) • After powering ON the device stations and the devices on the communication path, power ON the master station.
Is '1: Operating with the protocol version 1.0' stored in 'Protocol operating status' (address 1294016 (13BEC0H))?	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 device stations to a version that supports the protocol version 2.0. Alternatively, replace with device 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 VLAN function of the general-purpose hub is set to "Enable." If it is set to "Enable," set it to "Disable."
	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 device 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.
	Has the cyclic data size exceeded 2K bytes in total for CC-Link IE TSN Class A devices connected to the CC-Link IE TSN Class B devices other than the master station? (Including when connected to a CC-Link IE TSN Class B device via a general-purpose hub)	• Connect to a CC-Link IE TSN Class B device via a TSN hub. (If connecting via a general-purpose hub, change the general-purpose hub to a TSN hub) • Limit the number of the 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 device to the master station.
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 215 CC-Link IE TSN Class A device does not perform data link
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 to "Communication Period Interval Setting" and "Cyclic Transmission Time."

12.2 Troubleshooting by Symptom

The following tables show examples of the major errors under the specific conditions.

When a corresponding error occurs, refer to the troubleshooting of each error.

Installation of the software package

Error	Description	Reference
Installation of the software package has failed.	The installation is terminated	Page 40 When installation is terminated or failed
	The driver is not installed.	Page 42 When driver installation fails
	The " ! " is displayed next to the icon of the driver name of board in the Device Manager screen of Windows.	Page 195 Checking with Device Manager
Uninstallation of the software package has failed.	The software package is not uninstalled even though the "uninstallation completed" message has been displayed.	Page 43 When uninstallation fails

Personal computer and utility

Error	Description	Reference
The personal computer does not start or shuts down.	The system error is displayed when OS rebooting is stopped and a blue screen appears.	Page 204 The personal computer does not start or shuts down
	The operating system shuts down or system reset occurs when the system is in operation.	
	The system down occurs when deleting or disabling the driver.	
The utility does not start up.	• There is no icon in the start menu of the operating system. • The utility does not start up by clicking the icon.	Page 204 The utility does not start up
The screen or operation is abnormal.	• The utility screen is not displayed properly. • The utility cannot be operated. • A file cannot be saved in the utility. • The setting cannot be ended in a screen for setting parameters.	Page 205 A screen or operation is abnormal
A screen in which the shown corrective actions are not clear is displayed.	• An unexpected screen is displayed. • A screen in which the shown corrective actions are not clear is displayed.	Page 206 A screen in which the shown corrective actions are not clear is displayed
The personal computer operates slowly.	• The operation of the mouse or keyboard is slow. • The operation of other applications is slow. • The CPU utilization of the personal computer is high. • The operation of the sound function is unstable.	Page 207 The personal computer operates slowly

Board and driver

Error	Description	Reference
All LEDs are OFF.	A hardware failure or the board WDT error occurred.	Page 207 The hardware failure has occurred
	An error has occurred when a board is reset.	Page 207 An error has occurred when resetting a board
	The driver does not start.	Page 210 The driver does not start
	An error has occurred during the firmware update.	Page 208 An error has occurred when updating the firmware
The RUN LED is flashing.	■The ERR LED is ON. The PCI Express bus error occurred.	Page 210 The PCI Express bus error has occurred
	■The P2 SD/RD is ON. The driver WDT error occurred.	Page 210 The driver WDT error has occurred
The ERR LED is ON or flashing.	An error occurred.	Page 191 ERR LED is ON or flashing

Network access

Error	Description	Reference
An error occurred in the network data link.	The RUN LED and ERR LED are ON.	Page 191 ERR LED is ON or flashing
	Communication cannot be performed occasionally while executing a user program.	Page 210 Communication cannot be performed occasionally while executing a user program
	A station is disconnected. • A connected station is disconnected unexpectedly. • Data cannot be read from/written to the access target station. • Communication with the access target station occasionally fails. • A relevant station repeats network connection and disconnection.	Page 211 A station is disconnected
	Communication is unstable. • The link scan time and transmission delay time is abnormally longer. • A timeout occurs during transient transmission.	Page 212 Communication is unstable
	Link refresh time is increased.	Page 212 Link refresh time is increased
An error occurred while accessing a device via a network.	Cyclic transmission cannot be performed. • The output of the own station does not reach the access target station. • The change of the input sent from the access target station does not reach the own station. • An unexpected value is set to a link device.	Page 213 Cyclic transmission cannot be performed
	Transient transmission cannot be performed. • Data cannot be written to the access target station. • Data cannot be read from the access target station. • Data cannot be monitored in the utility. • Data cannot be read or written while accessing a device with the MELSEC data link library function in a user program.	Page 214 Transient transmission cannot be performed
Other	The time synchronization for a personal computer in the local station is not performed.	Page 216 Time synchronization is not performed correctly

12

The personal computer does not start or shuts down

When a personal computer on which a board is installed does not start, or the system shuts down or is reset, check the cause by following the procedure shown below.

> **Point**
>
> Do not uninstall or disable the driver of the board in Windows Device Manager when the board is normally recognized. If it is uninstalled or disabled, the operating system may shut down (blue screen).

Operating procedure

1. Uninstall the board and check if the personal computer can be restarted.

☞ Page 194 Checking the personal computer and operating system

2. When the restart is successful, check if there is any error.

☞ Page 196 Checking with Event Viewer

3. Install the latest software package.

☞ Page 299 Update of software package

4. Install the board and restart the personal computer.

☞ Page 189 Checking board installation

☞ Page 195 Checking with Device Manager

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

> **Point**
>
> When the restart of the personal computer with a board installed is successful, follow the basic checking procedure below.
>
> ☞ Page 188 Basic checking procedure

The utility does not start up

When the utility does not start up normally, check the following:

Check item	Corrective action
Is an error message displayed?	Take corrective actions according to the message. (☞ Page 206 A screen in which the shown corrective actions are not clear is displayed)
Is the icon of the utility displayed in the menu of the operating system? Does the utility start by clicking the icon?	The installation is not completed normally. Install the software package. (📖Page 40 When installation is terminated or failed)
Have other MELSOFT products been deleted in a batch with the MELSOFT Complete Clean Up Tool?	Install the software package. (📖Page 40 When installation is terminated or failed)

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

A screen or operation is abnormal

When the screen is not displayed normally or the software cannot be operated normally, check the following:

Check item	Corrective action
Is an error message displayed?	Take corrective actions according to the message. (☞ Page 206 A screen in which the shown corrective actions are not clear is displayed)
Is the size of the text and other items in the screen set to a value other than 100% (96 DPI, 9 pt etc.) in Windows settings?	Set the value to 100% (96 DPI, 9 pt etc.). For Windows 10, refer to the following: ☞ Page 34 Considerations when using high DPI scaling
Are characters and languages used and the display language setting appropriate?	• Check the operating environment. (☞ Page 36 Characters and languages used) • Check the considerations for display language switching. (☞ Page 115 Display language switching)
Is the display setting correct?	• Check if the display setting is correct in Device Manager and install the appropriate display driver.
Are other applications being executed?	• Update Windows. • Change the hardware acceleration setting in the display setting. • Close the screens of all other applications.
Is there any error in the personal computer?	• Check the operating environment. (☞ Page 194 Checking the operation environment) • Check the personal computer and operating system. (☞ Page 194 Checking the personal computer and operating system)

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

A manual cannot be displayed

When a manual cannot be displayed in the utility, end all e-Manual Viewer running and retry the operation.

A file cannot be saved/read in the utility

When a file cannot be saved or the saved file cannot be opened in the utility, check if a character other than the available characters is used for the file name and the save destination folder name.

☞ Page 293 Unusable Character Strings (Reserved Words)

The setting cannot be ended in a screen for setting parameters

When the parameters cannot be set in the utility, check the following:

Check item	Corrective action
Is the administrator authority used for logging on to a personal computer?	Log off, and log on as a user with the administrator authority.

An event history cannot be displayed

When the event history list is not displayed properly in the "Event History" screen, check the following:

Check item	Corrective action
Is an event history file deleted?	Reset a board corresponding to the channel number.

The network configuration diagram is not displayed properly

When the network configuration diagram of "CC-Link IE TSN Diagnostics" is not displayed properly, refer to the following:

Check item	Corrective action
Is the network in the ring topology configured correctly?	• Match "Network Topology" under "Basic Settings" to the actual connection status. • Disconnect the switching hub. When "Network Topology" under "Basic Settings" is set to "Ring," disconnect the following network modules: • A network module not supporting ring topology • A network module the communication speed of which is different from that of the master station • A network module not set in the parameters of the master station

Information cannot be monitored in CC-Link IE TSN Communication Software

When information cannot be monitored in CC-Link IE TSN Communication Software, check the following items:

Check item	Corrective action
Are three or more personal computers (CC-Link IE TSN Communication Software) connected?	Connect two or fewer personal computers (CC-Link IE TSN Communication Software).
Is "Network Topology" under "Basic Settings" in the master station set to "Ring"?	Set "Network Topology" under "Basic Settings" to "Line/Star."
Is CC-Link IE TSN Communication Software connected to a CC-Link IE TSN Class A device?	Connect 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 CC-Link IE TSN Communication Software connected to a general-purpose hub?	Connect CC-Link IE TSN Communication Software to a CC-Link IE TSN Class B device or a TSN hub.
Does CC-Link IE TSN Communication Software reconnect within 20 seconds of disconnecting?	Before reconnecting 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

A tool cannot be started from the menu

When a board is not installed, the menu cannot be selected for the device monitor utility and Firmware Update Tool.
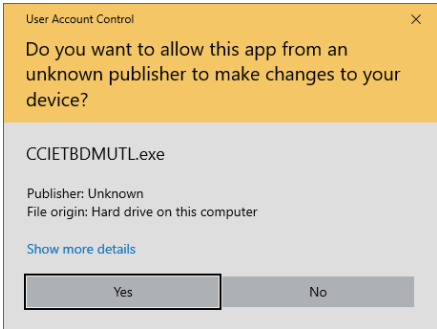
For the troubleshooting for Firmware Update Tool, refer to the following:

☞ Page 208 An error has occurred when updating the firmware

A screen in which the shown corrective actions are not clear is displayed

When an unexpected screen is displayed or the corrective action displayed on the screen is not clear, check the following:

The following table shows the corrective actions to take in each screen.

Screen	Corrective action
User Account Control Do you want to allow this app from an unknown publisher to make changes to your device? CCIETBDMUTL.exe Publisher: Unknown File origin: Hard drive on this computer Show more details Yes No	Appears when the user account control is enabled. Click the [Yes] button.
The user account control screen in which the password is required to be entered	Appears when logging on as a user without the administrator authority. Log off, and log on as a user with the administrator authority, then try again.

For error codes, refer to the following:

☞ Page 218 Error Code List

For screens displayed when installing the software package, refer to the following:

☞ Page 40 When an action displayed in the screen is not clear

For corrective actions related to the screens of the operating system, contact the operating system manufacturer.

For corrective actions related to the screens displayed by a user program, check the user program.

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

The personal computer operates slowly

The following explains the troubleshooting when the following symptoms have occurred and the operating speed of the personal computer becomes slow.
- The operation of the mouse or keyboard is slow.
- The operation of other applications is slow.
- The CPU utilization of the personal computer is high.
- The operation of the sound function is unstable.

When the operating speed of the personal computer becomes slow, check the following:

Check item	Corrective action
Is the CPU utilization of another application high?	• Start Windows Task Manager, and specify the application with high CPU utilization in the [Processes] or [Performance] tab. • Reduce the execution frequency of the application with high CPU utilization.
Is the cyclic transmission operation time longer?	• Adjust the value of link refresh cycle setting. (☞ Page 156 Driver setting) • Reduce the number of link refresh points (☞ Page 148 Refresh setting)

Replace the personal computer if its processing capability is lower for the desired processing.

The hardware failure has occurred

When a hardware failure, board WDT error, or PCI Express bus error occurs, restart the personal computer or reset the board.

If the same error occurs again, check the following:

Check item	Corrective action
Is the board installed properly?	Check the board installation status. (☞ Page 189 Checking board installation)
Does the board operate normally on another personal computer?	• If the board operates normally on another personal computer, there may be a problem with the computer. In this case, repair or replace the computer. • After formatting the HD, install the operating system again. • If the board does not operate normally on another personal computer, replace the board.
Is there any noise influence?	Check the wire and cable lengths and grounding condition of each device, and take measures against noise.

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

An error has occurred when resetting a board

When a board cannot be reset properly, refer to the following:

Check item	Corrective action
Is resetting of the board repeated at short intervals?	Wait for at least one second every time the board is reset.
Is the parameter set according to the actual board installation status?	Correct the parameter, then write parameters to the board again.
Is the board reset during the firmware update?	☞ Page 209 An error has occurred when terminating the process during the firmware update

For considerations for resetting, refer to the following:

☞ Page 274 Network Status at Power ON/OFF or Board Reset During Data Linking

An error has occurred when updating the firmware

For the operation of Firmware Update Tool, refer to the following:

☞ Page 296 Firmware update

When an error occurs during the firmware update, refer to the following:

Firmware Update Tool cannot be started

Check item	Corrective action
Is a TSN board installed?	Check the board installation status. (☞ Page 189 Checking board installation)
Is the channel number duplicated?	Set channel numbers of the board so that they are not duplicated. (☞ Page 189 Checking board installation)
Is Firmware Update Tool already started?	Multiple pieces of Firmware Update Tool cannot be started at the same time. Use the screen opened.
Is the software package with the latest version installed?	Install the latest software package. (☞ Page 299 Update of software package)

A board is not displayed in Firmware Update Tool

Check item	Corrective action
Has the [Check Board Status] button been clicked?	The board is displayed by selecting a firmware update file and clicking the [Check Board Status] button.
Has Firmware Update Tool been forcibly terminated while the firmware is being updated?	If so, reset the board and click the [Check Board Status] button.
Has the board been reset while the firmware is being updated?	Turn the power of the personal computer OFF and restart it, then click the [Check Board Status] button.

Firmware update cannot be performed with Firmware Update Tool

Check item	Corrective action
Is "Failure" displayed in the "Result" field?	When the firmware update fails, take corrective action corresponding to an error code displayed. (☞ Page 208 An error code is displayed in Firmware Update Tool)
Is "Firmware Update is cancelled" displayed in the "Result" field?	If so, reset the board and perform the firmware update again.

An error code is displayed in Firmware Update Tool

Error code	Error details and cause	Corrective action
10100H	Access to the flash ROM of a board failed.	Reset the board and perform the firmware update again. If the error occurs again, the board may be faulty. Please contact your local Mitsubishi Electric sales office or representative. (☞ Page 217 Information Required for Inquiries)
10201H	An error of a firmware update file is detected.	Check if the specified file is corrupted or incorrect, and perform the firmware update again.
10202H	A target board does not support the firmware update.	For the update of a TSN board with firmware version 01, please contact your local Mitsubishi Electric sales office or representative.
10300H	An error of a firmware update file is detected during the firmware update.	Reset the board and check the specified file, and then perform the firmware update again.
10500H	Access to a board failed.	• Reset the board and perform the firmware update again. • Turn the power of the personal computer OFF and restart it, then perform the firmware update again. • Reinstall the software package, then perform the firmware update again. • Check the channel number setting, then perform the firmware update again. (☞ Page 189 Checking board installation) • Set parameters correctly, then perform the firmware update again. (☞ Page 112 Setting parameters) If the error occurs again, the board may be faulty. Please contact your local Mitsubishi Electric sales office or representative. (☞ Page 217 Information Required for Inquiries)
10501H	An error is detected during the firmware update.	Reset the board and perform the firmware update again. If the error occurs again, the board may be faulty. Please contact your local Mitsubishi Electric sales office or representative. (☞ Page 217 Information Required for Inquiries)

Error code	Error details and cause	Corrective action
10502H	Insufficient memory error	• Close other applications running and reset the board, then perform the firmware update again. • Check if the specified file is incorrect, then perform the firmware update again.
10503H	Parameter setting error	Set "Use of Board" and "Model Name" in the parameter, then perform the firmware update again. (☞ Page 112 Setting parameters)

An error has occurred when terminating the process during the firmware update

When the following operations are executed during the firmware update, the update may be completed with an error, resulting in failure of the board.

- Turning OFF the power of a personal computer
- Restarting an operating system
- Resetting a board
- Installing/uninstalling a board

When an error occurs, refer to the following:

Check item	Corrective action
Is the board displayed in the CC IE TSN utility?	Turn the power of the personal computer OFF and restart it.
Can the board be reset?	Turn the power of the personal computer OFF and restart it.
Is the target board displayed in Firmware Update Tool?	• Reset the board, then click the [Check Board Status] button. • Turn the power of the personal computer OFF and restart it.
Does the firmware version of the target device, which is displayed in Firmware Update Tool, remain the same as before the update?	Perform the firmware update again.

If the problem persists, refer to the following:

A board does not operate after firmware update

In this case, perform the firmware update again.

If the problem persists, refer to the following:

Precautions

When there is any error for the system operation after the update, revert the firmware to a previous version.

If the software package is also updated, revert it to a previous version.

The PCI Express bus error has occurred

When the PCI Express bus error occurs, check the following:

Check item	Corrective action
Is the channel number of a TSN board duplicated on the network?	Set channel numbers of the board so that they are not duplicated. (☞ Page 189 Checking board installation)
Does the board operate normally on another personal computer?	• After formatting the HD, install the operating system again. • Repair or replace the personal computer.

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

The driver WDT error has occurred

When the driver WDT error occurs, check the following:

Check item	Corrective action
Has the system temporarily overloaded due to the following causes? • Windows start processing at the personal computer startup • Operation of a device driver such as a graphic board • Operation of other software applications	• Reset the board. • Restart the personal computer.
Has the same symptom occurred repeatedly? (Is the system overloaded constantly?)	• Remove the factor of system overload. • Extend the driver WDT monitoring time. (☞ Page 156 Driver setting) • Set the driver WDT setting to "Not Use." (☞ Page 156 Driver setting)

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

The driver does not start

When the driver does not start normally, check the following:

Check item	Corrective action
Is the board installed properly?	Check the board installation status. (☞ Page 189 Checking board installation)
Is the channel number set properly?	Check the channel number. (☞ Page 198 Checking channel numbers)
Is the software package installed?	Reinstall the software package.
Does the personal computer recognize the board?	Check if the board is normally recognized in Windows Device Manager. (☞ Page 195 Checking with Device Manager)

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

Communication cannot be performed occasionally while executing a user program

When communication cannot be performed occasionally while executing a user program, check the following:

Check item	Corrective action
Is the error code returned to the user program?	Check the returned value of the MELSEC data link library. (☐MELSEC Data Link Library Reference Manual)
Can the network error be monitored in the utility?	Check the network status in CC IE TSN diagnostics. (☞ Page 132 CC-Link IE TSN diagnostics)
Does the error occur when adding stations to the system sequentially?	Check if the error occurs by adding stations sequentially in the system which is configured with the master station and the own station only. If the error occurs, check the added station. • ☞ Page 189 Checking installation environment • ☞ Page 189 Checking cables and wiring • ☞ Page 198 Checking with tests

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

A station is disconnected

The following explains the troubleshooting when the following symptoms have occurred and a station is disconnected.

- A connected station is disconnected unexpectedly.
- Data cannot be read from/written to the access target station.
- Communication with the access target station occasionally fails.
- A relevant station repeats network connection and disconnection.

When the station is disconnected, check the following:

Check item		Corrective action
Is there any influence of ambient temperature or noise?		Check the installation environment. (☞ Page 189 Checking installation environment)
Is there an error in cables? Is the wiring correct?		Check the cables and wiring. (☞ Page 189 Checking cables and wiring)
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 20 μs?		Set "System Reservation Time" to 200 μs.
When "Communication Period Setting" of the master station is set to "1Gbps" and a CC-Link IE TSN Class B/A device with communication speed of 100 Mbps is used, is "Communication Period Setting" set to "Basic Period" or "Normal-Speed"?		For the CC-Link IE TSN Class B/A device with communication speed of 100 Mbps, set "Communication Period Setting" to "Low-Speed."
When "Communication Speed" of the master station is 1 Gbps, 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 communication speed of 100 Mbps at the boundary between the CC-Link IE TSN Class B device with communication speed of 1 Gbps (except for the master station) and the one with communication speed of 100 Mbps?		• Restrict the number of the connected stations so that the cyclic data size of the devices with communication speed of 100 Mbps does not exceed 2K bytes in total. • Connect the device with communication speed of 100 Mbps to the master station.
When "Communication Period Setting" of the master station is set to "1Gbps" and a CC-Link IE TSN Class B/A device with communication speed of 100 Mbps is used in multicast mode, does the station repeat disconnection and return even if "Communication Period Setting" is set to "Low-Speed"?		Connect the data link faulty station to the device supporting the multicast filter. (📖Manual of the device used)
In multicast mode, is the CC-Link IE TSN Class A remote station connected to the master station, remote station, or CC-Link IE TSN Class A local station?		• Check the connected devices and connect the CC-Link IE TSN Class A remote station to the CC-Link IE TSN Class B local station. • Set unicast mode.
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 standard Ethernet device. • 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.
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 local station or remote station supporting the multicast filter to the CC-Link IE TSN Class A remote station. • Set unicast mode.
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.
Is '1: Operating with the protocol version 1.0' stored in 'Protocol operating status' (address 1294016 (13BEC0H))?	Has the cyclic data size exceeded 2K bytes in total for CC-Link IE TSN Class A devices connected to the CC-Link IE TSN Class B devices other than the master station? (Including when connected to a CC-Link IE TSN Class B device via a general-purpose hub)	• Connect to a CC-Link IE TSN Class B device via a TSN hub. (If connecting via a general-purpose hub, change the general-purpose hub to a TSN hub) • Limit the number of the connected stations so that the cyclic data size does not exceed 2K bytes in total for CC-Link IE TSN Class A devices connected to CC-Link IE TSN Class B devices other than the master station. (Including when connected to a CC-Link IE TSN Class B device via a general-purpose hub)
■When a device with protocol version 1.0 is included in connected devices Has the cyclic data size exceeded 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 (except for the master station) and CC-Link IE TSN Class A devices?		• Correct the number of the 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 device to the master station. For details, refer to the following: ☞ Page 215 CC-Link IE TSN Class A device does not perform data link

Check item	Corrective action
■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 215 CC-Link IE TSN Class A device does not perform data link

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

Communication is unstable

When the link scan time and transmission delay time are abnormally longer, or a timeout occurs during transient transmission, check the following:

Check item	Corrective action
Is the L ERR LED or L ER LED ON?	Check the LED. (☞ Page 190 Checking the LED status)
Can the network error be monitored in the utility?	Check the network status in CC IE TSN diagnostics. (☞ Page 132 CC-Link IE TSN diagnostics)
Is there any influence of ambient temperature or noise?	Check the installation environment. (☞ Page 189 Checking installation environment)
Is there an error in cables? Is the wiring correct?	Check the cables and wiring. (☞ Page 189 Checking cables and wiring)
Is the board hardware operating normally?	Perform the board tests. (☞ Page 198 Checking with tests)

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

Link refresh time is increased

Link refresh processing time may be increased if the processing is interrupted by Windows system or other application since Windows does not have a function which guarantees to complete the processing within a certain time.
By reducing the number of processings on Windows system or other application, link refresh processing time may be decreased.
When increase in link refresh processing time occurs, check the following items.

Check item	Corrective action
Is the CPU utilization or disk utilization by other application high?	Start Windows Task Manager, and specify the application occupying high CPU utilization or disk utilization in the [Processes] or [Performance] tab. Example: Antivirus software, security measure software, backup software, etc. Reduce the execution frequency of the application with high CPU utilization.
Is a service of Windows running?	In Windows logs of the event viewer, specify the running service of Windows, and stop the service if possible.
Is System Protection (System Restore) of Windows enabled?	Disable System Protection (System Restore) of Windows.
Is the setting to save power configured in the power option setting of Windows?	Disable the setting to save power (by setting it to 'off', 'not set', etc.) in the power option setting of Windows. Example: In the power plan settings of Windows, set "Never" for "Turn off the display".

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

Data link cannot be performed

Check the error occurring in the CC IE TSN utility.

- ☞ Page 198 Checking with errors on board diagnostics
- ☞ Page 198 Checking with tests
- ☞ Page 198 Checking with CC-Link IE TSN diagnostics

When the data link with a target station cannot be performed even though there is no error, check the following:

Check item	Corrective action
Is the D LINK LED ON? (☞ Page 130 Board information list)	Perform troubleshooting for when the D LINK LED is OFF or flashing. (☞ Page 192 D LINK LED is OFF or flashing)
Are the configuration and parameter setting of a device connected to the network correct?	Check the connected device and the parameter setting. (☞ Page 200 Checking the CC-Link IE TSN system configuration and parameter setting)
Is there any cause for cyclic transmission not to 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.
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.

If the problem persists, refer to the following:

☞ Page 217 Information Required for Inquiries

For the troubleshooting for the specific symptoms, refer to the following:

Cyclic transmission cannot be performed

The following explains the troubleshooting when the following symptoms have occurred and cyclic transmission cannot be performed.

- The output of the own station does not reach the access target station.
- The change of the input sent from the access target station does not reach the own station.
- An unexpected value is set to a link device.

When cyclic data does not reach the master station or normal station, check the following:

Check item	Corrective action
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 281 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 20 μs?	Set "System Reservation Time" to 200 μs.

Transient transmission cannot be performed

The following explains the troubleshooting when the following symptoms have occurred and transient transmission cannot be performed.

- Data cannot be written to the access target station.
- Data cannot be read from the access target station.
- Data cannot be monitored in the utility.
- Data cannot be read or written while accessing a device by using the MELSEC data link library in a user program.

When transient transmission to a target station cannot be performed or data cannot be monitored in the device monitor utility, check the following items:

Check item	Corrective action
Is the arguments of the MELSEC data link library correct? • Target network number • Target station number • Target IP address	Check the arguments of the MELSEC data link library. (📖MELSEC Data Link Library Reference Manual)
Is the network number duplicated on the network?	Change the duplicated network number.
Are the link dedicated instruction and the SEND/RECV function with the same channel setting executed simultaneously?	• Set a different channel for each. • Shift the execution timing of the link dedicated instruction and the SEND/RECV function.
Does loopback occur or is loopback not resolved?	• Perform transient transmission again.
Has the communication path using dynamic routing been determined?	• Power ON the system, 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." (☞ Page 156 Routing setting)
Do the relay stations on the communication path support dynamic routing?	If relay stations which do not support dynamic routing exist, set "Routing Setting" to all stations on the communication path. (☞ Page 93 Routing function)
Is the routing parameter for the sending source of transient transmission correct?	Correct the setting in "Routing Setting" under "Application Settings." (☞ Page 156 Static routing setting (detailed setting))
Are the routing parameter for the relay station set correctly?	Correct the setting in "Routing Setting" of "CPU parameter" of the relay station.
Has the congestion occurred due to other transient transmission?	• Lower the transient transmission usage frequency, and perform it again. • Adjust the setting value of "Cyclic Transmission Time" so that the value of "Transient Transmission Time" under "Basic Settings" is greater.

If the problem persists, refer to the following:

■When using the RECV function receive buffer

When "RECV Function Receive Buffer" of "Driver Setting" under "Application Settings" is set to "Use" in the parameter of the master station, check the following items:

Check item	Corrective action
Is data read immediately after the send data completion at the receiving station?	Retry the reading data operation after 1 ms or more.
Is data sent consecutively from the sending station?	• Retry the sending data operation after 1 ms or more. • Change the storage channel of the target station.
Is data read at the receiving station?	Retry the sending data operation after data is read at the receiving station.

An unexpected value is set to the specific link device

Check the following:

Check item	Corrective action
Is there a link error station?	Check the network status in CC IE TSN diagnostics. (☞ Page 132 CC-Link IE TSN diagnostics)
Is the parameter assignment range correct?	Correct the link devices to be assigned to the device station in "Network Configuration Settings" of the master station.
Is the link device accessed using a user program?	Check the arguments of the MELSEC data link library accessing to the link device.
Is the link device accessed from a programmable controller in the network?	Check the device range used in programs.

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	Corrective 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 Setting" under "Basic Settings."
Is the refresh range of "CPU Side" in "Refresh Setting" overlapped with that of "CPU Side" of another network module?	Correct the setting in "Refresh Setting" under "Basic 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."

CC-Link IE TSN Class A device does not perform data link
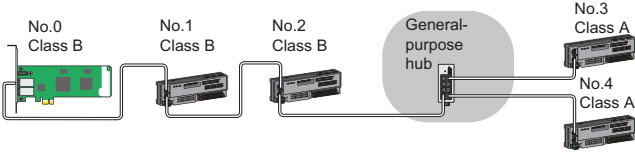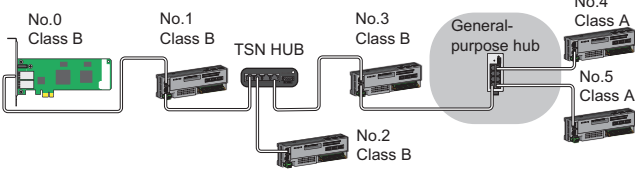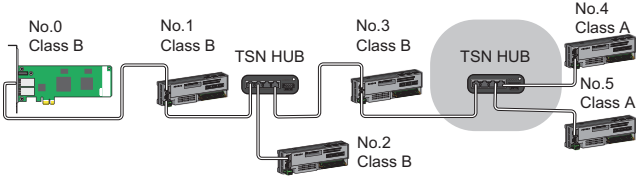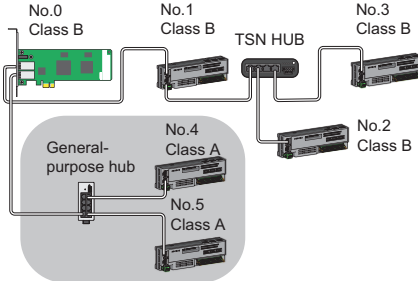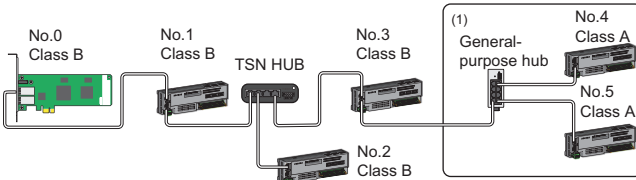
■When set to "Not to Use TSN HUB"

If "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" is set to "Not to Use TSN HUB," check the following:

Check item	Corrective action
Are the CC-Link IE TSN Class B device and the 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 directly to the CC-Link IE TSN Class A device. Alternatively, connect them via a general-purpose hub.
Is the TSN hub used for the 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 the TSN hub used for the connection between CC-Link IE TSN Class B devices?	Disconnect the TSN hub used for the connection between the CC-Link IE TSN Class B devices.

12

■When set to "Use TSN HUB"

When "TSN HUB Setting" of "Connection Device Information" in "Basic Settings" is set to "Use TSN HUB," check the following:

Check item	Corrective action
Are the CC-Link IE TSN Class B device and the CC-Link IE TSN Class A device directly connected or connected via a general-purpose hub?	Set "TSN HUB Setting" in "Connection Device Information" under "Basic Settings" to "Not to Use TSN HUB."
Are the CC-Link IE TSN Class B device and the CC-Link IE TSN Class A device directly connected or connected via a general-purpose hub?	Connect the CC-Link IE TSN Class B device and the CC-Link IE TSN Class A device via a TSN hub. Connect the CC-Link IE TSN Class A device directly to the master station. Alternatively, connect them via a general-purpose hub. Limit the number of connected stations so that the cyclic data size for device stations (1) 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 does not exceed 2K bytes in total.

Time synchronization is not performed correctly

When the time on a personal computer in the local station is not synchronized or different from that in the master station or programmable controller CPU, check the following items:

Check item	Corrective action
Are the time zone settings and daylight saving time settings in the master station and the local station different?	Set the same time zone and daylight saving time between the master station and local station.
Is the time in Windows changed?	Check the "Date & time" settings in Windows. • Set "Set time automatically" to "Off." • Set "Set time zone automatically" to "Off." • Do not change the date and time by "Change date and time."
Are the following buffer memories set correctly? • 'Time distribution interval setting of the personal computer' (address 1275136 (137500H)) of the master station • 'Time reflection setting to the personal computer' (address 1275137 (137501H)) of the local station	Set buffer memories correctly. (☞ Page 256 Time synchronization)

12.3 Information Required for Inquiries

When the troubleshooting cannot solve a problem, please contact your local Mitsubishi Electric sales office or representative. Inform us the following conditions and situations when making inquiries:

Product information

Item		Condition/situation
Product version	Board	Model: NZ81GN11- SERIAL field: _____ _____-_ Product information: _____ _____-_
	Utility	Model: SW1DNN-CCIETBDM-B Version: _.__ _
Personal computer	Personal computer name	Manufacturer: Personal computer name:
	CPU	(Example: Intel® Core™2 Duo Processor 3 GHz)
	Memory size	(Example: Implemented RAM 16 GB)
	OS	(Example: Windows 10 Professional)
Installing slot position		(Example: Second slot)
Other option boards	Existence	If exists, inform us of the information such as the type, manufacturer, memory and I/O addresses (start address and occupied size), IRQ number, and DMA number for each board.

Failure content

Item	Condition/situation
Failure description	(Example: The board does not start up after the power-ON and startup of a personal computer with the screen displaying "board Not response.")
Occurrence frequency	
Occurrence condition	If the failure occurs only in the specific case, inform us of the occurrence condition that you know.
Troubleshooting result	Inform us of the following descriptions: Result of performed troubleshooting Situation when checking with other boards or personal computers. (Example: The message "The Board WDT error had occurred." for event ID 295 is displayed on Event Viewer when the personal computer is started up. It also occurs when the board is installed in another personal computer but does not occur when another board is installed in the same computer.)

12.4 Error Code List

This section explains the error codes, error details and causes, and corrective actions for the errors that occur during the processing.

The following error codes can be checked in the "Board Diagnostics" screen of the CC IE TSN utility.

Error code	Error details and cause	Corrective action
1080H	The number of writes to the flash ROM has exceeded 100000.	Replace the board.
1082H	Write failed because the same sector of the flash ROM was written continuously within 90 seconds.	Write to the same sector with an interval of 90 seconds or more.
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.
1128H	The port number is incorrect.	Correct the port number.
1152H	The IP address is not set correctly.	Correct the IP addresses.
1802H	• During data link, overlapping IP addresses have been detected. • When multiple boards are installed on the same PC and wired to be on the same network, parameter setting or channel number setting were executed. Or, there were boards with overlapping channel number.	• Change the IP address of devices with an overlapped IP address. • Reset each board installed on the same PC. • Check if the channel numbers are duplicated.
1803H	The number of connectable stations is exceeded.	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. Do one or both of the following: • Update the firmware version of the master station to a device that supports CC-Link IE TSN protocol version 2.0. • Update the firmware of the CC-Link IE TSN Class A device to the latest version, or replace it with a device that supports CC-Link IE TSN protocol version 2.0.
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. • With the 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.	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 cycle 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 • 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.	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.
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 station is connected further on the end side than a CC-Link IE TSN Class A station.	• Disconnect the switching hub connected to 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.
1811H	A stop error has been detected in the board driver.	• Remove the factor of system overload. • Set the driver WDT setting to "Not Use" or increase the driver WDT monitoring time in CC IE TSN utility.

Error code	Error details and cause	Corrective action
1845H	Too much processing of transient transmission (SEND/RECV function[*1]) and cannot perform transient transmission.	Correct the number of transient transmission (SEND/RECV function[*1]) execution.
1D20H	Proper communication was not possible between CC-Link IE TSN device stations.	• Increase "Communication Period Interval Setting" and "Transient Transmission Time" in "Communication Period Setting" under "Basic Settings". • If the value is not 0 in 'Transient transmission additional time (calculation value)' (SW007A), add the value to "Communication Period Interval Setting" and "Transient Transmission Time". • Set "Communication Period Setting" of the device station to "Basic Period" in "Network Configuration Settings" under "Basic Settings" of the master station, if the device station is not supported with "Normal speed" or "Low speed", refer to the manual for the device station. • Check if the hub and the cables are connected properly. • After taking the above corrective actions, power on the PC again or reset the board.
1D21H	Proper communication was not possible between CC-Link IE TSN device stations.	• Initialization with the device station of CC-Link IE TSN failed. • Take measures to reduce noise. • After taking the above corrective actions, power on the PC again or reset the board.
1D30H	A co-recording trigger was received but then discarded because the trigger was not supported.	Check the firmware versions of the board and the co-recording trigger source device. If the combination is incorrect, update the firmware version of the board or co-recording trigger source device, whichever the older version is used.
2160H	• Overlapping IP addresses have been detected. • When multiple boards are installed on the same PC and wired to be on the same network, parameter setting or channel number setting were executed. Or, there were boards with overlapping channel number.	• Check and correct the IP addresses. • Reset each board installed on the same PC. • Check if the channel numbers are duplicated.
2220H	• The parameter setting is corrupted.	Write the parameter setting to the board. (☞ Page 198 Checking with errors on board diagnostics) If the same error occurs again, the possible cause is a hardware failure of the board. Refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
2221H	• The set value is out of the range. Or the setting values of the master station and local stations are not consistent. • CC IE TSN utility does not support the parameters required by the board. • "Link points extend setting" of the own station is set to the extended mode but the master station is not set to the extended mode or the master station does not support the link points extend function. • "Link points extend setting" of the own station is not set to the extended mode but the master station is set to the extended mode.	• Check the detailed information of the error by executing board diagnostics using CC IE TSN utility, and correct the parameter setting. (☞ Page 198 Checking with errors on board diagnostics) • Update the software package to the latest version and try again. • Set "Link points extend setting" in "Application Settings" of the own station and the master station to the same setting. If the master station does support the link points extend function, set "Link points extend setting" to "Not Use" in "Application Settings".
3009H	The result of multiplying the value set by "Communication Period Interval Setting" in "Communication Period Setting" of "Basic Settings" with set by "Communication Period Setting" of "Basic Settings" exceeds usable range.	Check the detailed information of the error by executing board diagnostics using CC IE TSN utility, and correct the parameter setting. (☞ Page 198 Checking with errors on board diagnostics) Correct the following parameter settings so that the multiplication result of the value set in "Communication Period Interval Setting" of "Communication Period Setting" under "Basic Settings" of master station and the value set in "Communication Period Setting" of the corresponding device station of "Network Configuration Settings" under "Basic Settings" is within 16 ms. • "Communication Period Interval Setting" of "Basic Settings" • "Multiple Period Setting" of "Basic Settings" • "Communication Period Setting" of the corresponding device station of "Network Configuration Settings" "Communication Period Setting" to be set to the device station is Specify a multiple with "Multiple Period Setting" of "Communication Period Setting" of "Basic Settings".
300AH	The setting value is out of the usable range. Or the setting values of master station and local stations are not consistent.	Check the detailed information of the error by executing board diagnostics using CC IE TSN utility, and correct the master station parameter setting corresponding to the displayed number. If the same error occurs again, the possible cause is a hardware failure of the board. Refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)

12

Error code	Error details and cause	Corrective action
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 station. When the CC-Link IE TSN interface board is operating as the grandmaster, refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
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 station. When the CC-Link IE TSN interface board is operating as the grandmaster, refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
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 station. When the CC-Link IE TSN interface board is operating as the grandmaster, refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
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.
300FH	• Detected that there are multiple master stations on the network. • When multiple boards are installed on the same PC and wired to be on the same network, parameter setting or channel number setting were executed. Or, there were boards with overlapping channel number.	• Make one master station connected to the same network. • After the above procedure, power OFF and ON or reset all stations that detected this error. • Reset each board installed on the same PC. • Check if the channel numbers are duplicated.
3010H	The value set by "Communication Period Interval Setting" in "Communication Period Setting" of "Basic Settings" is smaller than the Communication Period Interval calculated from set by "Network Configuration Settings" of "Basic Settings".	Set the value of "Communication Period Interval Setting" in "Communication Period Setting" of "Basic Settings" above the value of the Detailed Information in the Board Diagnostics or the Module Diagnostics. If the value of the Board Diagnostics exceeds the upper limit of "Communication Period Interval Setting" that can be set by the master station, in "Network configuration setting", reduce the number of units connected to the master station, the number of link devices assigned to each unit, and set it so that it does not exceed the upper limit of "Communication Period Interval Setting".
3011H	The value set by "Cyclic Transmission Time" in "Communication Period Setting" of "Basic Settings" is smaller than the Cyclic Transmission Interval calculated from set by "Network Configuration Settings" of "Basic Settings".	Set the value of "Cyclic Transmission Time" in "Communication Period Setting" of "Basic Settings" above the value of the Detailed Information in the Board Diagnostics or the Module Diagnostics. If the value of the Board Diagnostics exceeds the upper limit of "Cyclic Transmission Time" that can be set by the master station, in "Network configuration setting", reduce the number of units connected to the master station, the number of link devices assigned to each unit, and set it so that it does not exceed the upper limit of "Cyclic Transmission Time".
3013H	The value set by "Transient Transmission Time" in "Communication Period Setting" of "Basic Settings" is smaller than the Transient Transmission Interval calculated from set by "Network Configuration Settings" of "Basic Settings".	Set "Communication Period Interval Setting" and "Cyclic Transmission Time" so that the value of "Transient Transmission Time" in "Communication Period Setting" of "Basic Settings" of the master station is greater than the value of detailed information displayed in the Board Diagnostics or the Module Diagnostics.
3014H	Communication Period Setting of local stations is set to "Normal-Speed" or "Low-Speed" in "Network Configuration Settings" of "Basic Settings" when "Communication Mode" in "Application Settings" of the master station is set to "Multicast".	• Set "Communication Mode" in "Application Settings" of the master station to "Unicast". • Set "Communication Period Setting" of local stations to "Basic Period" in "Network Configuration Settings" of "Basic Settings" of the master station.
3016H	When "Network Topology" under "Basic Settings" of the master station is set to "Ring", "CC-Link IE TSN Class Setting" under "Basic Settings" is set to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A only".	• Set "Line/Star" in "Network Topology" under "Basic Settings" of the master station. • Set "CC-Link IE TSN Class B Only" in "CC-Link IE TSN Class Setting" under "Basic Settings" of the master station.
3021H	• At startup of data link, an overlapping IP address among device stations has been detected. • When multiple boards are installed on the same PC and wired to be on the same network, parameter setting or channel number setting were executed. Or, there were boards with overlapping channel number.	• Correct the IP addresses of the device stations. • Reset each board installed on the same PC. • Check if the channel numbers are duplicated.
3060H	The send/receive data size exceeds the allowable range.	• Check and change the send data size of the CC-Link IE TSN-equipped device or the external device. • If the same error occurs again after changing the data size, the possible cause is a hardware failure of the board. Refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
3121H	The cyclic transmission setting information received from the master station exceeds the setting range.	Write the parameter to the board again.

Error code	Error details and cause	Corrective action
3130H	A device with the time synchronization priority of 0 to 15 was connected.	Remove the device with the time synchronization priority 0 to 15 or change the priority to 16 to 255.
3135H	The number of connectable stations is exceeded.	• Reduce number of connected stations to 31 or less (including master station). • Configure the system with the number of CC-Link IE TSN Class B devices to eight or less for each port of the master station.
3136H	Invalid ring connection detected.	Power OFF and ON or reset all stations with line or star connection.
3160H	The number of points of link devices about the device station for which "CC-Link IE TSN Class A" is set in "CC-Link IE TSN Class" of "Network Configuration Setting" under "Basic Settings" exceeds the points that can be assigned.	Correct the number of points of link devices in "Network Configuration Setting" under "Basic Settings" about the device station shown in Detailed Information 2 does not exceed the points that can be assigned to a CC-Link IE TSN Class A station.
3180H	• The setting value is out of the usable range.	• Write again from the buffer memory, power off and on or reset the own station. • If the same error occurs again even after taking the above, the possible cause is a hardware failure of the board. Refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
3181H	• Writing the parameter could not be successful. • The power is turned off while writing the parameter.	• Write again from the buffer memory, power off and on or reset the own station. • If the same error occurs again even after taking the above, the possible cause is a hardware failure of the board. Refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
31ABH	The transmission and reception of cyclic data with the device station set to "Low Speed" in the "Communication Period Setting" cannot be assured within the "Low Speed" cycle.	• Set "Low Speed" of "Multiple Period Setting" to the value is equal to or larger than "Multiple Period Setting (Low Speed) (1277442)". • Set "Communication Period Interval Setting" in "Basic Cycle Setting" to the value is equal to or larger than "Communication Period Interval (Calculated Value) (1277443)".
31ACH	CC-Link IE TSN Class Setting of the device stations registered in "Network Configuration Setting" does not match "CC-Link IE TSN Class Setting" of "Connected Device Information" in "Basic Setting".	Set "CC-Link IE TSN Class Setting" of the device stations registered in "Network Configuration Setting" to "CC-Link IE TSN Class B", or change "CC-Link IE TSN Class Setting" of "Connected Device Information" in "Basic Setting" to "Mixture of CC-Link IE TSN Class B/A or CC-Link IE TSN Class A only".
31B8H	The sum number (the total number of RX/RY/RWr/RWw + the number of LB/LW setting points for each station ÷ Communication Period Setting(LBLW)) exceeds 556k bytes.	Set the sum number (the total number of RX/RY/RWr/RWw + the number of LB/LW setting points for each station ÷ Communication Period Setting(LBLW)) not to exceed 556k bytes.
31B9H	Parameters are set which are not supported by the installed firmware version.	Check the detailed information of the error by executing board diagnostics using CC IE TSN utility, and correct the parameter setting corresponding to the displayed number.
31BAH	"Communication Mode" in "Application Settings" is set to "Unicast".	When "Link points extended setting" is set to "Extend", set "Multicast" in "Communication Mode" under "Application Settings".
3601H	The network synchronization communication setting in the network configuration setting of the master station does not match the inter-module synchronization target module of the local station.	Correct the parameter so that "Inter-module synchronization target module" under "Synchronization Setting within the Modules" in the system parameters and "Network synchronous communication" in "Network configuration settings" of "Basic settings" of the master station have the same settings.
3613H	A PCI Express bus error has been detected.	Refer to the troubleshooting when the PCI Express bus error occurred. (☞ Page 210 The PCI Express bus error has occurred)
3C00H to 3C02H	A hardware failure has been detected.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
3C0FH		
3C10H		
3C13H		
3C14H		
3C2FH	An error was detected in the memory.	
3E01H	Network type of the own station is unexpected setting.	Rewrite the parameter using CC IE TSN utility. If the same error occurs again, the possible cause is a hardware failure of the board. Refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
3E02H	A time synchronization error was detected.	Refer to the troubleshooting when the hardware failure occurred. (☞ Page 207 The hardware failure has occurred)
3E03H	An error was detected in the memory.	
3E04H	A hardware failure has been detected.	
3E07H		

*1 The following functions of the SEND/RECV function correspond to link dedicated instructions of a network module:
mdSendEx (SEND function)
mdReceiveEx (RECV function)
If a related error occurs in a system in which both a network module and a board are included, replace these functions with dedicated

12

instructions to take corrective action depending on the situation.

The following table shows the error codes stored as the error response from the link special register or the communication target.

For the corrective actions for the error response from a communication target, refer to the manual for the target device.

Error code	Error details and cause	Corrective action
C011H	The port number of the external device is not set correctly.	Correct the port number of the external device.
C012H	A port number being used for opened connection was set (for TCP/IP).	Correct the port numbers of the CC-Link IE TSN interface board and the external device.
C013H	A port number being used for opened connection was set (for UDP/IP).	Correct the port numbers of the CC-Link IE TSN interface board 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 disconnected.
C018H	The specified IP address of the external device is incorrect.	Correct the specified IP address of the external device.
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 connection 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 setting for data communication of the CC-Link IE TSN interface board. • Check if the connection 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. • 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 communication test, and if the test was completed with an error, take corrective action. • Correct the network number, station number, or IP address specified with the MELSEC data link library function.
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 communication test, and if the test was completed with an error, take corrective action.
C040H	• 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 certain period of time.
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.
C087H	IP address of the destination external device could not be acquired.	• Check if the network or station number of the external device is correctly specified with the MELSEC data link library function. • Check if the external device is set in "Network Configuration Settings" of "Basic Settings" of the master station. • Check if the connection cable is connected properly.
C0B2H	There is insufficient space in the receive buffer or the send buffer of the relay station or external station for the SEND/RECV function[*1]. (Send · receive buffer full error)	Increase the request interval (execution interval) and execute the operation. • Make sure that access using the SEND/RECV function[*1] is not concentrated on one station. • Wait for a response to the previous request before sending the next request. • Correct the setting value of the timer setting for data communication of the CC-Link IE TSN-equipped module.

Error code	Error details and cause	Corrective action
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.
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.
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.
C842H	The routing setting is not set to reach to the destination network number.	• Execute 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.
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 after a period of time.	• Execute the communication test, and if the test was completed with an error, take corrective action.
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 that of the master station. • Check if the communication speed matches that of the external device. • Check if the cables are properly connected and that there is no error.
CF40H to CF42H	Incorrect frame was received.	• Check the operating status and connection status of the target device. • Check the connection of an Ethernet cable and a hub. • Check the Ethernet line status. • Reset the target device, and retry the operation. If the problem persists, contact the manufacturer of the target device.
CF43H	A reception error has occurred.	• Check the operating status of the external device. • Check if there is any error in the line status. If the problem persists, 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 an Ethernet cable and a hub. • Check the Ethernet line status. • Reset the target device, and retry the operation. If the problem persists, contact the manufacturer of the target device.
D0A0H	A response wait timeout has occurred in communication with a device station.	• Check the network status using the CC-Link IE TSN diagnostics, and take action. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Check if the switching hub and the cables of the request source are connected properly.
D0A2H	A transmission processing wait timeout has occurred in communication with a device station.	• Check if the switching hub and the cables of the request source are connected properly. • Perform the processing after the previous processing completion.
D0A3H	Send processing of the transient transmission has failed.	• Check the network status using the CC-Link IE TSN diagnostics, 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" is correctly set.
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.

Error code	Error details and cause		Corrective action
D205H	The target station number of transient transmission is incorrect.		Execute the function again after correcting the target station number at the transient request source.
D20AH			
D20BH	There was no master station when the specified master station was specified for transient transmission.		
D20DH	Transmission completion wait timeout has occurred in transient data transmission.		• Check the network status using the CC-Link IE TSN diagnostics, 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 lowering the transient transmission usage frequency. • Check if the switching hub and the cables of the request source are connected properly.
D20EH	The header information of transient transmission is incorrect.		Execute the function 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.
D211H	Transient transmission was performed when the station number/IP address of the own station had not been determined.		Set the station number/IP address, and perform transient transmission again.
D213H	• The command of transient transmission is incorrect. • The CC-Link IE TSN diagnostics was used for the network to which the relay receiving station belongs. • The device at the connection destination does not support this function.		• Execute the function again after correcting the request command at the transient request source. • Review the connection destination so that the CC-Link IE TSN diagnostics is used for the network to which the relay sending station belongs. • Check the manual for the device 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.
D239H	SLMP transmission failed.		• Retry the operation after a while.
D240H	The setting data at the SEND/RECV function[1] is incorrect.	Network number specification	• Execute the function again after correcting the setting data at the SEND/RECV function[1] request source. • If the request source is on another network, check if "Routing Setting" of parameters is set correctly, and take action.
D241H		Target station number	
D243H		Channel specification	
D244H	The transient data is incorrect.		• Execute the instruction again after correcting the transient data at the transient request source.
D245H	The setting data at the SEND/RECV function[1] is incorrect.	Target station number	• Execute the function again after correcting the setting data at the SEND/RECV function[1] request source. • If the request source is on another network, check if "Routing Setting" of parameters is set correctly, and take action.
D247H	When the SEND/RECV function[1] was executed, a duplicate response from the target station was received.		• Check the network status using the CC-Link IE TSN diagnostics, and take action. • Check if the switching hub and the cables of the request source are connected properly. • If the request source is on another network, check if "Routing Setting" of parameters is set correctly, and take action.
D249H	The setting data at the SEND/RECV function[1] is incorrect.	Target station CPU type	• Execute the function again after correcting the setting data at the SEND/RECV function[1] request source. • If the request source is on another network, check if "Routing Setting" of parameters is set correctly, and take action.
D24AH	The arrival monitoring time specification of the transient transmission is incorrect.		• Correct the arrival monitoring time at the transient request source, and retry the operation. • When the own station, target station, or relay station detected an error, identify the cause of the error and take action. • Execute the instruction again after lowering the transient transmission usage frequency. • Check if the switching hub and the cables of the request source are connected properly.
D24CH	The setting data at the SEND/RECV function[1] is incorrect.	Network number specification	• Execute the function again after correcting the setting data at the SEND/RECV function[1] request source. • If the request source is on another network, check if "Routing Setting" of parameters is set correctly, and take action.
D24DH		Channel specification	• Set 1 to 8 for the target channel number when executing the SEND function[1]. • Execute again after correcting the number of the channel used by own station.

Error code	Error details and cause		Corrective action
D24FH	The SEND/RECV function[1] was executed when the station number/IP address of the own station had not been set yet.		• Specify the station number/IP address, and execute the function again.
D251H	At execution of a SEND/RECV function[1], or group specification or all stations specification of the target station, the execution type is set to "With arrival acknowledgment."		• Execute the function again after changing the execution type to "Without arrival acknowledgment."
D253H	A response timeout has occurred when the SEND/RECV function[1] was executed.		• Check the network status using the CC-Link IE TSN diagnostics, and take action. • Execute the function again after increasing the number of resends at the request source of the SEND/RECV function[1]. • Execute the instruction again after lowering the transient transmission usage frequency. • When "Dynamic Routing" under "Application Settings" is set to "Enable", check the 'Communication path determination status' (address 1260544 to 1260559 (133C00H to 133C0FH)) and check if communication to the target network number is possible. • Execute the SEND/RECV function[1] for a target station that supports the SEND/RECV instruction or SEND/RECV function. • For the RECV function[1], execute it again after correcting the own station storage channel. • For the RECV function[1], check that 'RECV execution request flag CH1' (SB0030) to 'RECV execution request flag CH8' (SB0037) are on. • Correct the network number, station number, or IP address for the target station. • Check if the connection cable is connected properly. • If the request destination is for another network, check if the device serving as the relay station supports the routing settings, and take corrective actions.
D254H	A SEND function which the target station does not support was executed.		• Change the target station at the station that executed the SEND function.
D255H	The setting data at the SEND/RECV function[1] is incorrect.	Target station number	• Execute the function again after correcting the target station number.
D256H	The setting data at the SEND/RECV function[1] is incorrect.	Execution or error completion type	• Execute the function again after correcting the execution or error completion type.
D258H	The control station does not exist when the SEND/RECV function[1] was executed to the specified control station or current control station.		• Execute the function again after correcting the target station number.
D25AH	The SEND/RECV function[1] 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.
D25BH			Change the channels used by own station or the target station storage channel.
D25DH	The transient data is incorrect.		Execute the function again after correcting the transient data at the transient request source.
D273H	The request data size of transient transmission is incorrect.		Execute the function again after correcting the request command at the transient request source.
D2D3H	Send processing of the transient transmission has failed.		• Check the network status using the CC-Link IE TSN diagnostics, 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 function again after correcting the target IP address of transient data. • When the access destination is a module with a different network number, check if "Routing Setting" is correctly set.
D602H	Parameter error		Write the parameter to the board again.
D605H			

Error code	Error details and cause		Corrective action
D60BH	Parameter error	Device overlap error (LB)	• Write the parameter to the board again. • Execute the function again after correcting the offset or size of the link device of the device station in the setting data.
D60CH		Device overlap error (LW)	
D60DH		Each station device range assignment error (LB) : Size	
D60EH		Each station device range assignment error (LB) : Offset	
D60FH		Each station device range assignment error (LW) : Size	
D610H		Each station device range assignment error (LW) : Offset	
D611H		Each station device range assignment error (RWw) : Size	
D612H		Each station device range assignment error (RWw) : Offset	
D613H		Each station device range assignment error (RWr) : Size	
D614H		Each station device range assignment error (RWr) : Offset	
D615H		Each station device range assignment error (RY) : Size	
D616H		Each station device range assignment error (RY) : Offset	
D617H		Each station device range assignment error (RX) : Size	
D618H		Each station device range assignment error (RX) : Offset	
D619H	Parameter error		Write the parameter to the board again.
D61AH			
D61BH	Parameter error	Device overlap error (RWw)	• Write the parameter to the board again. • Execute the function again after correcting the offset or size of the link device of the device station in the setting data.
D61CH		Device overlap error (RWr)	
D61DH		Device overlap error (RY)	
D61EH		Device overlap error (RX)	
D621H	Parameter error		Write the parameter to the board again.

Error code	Error details and cause		Corrective action
D622H	Parameter error	Error in the total number of linked stations	• Write the parameter to the board again. • Execute the function again after correcting the setting data.
D625H		Station-based block data assurance setting error	
D628H		Station type error	
D629H		Station number range error	
D62AH		Data link error station setting error	
D641H		IP address error	
D642H		Gateway address setting	
D643H		Communication Period Setting	
D644H		Cyclic transmission time setting	
D645H		Transient transmission time setting (Communication cycle setting or cyclic transmission time)	
D646H		Transmission path setting	
D647H		Time synchronization setting	
D649H		Send timeslot setting	
D64AH		Number of data link error detection	
D64BH		Number of occupied stations	
D64CH		Cyclic group setting	
D64EH		Motion control station setting	
D64FH		Cyclic frame cycle setting	
D651H		Number of modules	
D652H		Communication mode	
D653H		Transient transmission group setting	
D654H		Dynamic Routing	
D655H	Network addresses of the master station and device stations are incorrect.		Review the IP address setting of the master station or device station.
D657H	Parameter error	Station sub-ID	• Write the parameter to the board again.
D658H		Multidrop number	
D65AH		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 board again.
D65BH		CC-Link IE TSN Class Setting	• Write the parameter to the board again. • Execute the function again after correcting the setting data.
D65CH		TSN HUB Setting	
D65DH		Multiple Period Setting	
D65FH		Link points extended setting	
D720H	Link startup/stop direction is incorrect.		Check the setting, and stop or start data link.
D721H	Link start/stop was requested from another station during link start/stop processing.		Retry the operation after the stop or restart of data link is completed.
D722H	Link start/stop was requested from the own station during link start/stop processing.		
D723H	System link start/stop was requested during link start/stop processing.		
D724H	Link startup/stop station specification is incorrect.		Check the setting, and stop or start data link.
D725H	System link start/stop was requested from a local station.		A local station cannot start or stop data link of all or multiple stations. Perform these operations from the master station.
D727H	Link start was requested from a station other than the station which had requested link stop.		• Data link start was instructed from a station different from the one that had instructed the data link stop. Instruct data link start and data link stop from the same station. • The method of the data link start differs from that of the data link stop. Instruct the data link start using the same method as the data link stop. • Data link start has failed. Forcibly restart the data link.
D728H	Data link startup instruction was executed to the station which is performing data link.		Please give data link startup instructions to stations where data link is stopped.

12

Error code	Error details and cause		Corrective action
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 lowering the transient transmission usage frequency.
D841H	The request data size of memory read/write command is out of range.		Execute the function 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 function again after correcting the target network number at the transient request source. • Execute the function 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 parameters(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.
D843H	The board 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 function 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.
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 diagnostics, and take action. Then, retry the operation. • Execute the instruction again after lowering the transient transmission usage frequency. • Check if "Routing Setting" of the parameter is correctly set, and take action.
D906H	Transmission completion wait timeout has occurred in communication test.		• Check the network status using the CC-Link IE TSN diagnostics, and take action. Then, retry the operation. • Execute the instruction again after lowering the transient transmission usage frequency. • Check if "Routing Setting" of the parameter is correctly set, and take action.
D909H	The header information of transient transmission is incorrect.		Execute the function 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 diagnostics, 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 diagnostics, 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.
D90DH	An error was detected in the CC-Link IE TSN interface board.		Please contact your local Mitsubishi Electric sales office or representative.
D912H	Transient transmission sending failed.		• Execute the instruction again after lowering the transient transmission usage frequency. • Check if the switching hub and the cables are connected properly.
D913H to D917H	An error was detected in the CC-Link IE TSN interface board.		Please contact your local Mitsubishi Electric sales office or 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 details and cause	Corrective action
DA00H	An error was detected in the CC-Link IE TSN interface board.	Please contact your local Mitsubishi Electric sales office or representative.
DA10H to DA19H		
DA1BH	A SEND/RECV function[1] which the target station does not support was executed.	• Change the target station at the station that executed the SEND function[1]. • Correct the network number and station number/IP address of the target station of the SEND/RECV function[1].
DA1CH	The target station of the SEND function[1] does not exist.	If the target station of the SEND function[1] 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.	Execute the write instruction again after correcting the setting value.
DC01H	The setting value was not written correctly.	Execute the write instruction again.

*1 The following functions of the SEND/RECV function correspond to link dedicated instructions of a network module:
mdSendEx (SEND function)
mdReceiveEx (RECV function)
If a related error occurs in a system in which both a network module and a board are included, replace these functions with dedicated instructions to take corrective action depending on the situation.

Point

When errors which are not shown in the list occur, refer to the following:
📖MELSEC iQ-R CC-Link IE TSN User's Manual (Application)
📖MELSEC iQ-R Programmable Controller CPU Module User's Manual

If the problem persists, refer to the following:

12.5 List of Parameter Numbers

This section lists the parameter numbers displayed in the board 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 "Board Diagnostics" screen. (☞ Page 127 Error information)

Item			Parameter No.
Required Settings	Station Type	Station Type	7100H, 7700H
	Network No.	Network No.	7100H
	Station No./IP Address Setting	Station No.	Station No.	7100H
		IP Address	IP Address	A012H
			Subnet Mask	A012H
			Default Gateway	A013H
Basic Settings	Network Configuration Settings	Mode Setting	A100H
		Station No.	A104H
		Station Type	A104H
		Number of input/output bit points	RX Setting	■NZ81GN11-SX A10FH ■NZ81GN11-T2 A101H, A108H
			RY Setting	
		Number of input/output word points	RWw Setting	
			RWr Setting	
		—	LB Setting	
			LW Setting	
		IP Address	A105H
		Subnet Mask	A105H
		Default Gateway	A105H
		Reserved/Error Invalid Station	Reserved Station	A001H
			Error Invalid Station	A002H
		Communication Period Setting (NZ81GN11-SX only)	RX/RY/RWr/RWw	A10EH
			LB/LW	
		Communication Period Setting (NZ81GN11-T2 only)		A108H
		Station Information	Alias	A011H
			Comment	
			Station-specific mode setting	A106H
		CC-Link IE TSN Class	A104H
	Refresh Setting	Refresh Setting	7401H
	Network Topology	Network Topology	A100H
	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	■NZ81GN11-SX A10EH ■NZ81GN11-T2 A108H
			Low-Speed	■NZ81GN11-SX A10EH ■NZ81GN11-T2 A108H
	Connection Device Information	CC-Link IE TSN Class Setting	A100H
		TSN HUB Setting	A100H
	Device Station Setting	Disconnection Detection Setting	A100H

Item				Parameter No.
Application Settings	Communication Speed	Communication Speed		7100H
	Supplementary Cyclic Settings	Station-based Block Data Assurance		A100H
		I/O Maintenance Settings	Data Link Error Station Setting	A112H
	Link points extended setting	LB/LW Points Extended Setting		7100H
	Transient Transmission Group No.		Transient Transmission Group No.	A010H
	Communication Mode		Mode	A112H
	Parameter Name		Parameter Name	7310H, 7311H
	Event Reception from Other Stations		Event Reception from Other Stations	A016H
	Board Operation Mode		Board 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

12.6 Event List

Information such as errors detected by a board or those occurred on a network is saved to a personal computer. (☞ Page 104 Event history function)

When an event occurs, the event code and the descriptions of the event can be displayed in the CC IE TSN utility.

This section lists the events that occur in CC-Link IE TSN. There are three types: system, security, and operation.

The event history list is displayed by clicking the [Event History] button in the [Error Information] tab in the "Board Diagnostics" screen. (☞ Page 128 Event history)

> **Point**
>
> For details on events occurred on each CPU module, refer to the manual for each module.

System

Event code	Overview	Cause
00100	Link-up	Link-up has occurred when an external device was connected.
00141	Failed to time setting to the PC	Time setting to the PC failed.
00175	Co-recording trigger sending/receiving	The co-recording trigger received from another station has been sent to the network.
00406	Device station time synchronization completion	The device station time synchronization has completed.
00407	Grandmaster station selection (CC-Link IE TSN device)	The CC-Link IE TSN device was selected as the grandmaster.
00408	Grandmaster station selection (general-purpose device)	The general-purpose device was selected as the grandmaster.
00409	Own station time synchronization completed	The own station time synchronization has completed.
00420	Event history file generation	An event history file has been generated.
00421	Event history save limit	Limited event history saving from boards.
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	Connect the CC-Link IE TSN tool.	The CC-Link IE TSN tool was connected.
0050B	Disconnect the CC-Link IE TSN tool.	The CC-Link IE TSN tool was disconnected.
00510	Own station: Data link restart (cyclic transmission started)	Data link of the own station was restarted.
00511	Another station: Data link restart (cyclic transmission started)	Data link of another station was restarted.
00512	All stations data link normalization (cyclic transmission in all stations started)	Data link was 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.
00540	Loopback resolution	Loopback execution status was resolved when using a ring topology (using the loopback function).
00542	Own station: Receive frame error line status caution level	A receive frame error (line status: caution level) has occurred.
00800	Link-down	Link-down occurred when an external device was disconnected.
00906	Alive check error	The alive status of an external device could not be checked within the period specified by the response monitoring timer.
00907	Divided messages receive timeout error	• Sufficient data for the data length could not be received. • Could not receive the rest of the divided message.
00908	IP composition timeout error	• Because transient transmission load is high or transient transmission time is not enough long, an IP composition timeout error has occurred. (The remaining part of the divided data could not be received and a timeout has occurred.) • IP communication load is high.
00909	TCP-specified port number error	A port number being used for opened connection was set (for TCP/IP).
0090A	UDP-specified port number error	A port number being used for opened connection was 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 response from/to another station	• An abnormal response was returned from another station when accessing another station. • An abnormal response was returned to another station when accessed from another station.
00C10	Own station: Data link stop (cyclic transmission stopped)	Data link of the own station was stopped.
00C11	Another station: Data link stop (cyclic transmission stopped)	Data link of another station was stopped.
00C21	Another station: Error occurrence	An error has occurred in another station.
00C23	Loopback occurrent	Route switching occurred during ring connection (using the loopback function).
00C54	Initialization failed	A communication error occurred in the initialization processing when control communications are started.
00C55	Message disposal	The request was discarded because other requests were too many to process.
00C56	Response timeout	There was no response from the target device, and a timeout occurred.
00C57	Message disposal	After the response timed out, the target device responded.
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 from target device to not opened port number.
00C5A	Specification IP address error	Sent to target device with an error in setting of "IP Address" of device stations in "Network Configuration Settings" of "Basic Settings" of master station.
00C5B	Connection establishment failed	A connection could not be established in the open processing.
00C5C	TCP connection timeout	In TCP / IP communication, Ack is not returned from the target device.
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	Failed to send by UDP / IP due to any of the following factors. • An error occurs in the external device. • Failures of switching hubs and cables occur. • Congestion of packets on the line
00C5F	TCP/IP send failed	Failed to send by TCP / IP due to any of the following factors. • An error occurs in the external device. • Failures of switching hubs and cables 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.
00C61	Time synchronization loss	The time difference between the time notified from the grandmaster station 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 as the grandmaster station is disconnected, and then the CC-Link IE TSN device was newly selected as the grandmaster station.
00C64	Grandmaster switching (general-purpose device)	The device as the grandmaster station is disconnected, and then the general-purpose device was newly selected as the grandmaster station.
00C65	Time synchronization reception processing failure	Time synchronization reception processing failed.
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 device station to the latest version.
00C75	Another station: Parameter error occurrence	A parameter error has occurred in another station.
00C80	Detected device stations unsupported the CC-Link IE TSN protocol version 2.0	Detected device stations that does not support the CC-Link IE TSN protocol version 2.0.
00C81	CC-Link IE TSN class setting mismatch	A mismatch between the parameter of the master station and CC-Link IE TSN Class setting of device station was detected.

Security

Event code	Overview	Cause
10300	Access from IP address restricted with IP filter setting	Accessed from IP address restricted with the IP filter setting.

Operation

Event code	Overview	Cause
20200	Event history clear	The event history was cleared.
24100	Own station: Parameter change/new parameter reception	Parameter was changed. Or new parameter was received at power-on.
24F00	Another station: CPU operating status change detection	Operating status of the CPU module on another station was changed.
24F03	Firmware update successful	The firmware update was completed successfully.
24F04	Firmware update failed	The firmware update failed.

APPENDIX

Appendix 1 External Dimensions

The following figures show the external dimensions of each board.

NZ81GN11-SX

Standard size

(Unit: mm)

Low profile size

176

181

5

n 3.2

5

56.1

68.8

80

18.5

PI

P2

CC-LinkIE
TSN Class B
BD80C813052

(Unit: mm)

NZ81GN11-T2

Standard size

(Unit: mm)

A

Low profile size

(Unit: mm)
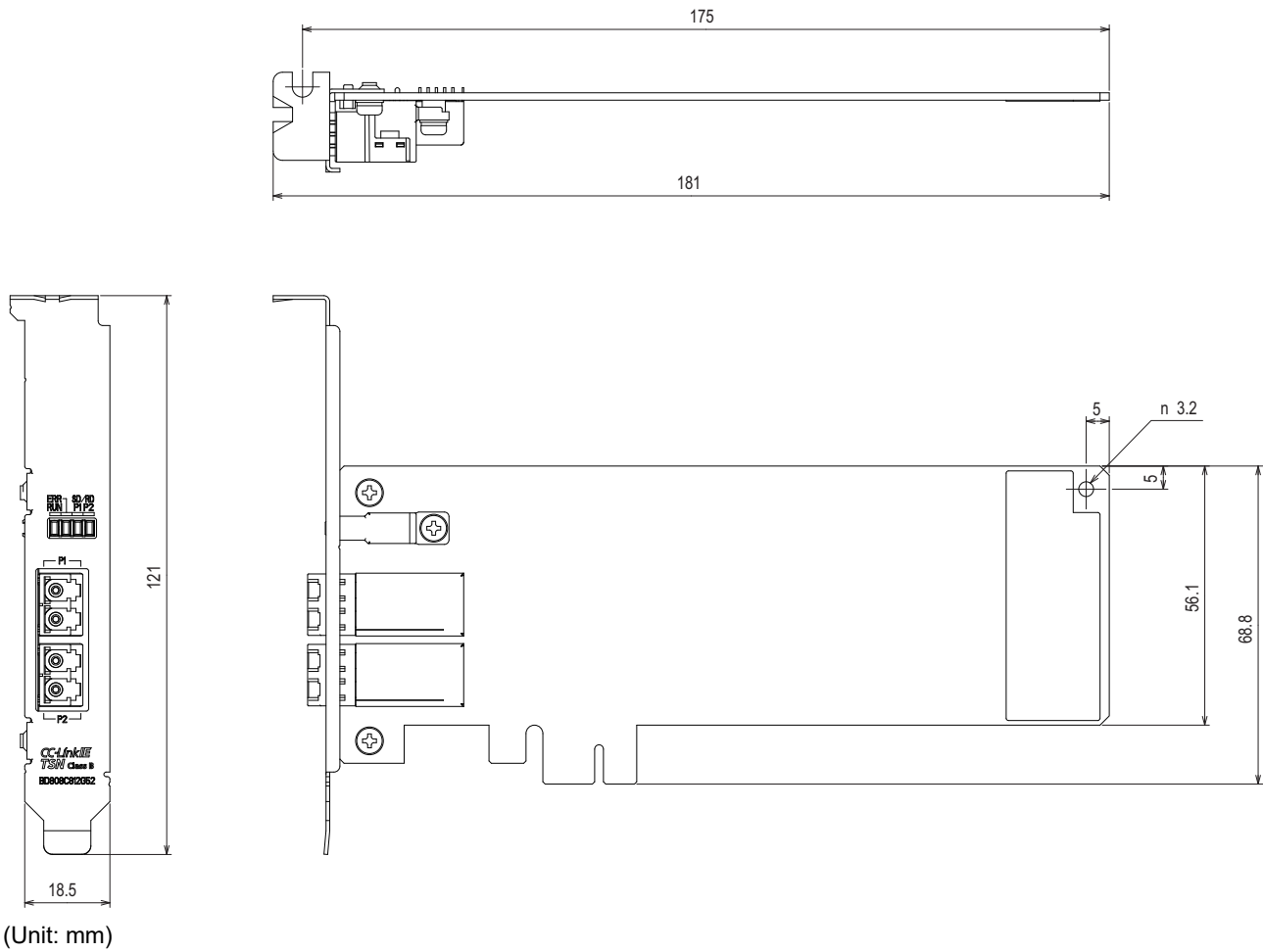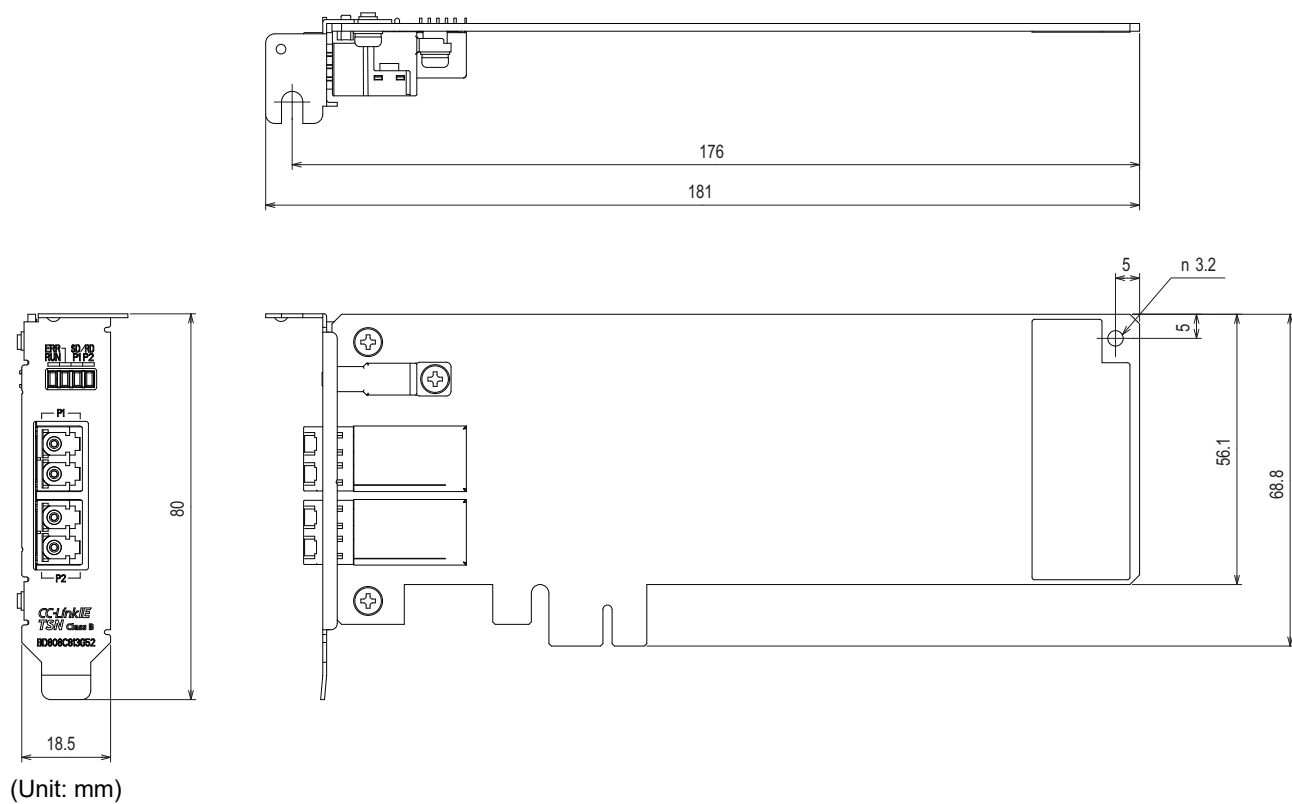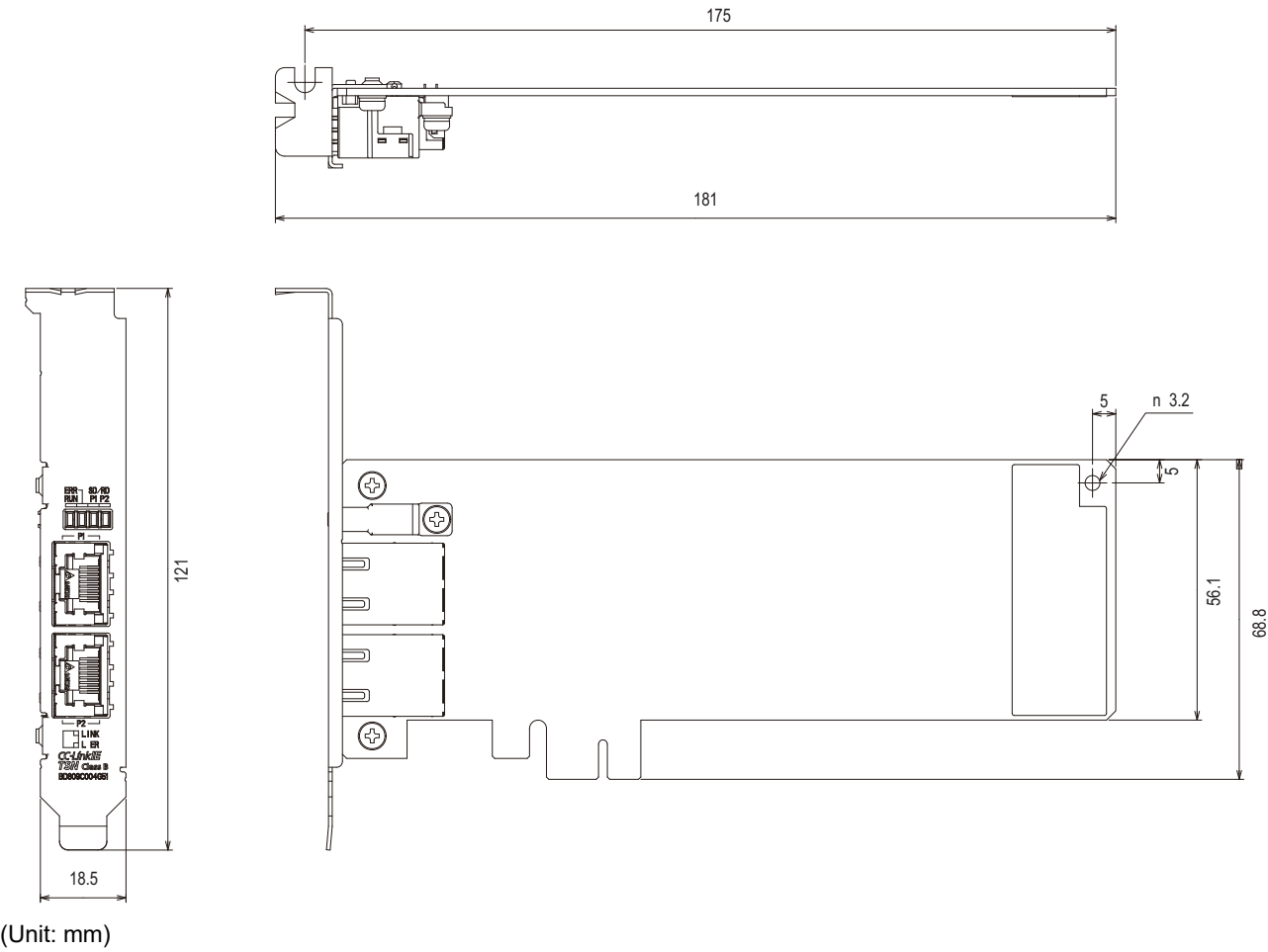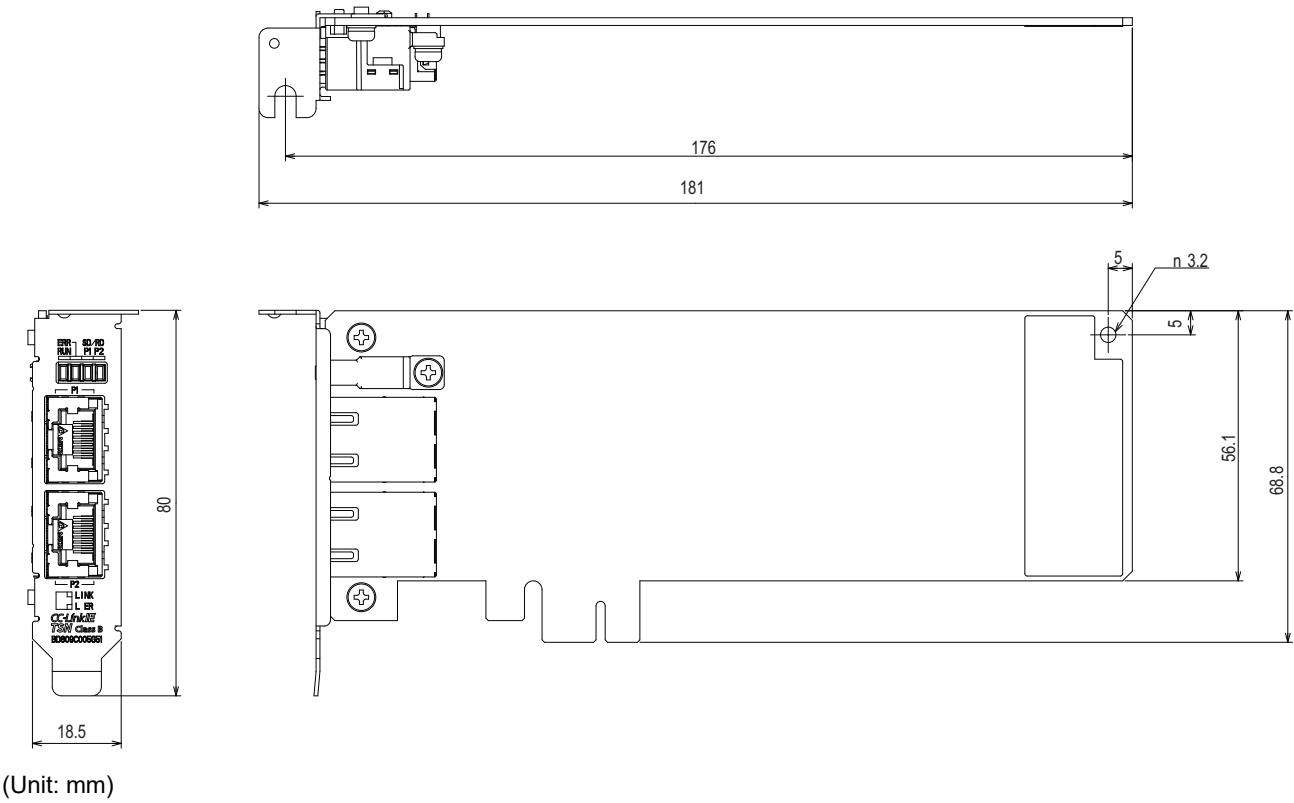
Appendix 2 Checking Production Information and Firmware Version

This section explains the methods for checking the production information and firmware version.

Checking in the rating plate

The production information (16 digits) and firmware version can be checked on the SERIAL field of rating plate.

Checking in the utility

The production information (16 digits) and firmware version are displayed in the following screens of the CC IE TSN utility.
- "Board Diagnostics" screen (☞ Page 125 Board diagnostics)
- "Station Information List" screen (☞ Page 142 Station information list)

> **Point**
>
> The firmware version can be changed in the CC IE TSN utility.
> ☞ Page 296 Firmware update

Appendix 3 EMC and Low Voltage Directives

In each country, laws and regulations concerning electromagnetic compatibility (EMC) and electrical safety are enacted.

For the products sold in the European countries, compliance with the EU's EMC Directive has been a legal obligation as EMC regulation since 1996, as well as the EU's Low Voltage Directive as electrical safety regulation since 1997.

Manufacturers who recognize their products are compliant with the EMC and Low Voltage Directives are required to attach a "CE marking" on their products in European countries.

In some other countries and regions, manufacturers are required to make their products compliant with applicable laws or regulations and attach a certification mark on the products as well (such as UK Conformity Assessed (UKCA) marking in the UK, and Korea Certification (KC) marking in South Korea).

Each country works to make their regulatory requirements consistent across countries based on international standards. When the requirements are consistent, measures to comply with the EMC and electrical safety regulations become common across countries.

The UK and South Korea have enacted EMC regulations whose requirements are consistent with those of the EMC Directive. The UK has also enacted electrical safety regulations whose requirements are consistent with those of the Low Voltage Directive. In this section, the requirements of the EMC and Low Voltage Directives are described as examples of those of the EMC and electrical safety regulations.

Measures to comply with the EMC Directive

The EMC Directive sets requirements for emission (conducted and radiated electromagnetic interference emitted by a product) and immunity (the ability of a product not to be influenced by externally generated electromagnetic interference). This section describes the precautions for machinery constructed with this product to comply with the EMC Directive. These precautions are based on the requirements of the EMC Directive and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the EMC Directive. The manufacturer of the machinery must determine the testing method for compliance and declare conformity to the EMC Directive.

EMC Directive related standards

All tests were conducted with this product installed in a personal computer with a CE mark.

■Emission requirements
Standard: EN61131-2:2007

Test item	Test description	Value specified in standard[1]
CISPR16-2-3 Radiated emission	The electromagnetic wave emitted by the product to the external space is measured.	• 30 to 230 MHz QP: 40 dBμV/m (measured at 10 m distance) • 230 to 1000 MHz QP: 47 dBμV/m (measured at 10 m distance)
CISPR16-2-1, CISPR16-1-2 Conducted emission	The noise level which the product emits to the power line is measured.	• 0.15 to 0.5 MHz QP: 79 dB, Mean: 66 dB • 0.5 to 30 MHz QP: 73 dB, Mean: 60 dB

*1   QP: Quasi-Peak value, Mean: Average value

■Immunity requirements
Standard: EN61131-2:2007

Test item	Test description	Value specified in standard
EN61000-4-2 Electrostatic discharge immunity	An electrostatic discharge is applied to the enclosure of the equipment.	• 8 kV Air discharge • 4 kV Contact discharge
EN61000-4-3 Radiated, radio-frequency, electromagnetic field immunity	An electric field is radiated to the product.	80% AM modulation @1 kHz • 80 to 1000 MHz: 10 V/m • 1.4 to 2.0 GHz: 3 V/m • 2.0 to 2.7 GHz: 1 V/m
EN61000-4-4 Fast transient/burst immunity	Burst noise is applied to power lines and signal lines.	• AC/DC power, I/O power, and AC I/O (unshielded) lines: 2 kV • DC I/O, analog, and communication lines: 1 kV
EN61000-4-5 Surge immunity	Lightning surge is applied to power lines and signal lines.	• AC power, AC I/O power, and AC I/O (unshielded) lines: 2 kV CM, 1 kV DM • DC power and DC I/O power lines: 0.5 kV CM, DM • DC I/O, AC I/O (shielded), analog, and communication lines: 1 kV CM

Test item	Test description	Value specified in standard
EN61000-4-6 Conducted RF immunity	High-frequency noise is applied to power lines and signal lines.	0.15 to 80 MHz 80% AM modulation @1 kHz, 10 Vrms
EN61000-4-8 Power-frequency magnetic field immunity	The product is immersed in the magnetic field of an induction coil.	50 Hz/60 Hz, 30 A/m
EN61000-4-11 Voltage dips and interruptions immunity	Power voltage is momentarily interrupted.	• 0%, 0.5 periods, starting at zerocrossing • 0%, 250/300 periods (50/60 Hz) • 40%, 10/12 periods (50/60 Hz) • 70%, 25/30 periods (50/60 Hz)

Installation in a control panel

This ensures safety as well as effective shielding of electromagnetic noise emitted from a personal computer.

■Control panel

- Use a conductive control panel.
- Mask off an area used for grounding when securing the top or bottom plate to the control panel using bolts.
- To ensure electrical contact between inner plates and the control panel, mask off the bolt installation areas of each inner plate so that conductivity can be ensured in the largest area.
- Ground the control panel with a thick ground cable so that low impedance can be ensured even at high frequencies.
- Keep the diameter of the holes on the control panel to 10cm or less. If the diameter is larger than 10cm, electromagnetic wave may leak. In addition, because electromagnetic wave leaks through a clearance between the control panel and its door, reduce the clearance as much as possible. Use of EMI gaskets (sealing the clearance) can suppress undesired radiated emissions.

■Power cable and ground cable

Do not use the ground cable of a power cable and the ground point for a personal computer simultaneously.

When using the ground point for a personal computer, perform the grounding as follows:

- Provide a ground point to the control panel near the power of a personal computer. Ground the FG terminal of the personal computer to the ground point with the thickest and shortest ground cable possible (a thickness at least 2 mm^2, a length of 30 cm or shorter).
- Twist the ground cable extended from the ground point with the power cable so that larger amount of noise generated from the power cable is absorbed to the ground. Note that if a noise filter is attached to the power cable, twisting may not be required.

■Noise filter (power supply line filter)

A noise filter is effective for reducing conducted noise in the 10 MHz or less frequency band. (Use of a noise filter can suppress noise.)

The following are the installation precautions.

- Do not bundle the cables on the input side and output side of the noise filter. If bundled, the noise on the output side is induced into the filtered cable on the input side.
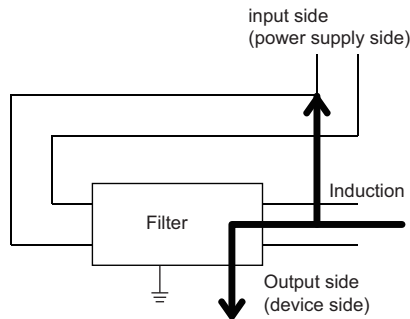
• Problematic example
Noise is induced when the input and output cables are bundled.
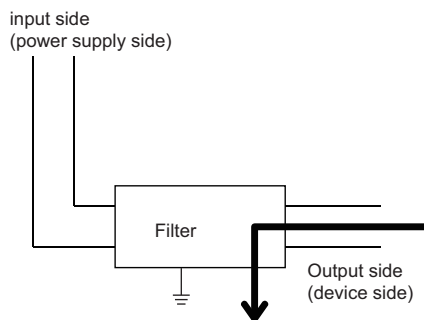
• Modification example
Install the input and output cables separately.

- Ground the ground terminal of the noise filter to the ground point of the control panel with the shortest cable possible (approximately 10 cm).

For NZ81GN11-T2

Use a shielded cable for a cable extended out of the control panel.

If a shielded cable is not used or not grounded correctly, the noise immunity will not meet the required value.

■CC-Link IE TSN Ethernet cables

The precautions for using Ethernet cables for CC-Link IE TSN are described below.

- Use a cable recommended by CC-Link Partner Association.
- The cable is shielded. Strip a part of the jacket as shown below and ground the exposed shield to the largest area.
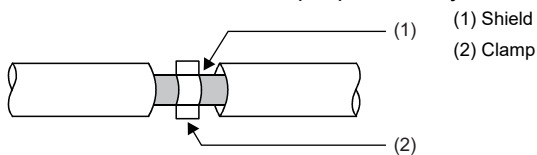
(1) Shield
(2) Clamp

■Grounding a shielded cable

Ground the shield of a shielded cable as close to the exit from the control panel as possible.

Otherwise, the cable after the ground point will cause electromagnetic induction, and will generate a higher frequency noise. Ground the exposed shield to a large area on the control panel.

A clamp can be used as shown below. In this case, mask off the inner wall surface of the control panel, which comes in contact with the clamp.

(1) Paint mask
(2) Clamp
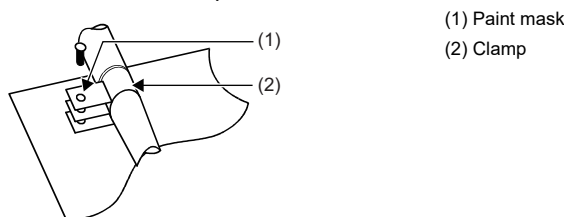
> **Point**
>
> Do not use the tip of a PVC wire soldered onto a shield of the shielded cable for grounding. Doing so will raise the high-frequency impedance, resulting in loss of the shielding effect.
>
>
>
> Shielded cable
> PVC wire
> Solderless terminal
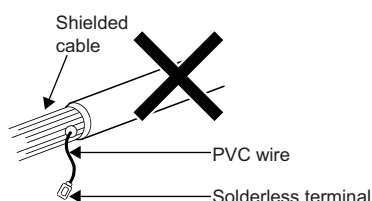
■Grounding cables with a cable clamp

Use shielded cables for external wiring and ground the shields of the shielded cables to the control panel with an AD75CK cable clamp (manufactured by Mitsubishi Electric). Ground the shields within 20 to 30 cm from the module.

Board
Inside the control panel
20 to 30cm
AD75CK
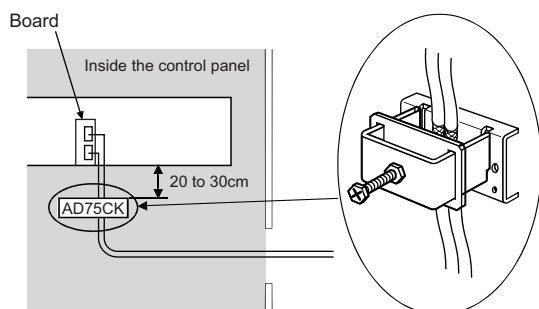
For details on the AD75CK, refer to the following:
📖AD75CK-type Cable Clamping Instruction Manual

Measures to comply with the Low Voltage Directive

This board is out of the requirement for conformance to the Low Voltage Directive, since it does not use the power supply in the range of 50 to 1000 VAC and 75 to 1500 VDC.

Appendix 4   Buffer Memory

The buffer memory is used to store setting values and monitor values related to the functions of this product.

The values in the buffer memory return to their defaults (initial values) when powering OFF the personal computer or resetting the board.

Buffer memory lists

The following shows the buffer memory lists.

Point
- Do not write data to the system areas. Doing so may cause malfunction of this product.
- If the value in an area of one word in size becomes equal to or higher than 65536, the count stops at 65535 (FFFFH).

CC-Link IE TSN information

Values related to CC-Link IE TSN are stored.

Some areas cannot be used depending on the setting for a station and the board type.

The following characters in the table indicate the station types and mode settings.
- M: Master station
- L (uni): Local station (unicast)
- L (mul): Local station (multicast)

The following characters in the table indicate the board types.
- SX: NZ81GN11-SX
- T2: NZ81GN11-T2

○: Supported, —: Not supported

P1, P2		Name		Initial value			Read, write	Board	
Address (decimal)	Address (hexadecimal)			M	L (uni)	L (mul)		SX	T2
0 to 57343	0H 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 98561	18100H to 18101H	Link points extended device area	Start offset of extended RX	18200	—	18200	Read	○	—
98562 to 98563	18102H to 18103H		Extended RX size	400	—	400	Read		
98564 to 98565	18104H to 18105H		Start offset of extended RY	18600	—	18600	Read		
98566 to 98567	18106H to 18107H		Extended RY size	400	—	400	Read		
98568 to 98569	18108H to 18109H		Start offset of extended RWw	18A00	—	18A00	Read		
98570 to 98571	1810AH to 1810BH		Extended RWw size	2000	—	2000	Read		
98572 to 98573	1810CH to 1810DH		Start offset of extended RWr	1AA00	—	1AA00	Read		
98574 to 98575	1810EH to 1810FH		Extended RWr size	2000	—	2000	Read		
98576 to 98577	18110H to 18111H		Start offset of extended LW	1CA00	—	1CA00	Read		
98578 to 98579	18112H to 18113H		Extended LW size	80000	—	80000	Read		
98580 to 98581	18114H to 18115H		Start offset of extended LB	9CA00	—	9CA00	Read		
98582 to 98583	18116H to 18117H		Extended LB size	2000	—	2000	Read		
98584 to 98815	18100H to 181FFH		System area						
98816 to 649727	18200H to 9E9FFH		Extended device area (RX/RY/RWw/RWr/LW/LB)	0	—	0	Read, write		

P1, P2 Address (decimal)	Address (hexadecimal)	Name		Initial value M	L (uni)	L (mul)	Read, write	Board SX	T2
649728 to 1245439	9EA00H 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 the 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						
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						

A

P1, P2		Name		Initial value			Read, write	Board	
Address (decimal)	Address (hexadecimal)			M	L (uni)	L (mul)		SX	T2
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 1252095	1317E4H 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	5	Read		
1252099	131B03H		Model code (upper 2 bytes)	1	1	5			
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)	0					
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	○	○

P1, P2 Address (decimal)	Address (hexadecimal)	Name		Initial value M	L (uni)	L (mul)	Read, write	Board SX	T2
1260560 to 1275135	133C10H to 1374FFH	System area							
1275136	137500H	Time distribution interval setting of the personal computer		0	—	—	Read, write	○	○
1275137	137501H	Time reflection setting to the personal computer		—	0	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							
1275933	13781DH	Time synchronizati on 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 1277441	137820H to 137E01H	System area							
1277442	137E02H	Cyclic data send/receive assurance information	Multiple period setting (low speed)	0	—	—	Read	—	○
1277443	137E03H		Communication cycle interval (calculation value)	0	—	—	Read		
1277444	137E04H	Communicati on period 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 Communicati on Software information (1st)	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						

P1, P2		Name		Initial value			Read, write	Board	
Address (decimal)	Address (hexadecimal)			M	L (uni)	L (mul)		SX	T2
1277480	137E28H	CC-Link IE TSN Communication Software information (2nd)	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 1294015	137E40H 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 implementation 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 linked station cyclic transmission	Timeslot for station number 1 cyclic transmission	0	—	—	Read	—	○
⋮			⋮		—	—			
1294167	13BF57H		Timeslot for station number 120 cyclic transmission	0	—	—	Read		
1294168 to 1294303	13BF58H to 13BFDFH	System area							
1294304	13BFE0H	Linked station cyclic transmission information	CC-Link IE TSN Class A (low speed) multiple	0	—	—	Read	—	○
1294305 to 2097151	13BFE1H to 1FFFFFH	System area							

Buffer memory details

Link device area

The RX, RY, RWw, RWr, LB, LW, SB, and SW values are stored.

■Remote input (RX) (address 57344 to 58367 (E000H to E3FFH))

The RX value is stored. The RX start number and number of points for each station number can be checked in 'RX offset/size information' (address 1245696 to 1246179 (130200H to 1303E3H)). (☞ Page 252 RX offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
57344	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
⋮																
58367	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

Each bit corresponds to 1 bit of RX.

■Remote output (RY) (address 58368 to 59391 (E400H to E7FFH))

The RY value is stored. The RY start number and number of points for each station number can be checked in 'RY offset/size information' (address 1246720 to 1247203 (130600H to 1307E3H)). (☞ Page 253 RY offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
58368	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
⋮																
59391	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

Each bit corresponds to 1 bit of RY.

■Remote register (RWw) (address 59392 to 67583 (E800H to 107FFH))

The RWw value is stored. The RWw start number and number of points for each station number can be checked in 'RWw offset/size information' (address 1247744 to 1248227 (130A00H to 130BE3H)). (☞ Page 253 RWw offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
59392	RWw0															
59393	RWw1															
⋮																
67583	RWw1FFF															

■Remote register (RWr) (address 67584 to 75775 (10800H to 127FFH))

The RWr value is stored. The RWr start number and number of points for each station number can be checked in 'RWr offset/size information' (address 1248768 to 1249251 (130E00H to 130FE3H)). (☞ Page 254 RWr offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
67584	RWr0															
67585	RWr1															
⋮																
75775	RWr1FFF															

■Link register (LW) (address 75776 to 92159 (12800H to 167FFH))

The LW value is stored. The LW start number and number of points for each station number can be checked in 'LW offset/size information' (address 1250816 to 1251299 (131600H to 1317E3H)). (☞ Page 255 LW offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
75776	LW0															
75777	LW1															
⋮																
92159	LW3FFF															

■Link relay (LB) (address 92160 to 94207 (16800H to 16FFFH))

The LB value is stored. The LB start number and number of points for each station number can be checked in 'LB offset/size information' (address 1249792 to 1250275 (131200H to 1313E3H)). (☞ Page 254 LB offset/size information)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
92160	LBF	LBE	LBD	LBC	LBB	LBA	LB9	LB8	LB7	LB6	LB5	LB4	LB3	LB2	LB1	LB0
92161	LB1F	LB1E	LB1D	LB1C	LB1B	LB1A	LB19	LB18	LB17	LB16	LB15	LB14	LB13	LB12	LB11	LB10
⋮																
94207	LB7F FF	LB7F FE	LB7F FD	LB7F FC	LB7F FB	LB7F FA	LB7F F9	LB7F F8	LB7F F7	LB7F F6	LB7F F5	LB7F F4	LB7F F3	LB7F F2	LB7F F1	LB7F F0

■Link special relay (SB) (address 94208 to 94463 (17000H to 170FFH))

The SB value is stored.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
94208	SBF	SBE	SBD	SBC	SBB	SBA	SB9	SB8	SB7	SB6	SB5	SB4	SB3	SB2	SB1	SB0
⋮																
94463	SB1F F	SB1F E	SB1F D	SB1F C	SB1F B	SB1F A	SB1F 9	SB1F 8	SB1F 7	SB1F 6	SB1F 5	SB1F 4	SB1F 3	SB1F 2	SB1F 1	SB1F 0

Each bit corresponds to 1 bit of SB.

■Link special register (SW) (address 94464 to 98559 (17100H to 180FFH))

The SW value is stored.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
94464	SW0															
94465	SW1															
⋮																
98559	SW1FFF															

Link points extended device area

If not extending the number of link points, the value is '0' and this area is disabled. Use the link device area. (Link device area)

■Start offset and size of a link device when extending the number of link points (address 98560 to 98583 (18100H to 18117H))

The start offsets and sizes of RX, RY, RWw, RWr, LB, and LW when setting "LB/LW Points Extended Setting" under "Application Settings" to "Extend" are stored.

Address (decimal)	Address (hexadecimal)	Description
98560 to 98561	18100H to 18101H	Start offset of RX when extending the number of link points
98562 to 98563	18102H to 18103H	RX size when extending the number of link points (in word units)
98564 to 98565	18104H to 18105H	Start offset of RY when extending the number of link points
98566 to 98567	18106H to 18107H	RY size when extending the number of link points (in word units)
98568 to 98569	18108H to 18109H	Start offset of RWw when extending the number of link points
98570 to 98571	1810AH to 1810BH	RWw size when extending the number of link points (in word units)
98572 to 98573	1810CH to 1810DH	Start offset of RWr when extending the number of link points
98574 to 98575	1810EH to 1810FH	RWr size when extending the number of link points (in word units)
98576 to 98577	18110H to 18111H	Start offset of LW when extending the number of link points
98578 to 98579	18112H to 18113H	LW size when extending the number of link points (in word units)
98580 to 98581	18114H to 18115H	Start offset of LB when extending the number of link points
98582 to 98583	18116H to 18117H	LB size when extending the number of link points (in word units)

■Link device area when extending the number of link points (address 98816 to 649727 (18200H to 9E9FFH))

Values of RX, RY, RWw, RWr, LB, and LW when setting "LB/LW Points Extended Setting" under "Application Settings" to "Extend" are stored.

For the start offset and size of each link device, reference the start offset and size of a link device of 'Link points extended device area' (address 98560 to 98583 (18100H to 18117H)).

Address (decimal)	Address (hexadecimal)	Description
98816 to 649727	18200H to 9E9FFH	Values of RX, RY, RWw, RWr, LB, and LW when extending the number of link points

Timeslot information

■Timeslot 0 information (address 1245440 to 1245455 (130100H to 13010FH))

Cycle start offset (ns, s unit) and cycle end offset (ns, s unit) or other information on timeslot 0 are stored.

Address (decimal)	Address (hexadecimal)	Name	Description
1245440 to 1245441	130100H to 130101H	Cycle start offset (ns unit)	The ns digits of cycle start offset are stored. Storage range: 0 to 999999999 (ns)
1245442	130102H	Cycle start offset (s unit)	The s digits of cycle start offset are stored. Storage range: 0 to 65535 (s)
1245443	130103H	System area	
1245444 to 1245445	130104H to 130105H	Cycle end offset (ns unit)	The ns digits of cycle end offset are stored. Storage range: 0 to 999999999 (ns)
1245446	130106H	Cycle end offset (s unit)	The s digits of cycle end offset are stored. Storage range: 0 to 65535 (s)
1245447 to 1245451	130107H to 13010BH	System area	
1245452	13010CH	VID (VLAN Identifier)	The VID of timeslot 0 is stored. Storage range: 1 to 4094, 65535 (do not use VID or judge frames to be relayed from VID)
1245453	13010DH	PCP (Priority Code Point)	The PCP of timeslot 0 is stored. Storage range: 0 to 7, 65535 (do not use PCP or judge frames to be relayed from PCP)
1245454	13010EH	EtherType	The EtherType of the frame to be relayed in timeslot 0 is stored. 65535 is stored in timeslot 0. Storage range: EtherType value of the frame to be relayed, 65535 (do not judge frames to be relayed from EtherType)
1245455	13010FH	System area	

■Timeslot 1 to 7 information (address 1245456 to 1245567 (130110H to 13017FH))

Timeslot 1 to 7 information is stored in the same order as the timeslot 0 information.

RX offset/size information

■RX offset/size information (address 1245696 to 1246179 (130200H to 1303E3H))

The start number and the number of points of RX for each station number are stored.

Address (decimal)	Address (hexadecimal)	Description
1245696 to 1245697	130200H to 130201H	Station No.0 offset
1245698 to 1245699	130202H to 130203H	Station No.0 size (in word units)
1245700 to 1245701	130204H to 130205H	Station No.1 offset
1245702 to 1245703	130206H to 130207H	Station No.1 size (in word units)
⋮		
1246176 to 1246177	1303E0H to 1303E1H	Station No.120 offset
1246178 to 1246179	1303E2H to 1303E3H	Station No.120 size (in word units)

The offset and size of buffer memory address for each station number can be calculated using the following formulas:

- Offset of buffer memory address = 1245696 + (station number) × 4
- Size of buffer memory address = 1245698 + (station number) × 4

RY offset/size information

■RY offset/size information (address 1246720 to 1247203 (130600H to 1307E3H))

The start number and the number of points of RY for each station number are stored.

Address (decimal)	Address (hexadecimal)	Description
1246720 to 1246721	130600H to 130601H	Station No.0 offset
1246722 to 1246723	130602H to 130603H	Station No.0 size (in word units)
1246724 to 1246725	130604H to 130605H	Station No.1 offset
1246726 to 1246727	130606H to 130607H	Station No.1 size (in word units)
⋮		
1247200 to 1247201	1307E0H to 1307E1H	Station No.120 offset
1247202 to 1247203	1307E2H to 1307E3H	Station No.120 size (in word units)

The offset and size of buffer memory address for each station number can be calculated using the following formulas:

- Offset of buffer memory address = 1246720 + (station number) × 4
- Size of buffer memory address = 1246722 + (station number) × 4

RWw offset/size information

■RWw offset/size information (address 1247744 to 1248227 (130A00H to 130BE3H))

The start number and the number of points of RWw for each station number are stored.

Address (decimal)	Address (hexadecimal)	Description
1247744 to 1247745	130A00H to 130A01H	Station No.0 offset
1247746 to 1247747	130A02H to 130A03H	Station No.0 size (in word units)
1247748 to 1247749	130A04H to 130A05H	Station No.1 offset
1247750 to 1247751	130A06H to 130A07H	Station No.1 size (in word units)
⋮		
1248224 to 1248225	130BE0H to 130BE1H	Station No.120 offset
1248226 to 1248227	130BE2H to 130BE3H	Station No.120 size (in word units)

The offset and size of buffer memory address for each station number can be calculated using the following formulas:

- Offset of buffer memory address = 1247744 + (station number) × 4
- Size of buffer memory address = 1247746 + (station number) × 4

A

RWr offset/size information

■RWr offset/size information (address 1248768 to 1249251 (130E00H to 130FE3H))

The start number and the number of points of RWr for each station number are stored.

Address (decimal)	Address (hexadecimal)	Description
1248768 to 1248769	130E00H to 130E01H	Station No.0 offset
1248770 to 1248771	130E02H to 130E03H	Station No.0 size (in word units)
1248772 to 1248773	130E04H to 130E05H	Station No.1 offset
1248774 to 1248775	130E06H to 130E07H	Station No.1 size (in word units)
⋮		
1249248 to 1249249	130FE0H to 130FE1H	Station No.120 offset
1249250 to 1249251	130FE2H to 130FE3H	Station No.120 size (in word units)

The offset and size of buffer memory address for each station number can be calculated using the following formulas:

- Offset of buffer memory address = 1248768 + (station number) × 4
- Size of buffer memory address = 1248770 + (station number) × 4

LB offset/size information

■LB offset/size information (address 1249792 to 1250275 (131200H to 1313E3H))

The start number and the number of points of LB for each station number are stored.

Address (decimal)	Address (hexadecimal)	Description
1249792 to 1249793	131200H to 131201H	Station No.0 offset
1249794 to 1249795	131202H to 131203H	Station No.0 size (in word units)
1249796 to 1249797	131204H to 131205H	Station No.1 offset
1249798 to 1249799	131206H to 131207H	Station No.1 size (in word units)
⋮		
1250272 to 1250273	1313E0H to 1313E1H	Station No.120 offset
1250274 to 1250275	1313E2H to 1313E3H	Station No.120 size (in word units)

The offset and size of buffer memory address for each station number can be calculated using the following formulas:

- Offset of buffer memory address = 1249792 + (station number) × 4
- Size of buffer memory address = 1249794 + (station number) × 4

LW offset/size information

■LW offset/size information (address 1250816 to 1251299 (131600H to 1317E3H))

The start number and the number of points of LW for each station number are stored.

Address (decimal)	Address (hexadecimal)	Description
1250816 to 1250817	131600H to 131601H	Station No.0 offset
1250818 to 1250819	131602H to 131603H	Station No.0 size (in word units)
1250820 to 1250821	131604H to 131605H	Station No.1 offset
1250822 to 1250823	131606H to 131607H	Station No.1 size (in word units)
⋮		
1251296 to 1251297	1317E0H to 1317E1H	Station No.120 offset
1251298 to 1251299	1317E2H to 1317E3H	Station No.120 size (in word units)

The offset and size of buffer memory address for each station number can be calculated using the following formulas:
- Offset of buffer memory address = 1250816 + (station number) × 4
- Size of buffer memory address = 1250818 + (station number) × 4

Own station information

The information of the own station on the network is stored.

■Own station (network card) information (address 1252096 to 1252103 (131B00H to 131B07H))

Address (decimal)	Address (hexadecimal)	Name	Description
1252096	131B00H	Manufacturer code	The information of the own station is stored. (Also used in the CLPA conformance test.) (Updated even if set as an error invalid station.) (Updated even if set as a reserved station.)
1252097	131B01H	Model type	
1252098	131B02H	Model code (lower 2 bytes)	
1252099	131B03H	Model code (upper 2 bytes)	
1252100	131B04H	Version	
1252101 to 1252103	131B05H to 131B07H	MAC address	The MAC address of the own station is stored. 1252101: 5th and 6th bytes of the MAC address 1252102: 3rd and 4th bytes of the MAC address 1252103: 1st and 2nd bytes of the MAC address

■Own station (controller) information (address 1252104 to 1252121 (131B08H to 131B19H))

Address (decimal)	Address (hexadecimal)	Name	Description
1252104	131B08H	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
1252105	131B09H	Manufacturer code	The information of the own station is stored.
1252106	131B0AH	Model type	
1252107	131B0BH	Model code (lower 2 bytes)	
1252108	131B0CH	Model code (upper 2 bytes)	
1252109	131B0DH	Version	
1252110 to 1252119	131B0EH to 131B17H	Model name string	
1252120 to 1252121	131B18H to 131B19H	Vendor-specific device information	

Communication path determination status

■Communication path determination status (address 1260544 to 1260559 (133C00H to 133C0FH))

The determination information on the communication path for each network number of the destination station is stored.

- 0: Path undetermined
- 1: Path determined

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
1260544	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
⋮																
1260558	Empty	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225
1260559	Empty															

The numbers in the table indicate the network numbers.

Time synchronization

■Time distribution interval setting of the personal computer (address 1275136 (137500H))

Set an interval for distributing the time in a personal computer where a board set as the master station is installed to a device 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: 10 s
- 0001H to FFFEH: Send using the set time interval (second)
- FFFFH: Distribution stop

(Default: 0000H)

■Time reflection setting to the personal computer (address 1275137 (137501H))

Set whether to apply the time in a CPU module or personal computer distributed from the master station to the personal computer in a local station.[*1]

- 0000H: Do not reflect the time to the personal computer.[*2]
- 0001H: Reflect the time to the personal computer.

(Default: 0000H)

*1 Even if setting 0001H in the buffer memory of a local station operating as the master station, the distributed time is not applied to the personal computer in the local station.

*2 The time set for the personal computer in the local station is used for operation.

Grandmaster information

The grandmaster status of the own station and MAC address are stored.

■Grandmaster (address 1275904 (137800H))

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 (address 1275907 to 1275909 (137803H to 137805H))

The grandmaster MAC address is stored.

- 1275907: 5th and 6th bytes of the MAC address
- 1275908: 3rd and 4th bytes of the MAC address
- 1275909: 1st and 2nd bytes of the MAC address

Time synchronization setting

■PTP frame send source check enable/disable (address 1275933 (13781DH))

- 1: Check
- 0: Do not check

■PTP frame send source check result (P1) (address 1275934 (13781EH))

- 1: Two or more send sources
- 0: One send source

■PTP frame send source check result (P2) (address 1275935 (13781FH))

- 1: Two or more send sources
- 0: One send source

Cyclic data send/receive assurance information

The setting value is stored when both of the following conditions are satisfied. However, it is not stored if a general CC-Link IE TSN module is selected in "Network Configuration Settings" for all.

- There is a device station with "CC-Link IE TSN Class" set to "CC-Link IE TSN Class A" and "Communication Period Setting" set to "Low-Speed" in "Network Configuration Settings."
- 'Protocol setting' (address 1294018 (13BEC2H)) is set to '2: Protocol version 2.0 fixed' or '0: Automatic setting.'

■Multiple period setting (low speed) (address 1277442 (137E02H))

The setting value of the multiple period setting (low speed) that ensures the cyclic data communications (send/receive) is stored.

- 0: Calculation not performed
- 16, 32, 64, 128: Low speed cycle for basic cycle

■Communication cycle interval (calculation value) (address 1277443 (137E03H))

The setting value of the communication cycle interval that ensures the cyclic data communications (send/receive) is stored.

- 0: Calculation not performed
- 125 to 4294967295: Communication cycle interval (unit: μs)

Communication period setting value (protocol version 2.0)

The communication cycle interval of protocol version 2.0 is stored regardless of the setting value of 'Protocol setting' (address 1294018 (13BEC2H)).
When setting 'Protocol setting' (address 1294018 (13BEC2H)) to '1: Protocol version 1.0 fixed' while a device supporting protocol version 2.0 and one supporting protocol version 1.0 are included, refer to the value in this buffer memory to configure "Basic Settings" in the parameter.

■Communication cycle interval (calculation value) (address 1277444 (137E04H))

The communication cycle interval is stored, which is calculated by the number of device stations and the number of points set in "Network Configuration Settings" under "Basic Settings."

- 125 or greater: Communication cycle interval (unit: μs)

When setting 'Protocol setting' (address 1294018 (13BEC2H)) to '1: Protocol version 1.0 fixed' for a configuration with both types of protocol versions included, refer to the value in this buffer memory to set a value in the following parameter.
"Basic Settings" ⇨ "Communication Period Setting" ⇨ "Communication Period Interval Setting"

■Cyclic transmission time (calculation value) (address 1277445 (137E05H))

The cyclic transmission time is stored, which is calculated by the number of device stations and the number of points set in "Network Configuration Settings" under "Basic Settings."

- 1 or greater: Cyclic transmission time (unit: μs)

When setting 'Protocol setting' (address 1294018 (13BEC2H)) to '1: Protocol version 1.0 fixed' for a configuration with both types of protocol versions included, refer to the value in this buffer memory to set a value in the following parameter.
"Basic Settings" ⇨ "Communication Period Setting" ⇨ "Cyclic Transmission Time"

■Transient transmission time (calculation value) (address 1277446 (137E06H))

The transient transmission time is stored, which is calculated by the number of device stations and the number of points set in "Network Configuration Settings" under "Basic Settings."

- 1 or greater: Transient transmission time (unit: μs)

When setting 'Protocol setting' (address 1294018 (13BEC2H)) to '1: Protocol version 1.0 fixed' for a configuration with both types of protocol versions included, refer to the value in this buffer memory to set a value in the following parameter.
"Basic Settings" ⇨ "Communication Period Setting" ⇨ "Transient Transmission Time"

CC-Link IE TSN Communication Software information

Information related to CC-Link IE TSN Communication Software is stored.

■CC-Link IE TSN Communication Software information (1st) (address 1277456 to 1277479 (137E10H to 137E27H))

Address (decimal)	Address (hexadecimal)	Name	Description
1277456	137E10H	Manufacturer code	Information on the first CC-Link IE TSN Communication Software is stored.
1277457	137E11H	Model type	
1277458	137E12H	Model code (lower 2 bytes)	
1277459	137E13H	Model code (upper 2 bytes)	
1277460	137E14H	Model code of extension module	
1277461	137E15H	Version	
1277462 to 1277464	137E16H to 137E18H	MAC address	
1277465 to 1277466	137E19H to 137E1AH	IP address (IPv4)	
1277467 to 1277474	137E1BH to 137E22H	IP address (IPv6)	
1277475 to 1277479	137E23H to 137E27H	System area	—

■CC-Link IE TSN Communication Software information (2nd) (address 1277480 to 1277503 (137E28H to 137E3FH))

Address (decimal)	Address (hexadecimal)	Name	Description
1277480	137E28H	Manufacturer code	Information on the second CC-Link IE TSN Communication Software is stored.
1277481	137E29H	Model type	
1277482	137E2AH	Model code (lower 2 bytes)	
1277483	137E2BH	Model code (upper 2 bytes)	
1277484	137E2CH	Model code of extension module	
1277485	137E2DH	Version	
1277486 to 1277488	137E2EH to 137E30H	MAC address	
1277489 to 1277490	137E31H to 137E32H	IP address (IPv4)	
1277491 to 1277498	137E33H to 137E3AH	IP address (IPv6)	
1277499 to 1277503	137E3BH to 137E3FH	System area	—

Protocol information

■Protocol information (address 1294016 to 1294031 (13BEC0H to 13BECFH))

Address (decimal)	Address (hexadecimal)	Name	Description
1294016	13BEC0H	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 the protocol version 1.0 2: Operating with the protocol version 2.0
1294017	13BEC1H	Write request	Write the protocol setting to a board. 0: Do not write 1: Write
1294018	13BEC2H	Protocol setting	Set the operating protocol. 0: Automatic setting 1: Protocol version 1.0 fixed 2: Protocol version 2.0 fixed
1294019	13BEC3H	Write implementation status	The write implementation status to a board is stored. 0: Writing not implemented or in progress 1: Writing completed
1294020	13BEC4H	Setting result	The setting result is stored. 0: Normal completion Other than 0: Completed with an error (error code)
1294021	13BEC5H	Protocol setting status	The protocol setting retained in a board is stored. 0: Automatic setting (factory default) 1: Protocol version 1.0 fixed 2: Protocol version 2.0 fixed

A

Address (decimal)	Address (hexadecimal)	Name	Description
1294022 to 1294031	13BEC6H to 13BECFH	System area	—

When there are only CC-Link IE TSN Class B devices as network configuration devices or when there is only one type of protocol versions, setting the protocol version is not required. The board operates with the initial value setting (0: Automatic setting) according to the system configuration.

The following shows the procedure for setting the operating protocol when both types of protocol versions are included.

1. Check the currently retained setting value in 'Protocol setting status' (address 1294021 (13BEC5H)).

2. To change the setting value, store it in 'Protocol setting' (address 1294018 (13BEC2H)) and set 'Write request' (address 1294017 (13BEC1H)) to '1.'

3. Make sure that 'Write implementation status' (address 1294019 (13BEC3H)) is set to '1' and 'Setting result' (address 1294020 (13BEC4H)) is set to '0.' If the setting result is not '0,' check the error code and set the value again.

4. Reset the board.

Point

- The operating protocol is determined during initialization and stored in 'Protocol operating status' (address 1294016 (13BEC0H)). To change the protocol before resetting the board in step 4, change the value in 'Write request' (address 1294017 (13BEC1H)) to '0' then change the value in the protocol setting. Then, change the value in 'Write request' (address 1294017 (13BEC1H)) back to '1.'

- Set the operating protocol with no cables connected before running the system. If changing the setting while the system is running, symptoms, such as link special relays (SB) and link special registers (SW) not being updated temporarily, may occur.

- Do not reset a CC-Link IE TSN board during the procedure for setting the operating protocol. Doing so may cause a hardware failure or parameter error.

Timeslot information for linked station cyclic transmission

■Timeslot information for linked station cyclic transmission (address 1294048 to 1294167 (13BEE0H to 13BF57H))

Address (decimal)	Address (hexadecimal)	Name	Description
1294048	13BEE0H	Timeslot for station number 1 cyclic transmission	The timeslot for cyclic transmission of the station number 1 is stored. 0: Undetermined 1: Timeslot 1 3: Timeslot 3 4: Timeslot 4 5: Timeslot 5 6: Timeslot 6
⋮			
1294167	13BF57H	Timeslot for station number 120 cyclic transmission	The timeslot for cyclic transmission of the station number 120 is stored. 0: Undetermined 1: Timeslot 1 3: Timeslot 3 4: Timeslot 4 5: Timeslot 5 6: Timeslot 6

Linked station cyclic transmission information

■CC-Link IE TSN Class A (low speed) multiple (address 1294304 (13BFE0H))

A multiple 'n' is stored for calculating the transmission delay time of a CC-Link IE TSN Class A device station with "Communication Period Setting" set to "Low-Speed."

- 0: There is no CC-Link IE TSN Class A device station with "Communication Period Setting" set to "Low-Speed" on the network configuration.

- 1 or greater: n value[1]

[1] When 'Protocol operating status' (address 1294016 (13BEC0H)) is '1: Operating with the protocol version 1.0,' it is fixed to 1.

Appendix 5 Link Special Relay (SB) List

A 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 the link special relay in the program.

Ranges of devices turned ON/OFF by users and by the system

The following ranges correspond to when the link special relay (SB) areas are assigned from SB0000 to SB0FFF.
- Range of devices turned ON/OFF by users: SB0000 to SB002F
- Range of devices turned ON/OFF by the system: SB0030 to SB0FFF

Link special relay (SB) list

The following table lists the link special relays (SB) when they are assigned from SB0000 to SB0FFF.

Point

Do not turn ON or OFF any device that is not on the link special relay (SB) list or that is turned ON or 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 registers related to communication errors (SW0074 to SW0077, SW007C to SW007F) 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)	○	×	×
SB0030	RECV execution request flag CH1	Stores the data reception status of channel 1 of the own station. • OFF: No data received • ON: Data received	○	○	○
SB0031	RECV execution request flag CH2	Stores the data reception status of channel 2 of the own station. • OFF: No data received • ON: Data received	○	○	○
SB0032	RECV execution request flag CH3	Stores the data reception status of channel 3 of the own station. • OFF: No data received • ON: Data received	○	○	○
SB0033	RECV execution request flag CH4	Stores the data reception status of channel 4 of the own station. • OFF: No data received • ON: Data received	○	○	○
SB0034	RECV execution request flag CH5	Stores the data reception status of channel 5 of the own station. • OFF: No data received • ON: Data received	○	○	○
SB0035	RECV execution request flag CH6	Stores the data reception status of channel 6 of the own station. • OFF: No data received • ON: Data received	○	○	○
SB0036	RECV execution request flag CH7	Stores the data reception status of channel 7 of the own station. • OFF: No data received • ON: Data received	○	○	○
SB0037	RECV execution request flag CH8	Stores the data reception status of channel 8 of the own station. • 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	Board operation mode of own station	Stores the board operation mode of the own station. • OFF: Online mode • ON: Not 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	○	○	○

No.	Name	Description	Master station	Local station	
				Unicast mode	Multicast mode
SB0045	Station setting 2 of own station	Stores the communication mode of the own station. • OFF: Unicast mode • ON: Multicast mode	○	○	○*1
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 in 'Cause of data link stop' (SW0049). (Also used in the CLPA conformance test.) (Updated even if set as an error invalid station.)	○	○	○
SB004B	Moderate/major error status of own station	Stores the board driver stop error occurrence status on the own station. • OFF: No board driver stop error • ON: Board driver stop error	○	○	○
SB004C	Operating status of own station	Stores the operating status of the own station. • OFF: Normal • ON: Error	○	○	○
SB004D	Received parameter error	Stores the status of received parameter. (Own parameter status is stored for the master station.) • OFF: Normal • ON: Error	○	○	○
SB0063	Link points extended setting	■NZ81GN11-SX only Indicates the setting contents of the link points extended setting. • OFF: Not to Extend • ON: Extend	○	×	○
SB0064	Cyclic data receive status	Indicates the receive status of cyclic data from a device station in the master station in the communication cycle set for "Disconnection Detection Setting." • OFF: Cyclic data received • ON: Cyclic data not received consecutively (Condition) • It turns ON when cyclic data from one or more device stations is not received consecutively. • Reserved stations and stations exceeding 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.)	○	×	×
SB0065	Loopback status	Stores the loopback status. The station number of the loopback station can be checked in 'Loopback station number 1' (SW0070) and 'Loopback station number 2' (SW0071). • OFF: Normal (no loopback stations) • ON: Loopback being performed (Condition) This relay is enabled when 'Data link error status of own station' (SB0049) is OFF, and 'Network topology setting' (SB0078) is ON. When 'Data link error status of own station' (SB0049) is turned ON (error), data prior to error is held.	○	×	×
SB006A	PORT1 link-down status of own station	Stores the status of communication with a device connected to the port on the P1 side of the own station. • OFF: Link-up • ON: Link-down The time required from when the power is ON or a cable is connected to when the link-up starts may vary. Normally, it takes a few seconds. However, it may take longer because the link-up processing is repeated due to the device condition on the line. (Also used in the CLPA conformance test.) (Updated even if set as an error invalid station.) (Updated even if set as a reserved station.)	○	○	○

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SB006B	PORT2 link-down status of own station	Stores the status of communication with a device connected to the port on the P2 side of the own station. • OFF: Link-up • ON: Link-down The time required from when the power is ON or a cable is connected to when the link-up starts may vary. Normally, it takes a few seconds. However, it may take longer because the link-up processing is repeated due to the device condition on the line. (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 a station set as a reserved station can be checked in '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 a station set as an error invalid station can be checked in '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	×	○	○
SB0078	Network topology setting	Stores the setting status of "Network Topology" for the own station (master operating station). • OFF: Line/Star • ON: Ring	○	×	×
SB007B	Input data status of data link faulty station	Stores the setting status for "Data Link Faulty Station Setting" of the own station. • OFF: Clear • ON: Hold	○	○	○
SB007E	IP address type	Stores the type of an IP address. • OFF: IPv4 • ON: IPv6	○	○	○
SB007F	IP address setting status	Stores the status of the IP address setting by parameter. • OFF: Not set • ON: Set	○	○	○
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 in 'Data link status of each station' (SW00B0 to SW00B7). 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 normal station' is applied to the CC-Link IE TSN Class A remote station. (Condition) Reserved stations and stations exceeding 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: Not set • ON: Set When this relay is turned ON, the status of each station can be checked in 'Reserved station setting status' (SW00C0 to SW00C7).	○	×	○[*1]
SB00D0	Error invalid station setting current status	Stores whether an error invalid station is set. • OFF: Not set • ON: Set When this relay is turned ON, the status of each station can be checked in 'Error invalid station setting status' (SW00D0 to SW00D7).	○	×	○[*1]

A

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
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 in 'Station type match status' (SW00E8 to SW00EF).	○	×	○[*1]
SB00F0	CPU operating status of each station	Stores the operating status of a CPU module controlling each station. • OFF: All stations in the RUN or PAUSE state • ON: Station in the STOP state or with a moderate/major error exists For CC-Link IE TSN interface boards, this relay stores the following states: • OFF: Normal • ON: Error When this relay is turned ON, the status of each station can be checked in 'CPU operating status of each station' (SW00F0 to SW00F7). 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 applied to the CC-Link IE TSN Class A remote station.	○	×	○[*1]
SB00F1	CPU operating status of master station	■For CC-Link IE TSN interface boards Stores the following states: • OFF: Normal • ON: Error ■For modules Stores the operating status of a 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	■For CC-Link IE TSN interface boards Stores the following states: • OFF: No board driver stop error • ON: Board driver stop error ■For modules Stores the moderate/major error occurrence status of a CPU module controlling each station. For remote stations, this relay stores the moderate/major error occurrence status of each station. • OFF: No station with a moderate/major error exists • ON: Station with a moderate/major error exists When this relay is turned ON, the status of each station can be checked in 'CPU moderate/major error status of each station' (SW0100 to SW0107). 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 applied to the CC-Link IE TSN Class A remote station.	○	×	○[*1]
SB0101	CPU moderate/major error status of master station	■For CC-Link IE TSN interface boards Stores the following states: • OFF: No board driver stop error • ON: Board driver stop error ■For modules Stores the moderate/major error occurrence status of a CPU module on the master station. • OFF: No moderate/major error • ON: Moderate/major error	○	×	○[*1]
SB0252	Parameter reception status	■NZ81GN11-SX only Stores the status of parameter reception. For the master station, this relay stores the status of parameter reception from a driver. For local stations, this relay stores the status of parameter reception from the master station. • OFF: Reception completed • ON: Reception not completed	○	○	○

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SB0254	Own station connection status	■NZ81GN11-SX only Stores the transmission path status of the own station. If a failure occurs, it can be checked in 'Connection status of own station' (SW0066). • OFF: Normal • ON: Failure (Condition) This relay turns ON when a value other than 'Normal' is stored in 'Connection status of own station' (SW0066).	○	○	○
SB0500	Co-recording device station supporting information	Stores the supporting information on a device station. • OFF: Co-recording not supported in all stations • ON: Co-recording supported in a station When this relay is turned ON, the supporting information on each station can be checked in 'Co-recording each station supporting information' (SW0500 to SW0507).	○	×	×
SB0510	Co-recording device station setting information	Stores the setting information on a device station. • OFF: Co-recording not used in all stations • ON: Co-recording used in a station When this relay is turned ON, the setting information on each station can be checked in 'Co-recording each station setting information' (SW0510 to SW0517).	○	×	×

*1   Available when 'Data link error status of own station' (SB0049) is OFF.

Appendix 6 Link Special Register (SW) List

Link special registers (SW) store information during data link as numerical values. Error locations and causes can be checked by using and monitoring link special registers (SW) in programs.

Ranges where data is stored by customers and by the system

The following ranges correspond to when the link special register (SW) areas are assigned from SW0000 to SW0FFF.
- Range where data is stored by customers: SW0000 to SW002F
- Range where data is stored by the system: SW0030 to SW0FFF

Link special register (SW) list

The following table lists the link special registers (SW) when they are assigned from SW0000 to SW0FFF.

Point

Do not write data to any device that is not on the link special register (SW) list or in which 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
SW0030	SEND/RECV function processing result CH1	Stores a processing result of the SEND/RECV function using channel 1 of the own station. • 0: Normal completion • 1 or greater: Abnormal completion (An error code is stored.)	○	○	○
SW0031	SEND/RECV function processing result CH2	Stores a processing result of the SEND/RECV function using channel 2 of the own station. • 0: Normal completion • 1 or greater: Abnormal completion (An error code is stored.)	○	○	○
SW0040	Network number	Stores the network number of the own station. • Range: 1 to 239	○	○	○
SW0042	Station number	Stores the station number of the own station. Range: • Master station: 125 • Local station: 1 to 120, 255 (station number not set)	○	○	○
SW0043	Mode status of own station	Stores the board operation mode setting or communication mode setting of the own station. • 0: Online mode/unicast mode • 1: Online mode/multicast mode • 2: Offline mode • B: Board communication test mode	○	○	○[1]
SW0045	Module type	Stores the hardware status of the own station. b15　　b12　to　　b3 b2 b1 b0 SW0045 □□□ | 0　to　　0 | □□□□ ■b0 to b1: Model type • 00: Module • 01: Board • 10: HMI ■b2: Connector type • 0: RJ45 connector • 1: Duplex LC connector ■b13 to b15: System area	○	○	○
SW0046 to SW0047	IPv4 address	Indicates the IP address (IPv4) set in the own station. SW0046 | (3) | (4) SW0047 | (1) | (2) (1): First octet (2): Second octet (3): Third octet (4): Fourth octet	○	○	○

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
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 stations (master station only) • 10H: Parameter not received (local stations only) • 12H: Reserved station setting of own station (local stations only) • 14H: Master station duplication (master station only) • 16H: Station number not set (local stations only) • 18H: Parameter error • 19H: Parameter communication in progress • 20H: Board driver stop error • 60H: Incorrect ring topology configuration (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	Own station status	Stores the status of the own station. • 02H: Board driver stop error • 04H: Normal • 0EH: Reset in progress • 0FH: Initial processing	○	○	○
SW004C	Parameter setting status	Stores the status of parameter settings. • 0: Normal • 1 or greater: Error definition (An error code is stored.) (Condition) This register is enabled when 'Received parameter error' (SB004D) is ON.	○	○	○
SW0058	Total number of linked stations setting value	Stores the total number of linked stations (device stations) that are set by parameters. Range: 1 to 120	○	○	○
SW0059	Total number of linked stations current value	Stores the total number of linked stations (device stations) that are actually connected by data link. • Range: 1 to 120 (0 when the 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 applied as a station performing a normal data link.	○	×	○[1]
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 the 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 applied as a station performing a normal data link. (Condition) This register is enabled when 'Data link error status of own station' (SB0049) is OFF.	○	×	○[1]
SW0060	Communication cycle interval	Stores the setting value of the communication cycle interval set in the parameter of the master station. (Unit: μs)	○	○	○
SW0061	System reservation time	Stores the setting value of the system reservation time set in the parameter of the master station. (Unit: μs)	○	○	○
SW0062	Cyclic transmission time	Stores the setting value of the cyclic transmission time set in the parameter of the master station. (Unit: μs)	○	○	○
SW0063	Transient transmission time	Stores the setting value of the transient transmission time set in the parameter of the master station. (Unit: μs)	○	○	○
SW0064	Multiple period setting (normal speed)	Stores the setting value of the multiple period setting (normal speed) set in the module parameter of the master station.	○	○	○
SW0065	Multiple period setting (low speed)	Stores the setting value of the multiple period setting (low speed) set in the module parameter of the master station.	○	○	○

A

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SW0066	Connection status of own station	Stores the connection status of the own station. • 00H: Normal (communication in progress on P1 and P2) • 01H: Normal (communication in progress on P1, cable disconnected on P2) (NZ81GN11-T2 only) • 04H: Normal (loopback communication in progress on P1, cable disconnected on P2) • 10H: Normal (cable disconnected on P1, communication in progress on P2) (NZ81GN11-T2 only) • 11H: Disconnected (cable disconnected on P1 and P2) • 12H: Disconnected (cable disconnected on P1, establishing line on P2) • 21H: Disconnected (establishing line on P1, cable disconnected on P2) • 22H: Disconnected (establishing line on P1 and P2) • 40H: Normal (cable disconnected on P1, loopback communication in progress on P2)	○	○	○
SW0070	Loopback station number 1	Stores the number of the station where loopback is being performed. • 0: No loopback stations • 1 to 120: Station number of the device station performing loopback • 125: Master station performing loopback (Condition) This register is enabled when 'Data link error status of own station' (SB0049) is OFF, and 'Network topology setting' (SB0078) is ON. When 'Data link error status of own station' (SB0049) is turned ON (error), data prior to error is held.	○	×	×
SW0071	Loopback station number 2				
SW0072	Communication cycle interval (calculation value)	Stores 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." (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" under "Basic Settings." (Unit: μs)	○	×	×
SW0074	PORT1 cable disconnection detection count	Stores the cumulative count that was detected for cable disconnections on the P1 side. When 'Clear communication error count' (SB0006) is turned ON, the stored count is cleared. When the maximum value 65535 (FFFFH) is counted, the value returns to 0 and continues to be counted.	○	○	○
SW0075	PORT1 receive error detection count	Stores the cumulative count that error data was received on 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 the maximum value 65535 (FFFFH) is counted, counting stops.	○	○	○
SW0076	PORT1 total number of received data (lower 1 word)	Stores the cumulative count that data was received on the P1 side. When 'Clear communication error count' (SB0006) is turned ON, the stored count is cleared. When the maximum value 4294967295 (FFFFFFFFH) 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" under "Basic Settings." (Unit: μs)	○	×	×
SW007C	PORT2 cable disconnection detection count	Stores the cumulative count that was detected for cable disconnections on the P2 side. When 'Clear communication error count' (SB0006) is turned ON, the stored count is cleared. When the maximum value 65535 (FFFFH) is counted, the value returns to 0 and continues to be counted.	○	○	○
SW007D	PORT2 receive error detection count	Stores the cumulative count that error data was received on the P2 side. The count stores only error data that is not transmitted to all stations. When 'Clear communication error count' (SB0006) is turned ON, the stored count is cleared. When the maximum value 65535 (FFFFH) is counted, counting stops.	○	○	○

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SW007E	PORT2 total number of received data (lower 1 word)	Stores the cumulative count that data was received on the P2 side. When 'Clear communication error count' (SB0006) is turned ON, the stored count is cleared. When the maximum value 4294967295 (FFFFFFFFH) is counted, counting stops.	○	○	○
SW007F	PORT2 total number of received data (upper 1 word)				
SW00B0 to SW00B7	Data link status of each station	Stores the data link status of each station. • 0: Data link normal station • 1: Data link faulty station If multiple stations change from faulty to normal, because they are reconnected to the network one by one per cycle, the time until the status changes to '0: Data link normal 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 normal station' is applied to the CC-Link IE TSN Class A remote station. |	b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 | SW00B0	16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 | SW00B1	32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 | SW00B2	48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 | SW00B3	64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 | SW00B4	80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 | SW00B5	96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 | SW00B6	112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 | SW00B7	— — — — — — — — 120 119 118 117 116 115 114 113 | Each number in the table represents a station number. — is fixed to '0.' (Condition) Stations exceeding the maximum station number are ignored. (Also used in the CLPA conformance test.)	○	×	○[*1]
SW00C0 to SW00C7	Reserved station setting status	Stores the reserved station setting status of each station. • 0: Station other than a reserved station • 1: Reserved station |	b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 | SW00C0	16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 | SW00C1	32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 | SW00C2	48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 | SW00C3	64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 | SW00C4	80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 | SW00C5	96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 | SW00C6	112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 | SW00C7	— — — — — — — — 120 119 118 117 116 115 114 113 | Each number in the table represents a station number. — is fixed to '0.' (Condition) Stations exceeding the maximum station number are ignored. (Also used in the CLPA conformance test.)	○	×	○[*1]

No.	Name	Description	Availability		
			Master station	**Local station**	
				Unicast mode	**Multicast mode**
SW00C8 to SW00CF	Parameter setting status	Stores the parameter setting status. • 0: Station not set in the parameter • 1: Station set in the parameter b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SW00C8: 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 SW00C9: 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 SW00CA: 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 SW00CB: 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 SW00CC: 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 SW00CD: 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 SW00CE: 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 SW00CF: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to '0.' (Condition) Stations exceeding the maximum station number are ignored.	○	×	○[*1]
SW00D0 to SW00D7	Error invalid station setting status	Stores the error invalid station setting status of each station. • 0: Station other than an error invalid station • 1: Error invalid station b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SW00D0: 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 SW00D1: 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 SW00D2: 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 SW00D3: 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 SW00D4: 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 SW00D5: 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 SW00D6: 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 SW00D7: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to '0.' (Condition) Stations exceeding the maximum station number are ignored. NZ81GN11-NX only	○	×	○[*1]
SW00E8 to SW00EF	Station type match status	Stores the match status between the station type set in the master station and that of the device station. 0: Station type match 1: Station type mismatch b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 SW00E8: 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 SW00E9: 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 SW00EA: 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 SW00EB: 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 SW00EC: 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 SW00ED: 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 SW00EE: 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 SW00EF: — — — — — — — — 120 119 118 117 116 115 114 113 Each number in the table represents a station number. — is fixed to '0.'	○	×	○[*1]

No.	Name	Description	Availability Master station	Availability Local station Unicast mode	Availability Local station Multicast mode
SW00F0 to SW00F7	CPU operating status of each station	■For CC-Link IE TSN interface boards Stores the following states: • 0: Operating normally • 1: Error occurring ■For modules Stores the operating status of a CPU module controlling each station. • 0: RUN, PAUSE • 1: STOP, or moderate/major error occurring Each number in the table represents a station number. — is fixed to '0.' (Condition) Reserved stations and stations exceeding 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 applied to the CC-Link IE TSN Class A remote station.	○	×	○[*1]
SW0100 to SW0107	CPU moderate/major error status of each station	■For CC-Link IE TSN interface boards Stores the following failure and error occurrence statuses: • 0: No board driver stop error • 1: Board driver stop error occurring ■For modules Stores the moderate/major error occurrence status of a CPU module controlling each station. For remote stations, this register stores the moderate/major error occurrence status of each station. • 0: No moderate/major error • 1: Moderate/major error occurring Each number in the table represents a station number. — is fixed to '0.' (Condition) If a failure or error occurs, data prior to it is held. Reserved stations and stations exceeding 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 applied to the CC-Link IE TSN Class A remote station.	○	×	○[*1]
SW0198	SEND/RECV function processing result CH3	Stores a processing result of the SEND/RECV function using channel 3 of the own station. • 0: Normal completion • 1 or greater: Abnormal completion (An error code is stored.)	○	○	○

SW00F0 table:

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW00F0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW00F1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW00F2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW00F3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW00F4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW00F5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW00F6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW00F7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

SW0100 table:

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW0100	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW0101	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW0102	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW0103	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW0104	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW0105	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW0106	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW0107	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

A

No.	Name	Description	Availability Master station	Availability Local station Unicast mode	Availability Local station Multicast mode
SW0199	SEND/RECV function processing result CH4	Stores a processing result of the SEND/RECV function using channel 4 of the own station. • 0: Normal completion • 1 or greater: Abnormal completion (An error code is stored.)	○	○	○
SW019A	SEND/RECV function processing result CH5	Stores a processing result of the SEND/RECV function using channel 5 of the own station. • 0: Normal completion • 1 or greater: Abnormal completion (An error code is stored.)	○	○	○
SW019B	SEND/RECV function processing result CH6	Stores a processing result of the SEND/RECV function using channel 6 of the own station. • 0: Normal completion • 1 or greater: Abnormal completion (An error code is stored.)	○	○	○
SW019C	SEND/RECV function processing result CH7	Stores a processing result of the SEND/RECV function using channel 7 of the own station. • 0: Normal completion • 1 or greater: Abnormal completion (An error code is stored.)	○	○	○
SW019D	SEND/RECV function processing result CH8	Stores a processing result of the SEND/RECV function using channel 8 of the own station. • 0: Normal completion • 1 or greater: Abnormal completion (An error code is stored.)	○	○	○
SW01A0 to SW01A7	Station protocol version 2.0 support status	Stores the station protocol version 2.0 support status of each station. • 0: Not supported • 1: Supported (See bit table below) Each number in the table represents a station number. — is fixed to '0.' (Condition) Stations exceeding the maximum station number are ignored.	○	×	×
SW0250	Transient transmission group number	■NZ81GN11-SX only Stores the transient transmission group number of the own station. • 0: No group specification • 1 to 32: Transient transmission group number	○	○	○
SW0252	Parameter information	■NZ81GN11-SX only Stores parameter information. (See bit diagram below) • Network range assignment (b0) • 0: Not available • 1: Available • Refresh parameter (b1) • 0: Not available • 1: Available (Condition) This register is enabled when 'Received parameter error' (SB004D) is OFF.	○	○	○
SW04A0	Time synchronization method	Stores the time synchronization method. • 0: IEEE1588 • 1: IEEE802.1AS	○	×	×

Bit table for SW01A0 to SW01A7:

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW01A0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW01A1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW01A2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW01A3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW01A4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW01A5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW01A6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW01A7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

Bit diagram for SW0252:

	b15	to	b2	b1	b0
SW0250	0	to	0		

No.	Name	Description	Availability		
			Master station	Local station	
				Unicast mode	Multicast mode
SW04B0 to SW04B7	Time synchronization status of each station	Stores the time synchronization status of each station. (Station No.1 to 120) • 0: Station that does not perform time synchronization • 1: Station that performs time synchronization The time synchronization method can be checked in 'Time synchronization method' (SW04A0).	○	×	×

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW04B0	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW04B1	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW04B2	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW04B3	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW04B4	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW04B5	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW04B6	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW04B7	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

Each number in the table represents a station number.
— is fixed to '0.'
(Condition)
Stations exceeding the maximum station number are ignored.

No.	Name	Description	Availability		
SW0500 to SW0507	Co-recording each station supporting information	Stores the supporting information on each station. (Station No.1 to 120) • 0: Co-recording not supported • 1: Co-recording supported	○	×	×

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW0500	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW0501	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW0502	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW0503	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW0504	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW0505	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW0506	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW0507	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

Each number in the table represents a station number.
— is fixed to '0.'
(Condition)
Reserved stations and stations exceeding the maximum station number are ignored.

No.	Name	Description	Availability		
SW0510 to SW0517	Co-recording each station setting information	Stores the setting information on each station. (Station No.1 to 120) 0: Co-recording not used 1: Co-recording used	○	×	×

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
SW0510	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
SW0511	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
SW0512	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
SW0513	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
SW0514	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
SW0515	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81
SW0516	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97
SW0517	—	—	—	—	—	—	—	—	120	119	118	117	116	115	114	113

Each number in the table represents a station number.
— is fixed to '0.'
(Condition)
Reserved stations and stations exceeding the maximum station number are ignored.

*1　Available when 'Data link error status of own station' (SB0049) is OFF.

A

Appendix 7 Network Status at Power ON/OFF or Board Reset During Data Linking

This section shows the network status when powering ON/OFF or restarting a personal computer, or resetting a board.

An error occurs during data linking and a network is disconnected in the following cases:

- Personal computer power-OFF
- Immediately after personal computer power-ON (during board driver startup)
- During personal computer restart (for Windows restart)
- During board reset

Methods for resetting a board

A board can be reset by the following methods:

- Utility: [Online] ⇨ [Reset Operation]
- User program: mdBdRst function in the MELSEC data link library

> **Point**
>
> A board is also reset automatically in the following cases:
>
> - Restarting Windows
> - Writing parameters to a board in the utility: [Online] ⇨ [Write to Board]
> - Setting the channel number for a board in the utility: [Online] ⇨ [Channel No. Setting]
> - Setting the board mode in a user program: mdBdModSet function in the MELSEC data link library
> - Firmware update in the utility: [Tool] ⇨ [Firmware Update Tool]

Precautions

- While a board is being reset, each function may stop or an error may occur. Check the effect on the system before resetting the board.
- Wait for at least one second every time a board is reset.
- When executing the mdBdRst or mdBdModSet function in a user program, board reset processing by each function is completed when a value is returned. Create a program to always check the return value.

Appendix 8 Processing Time

The transmission delay time in CC-Link IE TSN interface boards consists of the time components below.
- Link refresh time on the sending side + Communication cycle interval (cyclic data transfer processing time) + Link refresh time on the receiving side

It refers to the time between when writing data to a device on the sending side is completed and when the data is applied to a device on the receiving side; therefore, processing delay time caused by a user program is not included.

For the processing time when using devices other than CC-Link IE TSN interface boards, refer to the manual for each device.
- When using a module as the master station: 📖MELSEC iQ-R CC-Link IE TSN User's Manual (Application)
- Processing time of a device station: 📖Manual for a device station used

Transmission delay time of cyclic transmission

The following shows the calculation formulas for the cyclic transmission delay times below.
- Time between when a transmission source device turns ON or OFF and when a transmission destination device turns ON or OFF
- Time between when data is set for a transmission source device and when the data is stored in a transmission destination device

Calculation formulas for transmission delay time

The following table shows the variables used in each section.

Variable name	Description
SM	Link refresh time of the master station [μs]
SL	Link refresh time of a local station [μs]
LS	Communication cycle interval [μs] When setting "Communication Period Setting" to an item other than "Basic Period" for a communication target, multiply the communication cycle interval by the multiple specified in "Multiple Period Setting" according to the setting. ☞Page 150 Communication period setting
Rio	Processing time of a remote station [μs]
n1	Value of (SM ÷ LS) rounded up to the nearest integer
n2	Value of (LS ÷ SM) rounded up to the nearest integer
n3	Value of (SL ÷ LS) rounded up to the nearest integer
n1d	Value of [SM ÷ (LS × DV)] rounded up to the nearest integer
n3d	Value of [SL ÷ (LS × DV)] rounded up to the nearest integer
DV	Number of divided cyclic data portions • 1 for RX/RY/RWr/RWw • For LB/LW, 1 when setting "Communication Period Setting LB/LW" of the sending station to "Basic Period" or a multiple specified in "Multiple Period Setting" when setting it to "Normal-Speed" or "Low-Speed"

■Master station ← remote station

Transmission source, transmission destination	Calculation value	Station-based block data assurance	No station-based block data assurance
Master station (RX/RWr) ← remote station (input)	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

■Master station → remote station

Transmission source, transmission destination	Calculation value	Station-based block data assurance	No station-based block data assurance
Master station (RY/RWw) → remote station (output)	Normal value	(SM × n2) + (LS × 1) + Rio	(SM × 1) + (LS × 1) + Rio
	Maximum value	(SM × n2) + (LS × 2) + Rio	(SM × 2) + (LS × 2) + Rio

■Master station ← local station

• When using an NZ81GN11-T2 or setting the LB/LW points extended setting to "Not to Extend" for an NZ81GN11-SX

Transmission source, transmission destination	Calculation value	Station-based block data assurance	No station-based block data assurance
Master station (RX) ← local station (RY) Master station (RWr) ← local station (RWw) Master station (LB) ← local station (LB) Master station (LW) ← local station (LW)	Normal value	LS < SL: $(SM \times 1) + (LS \times (n1 + 1)) + (SL \times 1)$	$(SM \times 1) + (LS \times 2) + (SL \times 1)$
		LS ≥ SL: $(SM \times 1) + (LS \times (n1 + 2))$	
	Maximum value	$(SM \times 2) + (LS \times (n1 + 2)) + (SL \times 1)$	$(SM \times 2) + (LS \times 3) + (SL \times 1)$

• When setting the LB/LW points extended setting to "Extend" for an NZ81GN11-SX

For sending stations with "Communication Period Setting LB/LW" set to "Basic Period," the calculation formulas are same as when setting the LB/LW points extended setting to "Not to Extend."

The calculation formulas are as follows when setting "Communication Period Setting LB/LW" to "Normal-Speed" or "Low-Speed" for a sending station.

Transmission source, transmission destination	Calculation value	Station-based block data assurance	No station-based block data assurance
Master station (RX) ← local station (RY) Master station (RWr) ← local station (RWw) Master station (LB) ← local station (LB) Master station (LW) ← local station (LW)	Normal value	For $LS \times DV < SL$ and $LS \times DV < SM$: $SM + LS + (LS \times DV \times n1d) + SL$	$(SM \times 1) + [LS \times (DV + 1)] + (SL \times 1)$
		For $LS \times DV < SL$ and $LS \times DV \geq SM$: $SM + [LS \times (DV + 1)] + SL$	
		For $LS \times DV \geq SL$ and $LS \times DV < SM$: $SM + LS + [LS \times DV \times (n1d + 1)]$	
		For $LS \times DV \geq SL$ and $LS \times DV \geq SM$: $SM + [LS \times (DV \times 2 + 1)]$	
	Maximum value	For $LS \times DV < SL$ and $LS \times DV < SM$: $SM \times 2 + LS + (LS \times DV \times n1d) + SL$	$(SM \times 2) + [LS \times (DV + 2)] + (SL \times 1)$
		For $LS \times DV < SL$ and $LS \times DV \geq SM$: $SM \times 2 + [LS \times (DV + 2)] + SL$	
		For $LS \times DV \geq SL$ and $LS \times DV < SM$: $SM \times 2 + [(LS \times DV) \times (n1d + 1)] + SL$	
		For $LS \times DV \geq SL$ and $LS \times DV \geq SM$: $SM \times 2 + [LS \times (DV \times 2 + 1)] + SL$	

■Master station → local station

• When using an NZ81GN11-T2 or setting the LB/LW points extended setting to "Not to Extend" for an NZ81GN11-SX

Transmission source, transmission destination	Calculation value	Station-based block data assurance	No station-based block data assurance
Master station (RY) → local station (RX) Master station (RWw) → local station (RWr) Master station (LB) → local station (LB) Master station (LW) → local station (LW)	Normal value	LS < SM: $(SM \times 1) + (LS \times (n3 + 1)) + (SL \times 1)$	$(SM \times 1) + (LS \times 2) + (SL \times 1)$
		LS ≥ SM: $(LS \times (n3 + 2)) + (SL \times 1)$	
	Maximum value	$(SM \times 1) + (LS \times (n3 + 2)) + (SL \times 2)$	$(SM \times 1) + (LS \times 3) + (SL \times 2)$

• When setting the LB/LW points extended setting to "Extend" for an NZ81GN11-SX

For sending stations with "Communication Period Setting LB/LW" set to "Basic Period," the calculation formulas are same as when setting the LB/LW points extended setting to "Not to Extend."

The calculation formulas are as follows when setting "Communication Period Setting LB/LW" to "Normal-Speed" or "Low-Speed" for a sending station.

Transmission source, transmission destination	Calculation value	Station-based block data assurance	No station-based block data assurance
Master station (RY) → local station (RX) Master station (RWw) → local station (RWr) Master station (LB) → local station (LB) Master station (LW) → local station (LW)	Normal value	For LS × DV < SL and LS × DV < SM: SM + LS + (LS × DV × n3d) + SL	(SM × 1) + [LS × (DV + 1)] + (SL × 1)
		For LS × DV < SL and LS × DV ≥ SM: SM + [LS × (DV + 1)] + SL	
		For LS × DV ≥ SL and LS × DV < SM: LS + [LS × DV × (n3d + 1)] + SL	
		For LS × DV ≥ SL and LS × DV ≥ SM: [LS × (DV × 2 + 1)] + SL	
	Maximum value	For LS × DV < SL and LS × DV < SM: SM + LS + (LS × DV × n3d) + SL × 2	(SM × 1) + [LS × (DV + 2)] + (SL × 2)
		For LS × DV < SL and LS × DV ≥ SM: SM + [LS × (DV + 2)] + SL × 2	
		For LS × DV ≥ SL and LS × DV < SM: SM + [(LS × DV) × (n3d + 1)] + SL × 2	
		For LS × DV ≥ SL and LS × DV ≥ SM: SM + [LS × (DV × 2 + 1)] + SL × 2	

Multiples by which communication cycle intervals are multiplied

When setting "Communication Period Setting" in "Network Configuration Settings" under "Basic Settings" of the master station to an item other than "Basic Period" for a communication target, multiply LS: communication cycle interval by the multiple specified in "Multiple Period Setting" in "Communication Period Setting" under "Basic Settings" according to the setting.

In this case, multiples are as follows according to the settings for "CC-Link IE TSN Class" in "Network Configuration Settings" and "Communication Period Setting" under "Basic Settings."

CC-Link IE TSN Class	Communication period setting	Multiple
CC-Link IE TSN Class B	Normal or low speed	Multiple specified in "Multiple Period Setting"
CC-Link IE TSN Class A	Normal speed	Multiple specified in "Multiple Period Setting"
	Low speed	Multiple specified in "Multiple Period Setting" $\times$ n

■Details of n by which communication cycle intervals are multiplied

'n' can be checked in 'Linked station cyclic transmission information' (address 1294304 (13BFE0H)) in the buffer memory.

Stations with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed" are grouped by the sizes of cyclic data that the master station sends to/receives from a device station, and 'n' is determined by the number of the groups.

The following table shows the algorithm for determining 'n.'

No.	Processing	Branch		Loop 1	Loop 2	Detailed description
		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" set and "Communication Period Setting" set to "Low-Speed" for groups.

No.	Processing	Branch		Loop 1	Loop 2	Detailed description
		Yes	No			
2	Loop according to the number of stations (i = 1; i ≤ set stations; i++)	—	—	No.2 to No.11	—	Check device stations with the station number columns of 1 to 120 in "Network Configuration Settings" for the master station one by one. (Loop the processing of No.2 to No.11 for the number of stations)
3	Are "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed"?	→ No.4	→ No.11		—	In "Network Configuration Settings" for the master station, check "CC-Link IE TSN Class" and "Communication Period Setting" for the i-th station. If "CC-Link IE TSN Class A" is set and "Communication Period Setting" is set to "Low-Speed," perform the processing starting from No.4.
4	Calculate the values for cyclic data size (DMsi) sent from the master station to a device station and cyclic data size (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: $DMsi = (HBL \times n1i) + (16 \times n2i) + ndmi$ $DSsi = (HBL \times n3i) + (20 \times n4i) + ndsi$
5	Loop up to the maximum number of groups (j = 1; j ≤ 120; j++)	—	—		No.5 to No.10	Up to a total of 2 KB can be assigned to a group, and determine which group number (1 to 120) is assigned to i-th station starting from 1. (Loop the processing of No.5 to No.10 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 j-th group, determine whether the following condition is satisfied. $GMsj + DMsi \leq 2044$
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 received from device stations by the master station assigned to the j-th group, determine whether the following condition is satisfied. $GSsj + DSsi \leq 2044$
8	Update the data size (GMsj, GSsj) of the assigned group.	—	—			The values of GMsj and GSsj are updated when both the conditions No.6 and No.7 are satisfied.
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 loop No.5	—	—			—
11	End of loop No.2	—	—		—	—
12	Acquire the maximum value J of the group number.	—	—	—	—	After assigning a group number to all stations with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed," the maximum value J of the group number is acquired.
13	Value of n = J ÷ 4 rounded up to the nearest integer	—	—	—	—	'n' is determined from the following equation: Value of n = J ÷ 4 rounded up to the nearest integer
14	End	—	—	—	—	—

The following table shows the variable names used by the algorithm.

Variable name	Description
HBL	42
n1i	Value of (ndmi + (16 × n2i)) ÷ 1484 rounded up to the nearest integer When the calculation result of n1i is 2 or greater, add 1 to n2i.
n2i	(RYbi + RWwbi) RYbi: Value of (the number of points of "RY Setting" for the i-th station with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed") ÷ 11744 rounded up to the nearest integer RWwbi: Value of (the number of points of "RWw Setting" for the i-th station with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed") ÷ 734 rounded up to the nearest integer
ndmi	(Number of points of "RY Setting" for the i-th station with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed") ÷ 8 + (Number of points of "RWw Setting" for the i-th station with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed") × 2
n3i	Value of (ndsi + (20 × n4i)) ÷ 1484 rounded up to the nearest integer When the calculation result of n3i is 2 or greater, add 1 to n4i.
n4i	(RXbi + RWrbi) + 1 RXbi: Value of (the number of points of "RX Setting" for the i-th station with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed") ÷ 11712 rounded up to the nearest integer RWrbi: Value of (the number of points of "RWr Setting" for the i-th station with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed") ÷ 732 rounded up to the nearest integer
ndsi	(Number of points of "RX Setting" for the i-th station with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed") ÷ 8 + (Number of points of "RWr Setting" for the i-th station with "CC-Link IE TSN Class A" set and "Communication Period Setting" set to "Low-Speed") × 2 + 8

Ex.

A

When using the inverter FR-E800 (RX: 32 points, RY: 32 points, RWr: 32 points, RWw: 32 points)

When $1 \leq$ the number of inverters ≤ 44, n = 1

When $45 \leq$ the number of inverters ≤ 88, n = 2

When $89 \leq$ the number of inverters ≤ 120, n = 3

Communication cycle intervals

The minimum value of the communication cycle interval (cyclic data transfer processing time) is calculated by the following calculation formula.

Variables enclosed in double quotes ("") are the setting values in "Network Configuration Settings" under "Basic Settings."

Communication mode	Reference
Unicast mode	☞ Page 282 Unicast mode
Multicast mode	☞ Page 285 Multicast mode

Considerations

■When cyclic transmission cannot be performed by setting a calculation value

The minimum values of communication cycle interval and cyclic transmission time calculated by the formulas serve as guides.

If cyclic transmission is not performed when using a calculation value as a setting value, set a value obtained by the following formula: minimum value of cyclic transmission time + greatest value among the values below.

- 10% of the minimum value of the calculated cyclic transmission time
- When the communication speed of the master station is set to 1 Gbps: Number of device stations × 2 μs
- When the communication speed of the master station is set to 100 Mbps: Number of device stations × 20 μs

Each calculation value obtained from the calculation formulas mentioned above are stored in the following SW.

- SW0072: Communication cycle interval (calculation value) [μs]
- SW0073: Cyclic transmission time (calculation value) [μs]
- SW0078: Transient transmission time (calculation value) [μs]

■When the calculated value is greater than the setting

If each calculated value is greater than the set value of "Basic Period Setting" under "Basic Settings" as follows, an error occurs.

In this case, each calculated value is displayed in "Detailed Information" in the [Error Information] tab of the module diagnostics. Correct the set value so that it is equal to or greater than the calculated value.

- 3010H: When the communication cycle interval (calculation value) [μs] is greater than the set value of "Communication Period Interval Setting"
- 3011H: When the cyclic transmission time (calculation value) [μs] is greater than the set value of "Cyclic Transmission Time"
- 3013H: When the transient transmission time (calculation value) [μs] is greater than the displayed value of "Transient Transmission Time"

■When the general CC-Link IE TSN module is CC-Link IE TSN Class A

When "CC-Link IE TSN Class Setting" of the general CC-Link IE TSN module added to the list of network configuration setting stations is CC-Link IE TSN Class A, if the calculated values for the communication cycle interval (calculation value) (SW0072) and the cyclic transmission time (calculation value) (SW0073) are set for "Communication Period Interval Setting" and "Cyclic Transmission Time," cyclic transmission may not be performed. In this case, perform either of the following operations:

- Select an actual device to be used from "Module List" and add it to the station list.
- Check the maximum response time during time-managed polling in the manual for a device used, and calculate and set the communication cycle interval and cyclic transmission time.

A

How to count modules used in variables

The number of modules used in variables in a calculation formula for communication cycle intervals can be checked in "Network Configuration Settings." (☞ Page 158 CC-Link IE TSN Configuration Setting)
- Main module: A module with the CC-Link IE TSN communication function, which can be used as a single module (with a station number)
- Extension module: A remote module with no CC-Link IE TSN communication function (no station number)
- Local station and remote station: A station displayed as a station type in the setting screen. Extension modules are not included.
- Device station: A local station and remote station. Extension modules are not included.

Formulas shown in this section are for configurations not including extension modules.

Ex.

The following table shows whether to include each module and the number of modules used in variables in a calculation formula when the setting in the CC-Link IE TSN configuration screen is as follows.

○: Included, —: Not included

Setting in the CC-Link IE TSN configuration screen				Type used in variables in a calculation formula			
Item	Model name	Station No.	Station type	Main module	Local station	Remote station	Device station
1	RJ71GN11-T2	1	Local station	○	○	—	○
2	NZ2GN12A42-16DT	2	Remote station	○	—	○	○
3	General remote station	3	Remote station	○	—	○	○
Number of modules used in variables in a calculation formula				3	1	2	3

Unicast mode

A calculation formula for the communication cycle interval [ns] depends on the conditions for a model used and the communication speed of the master station as follows:

Model	Communication speed	Calculation formula
NZ81GN11-SX	1 Gbps	$\alpha_c + \alpha_p$ or 125000, whichever is larger
NZ81GN11-T2	1 Gbps	$\alpha_c + \alpha_p$ or 125000, whichever is larger
	100 Mbps	$\alpha_c + \alpha_p$

- α_c: Cyclic transmission time [ns] (☞ Page 282 Cyclic transmission time)
- α_p: Cyclic processing time [ns] (☞ Page 284 Cyclic processing time)

Round up values of α_c and α_p that are less than 1 μs.

■Cyclic transmission time

- α_c

A calculation formula depends on the conditions for a model used, the communication speed of the master station, and "Network Configuration Settings" in the parameter as follows:

Model	Communication speed	Network configuration setting	Calculation formula
NZ81GN11-SX	1 Gbps	—	The largest value in No.1 to No.4
NZ81GN11-T2	1 Gbps 100 Mbps	When a CC-Link IE TSN Class A device station set to "Basic Period" or "Normal-Speed" does not exist	The largest value in No.1 to No.4 + No.5
		When a CC-Link IE TSN Class A device station set to "Basic Period" or "Normal-Speed" exists	(No.1 or No.2, whichever is larger) + (No.3 or No.4, whichever is larger) + No.5 + No.6

Details on the calculation formulas for No.1 to No.6 are shown in the following tables.
- NZ81GN11-SX, 1 Gbps

No.	Calculation formula
1	$\{(50 \times n1) + (16 \times n2) + ndm\} \times 8 + (Sn - 1) \times 830 + 14000 + nrp$
2	$\{(30 \times n1) + (16 \times n2) + ndm\} \times 4 + (1661 \times n1) + (Sn - 1) \times 830 + 14300 + nrp$
3	$\{(50 \times n3) + (20 \times n4) + nds\} \times 8 + 14000 + nrp$
4	$\{(50 \times n5) + (20 \times n6) + ndl\} \times 8 + (Sn - 1) \times 830 + 14000 + nrp$

- NZ81GN11-T2, 1 Gbps

No.	Calculation formula
1	{(50 × n1) + (16 × n2) + ndm} × 8 + (Sn - 1) × 830 + 14000 + nh + nrp
2	{(30 × n1) + (16 × n2) + ndm} × 4 + (1661 × n1) + (Sn - 1) × 830 + 14300 + nh + nrp
3	{(50 × n3) + (20 × n4) + nds} × 8 + 14000 + nh + nrp
4	{(50 × n5) + (20 × n6) + ndl} × 8 + (Sn - 1) × 830 + 14000 + nh + nrp
5	{(Sn - 1) × 830 + 39102} × n7
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 "Basic Period" or "Normal-Speed"

- NZ81GN11-T2, 100 Mbps

No.	Calculation formula
1	{(42 × n1) + (16 × n2) + ndm} × 80 + (Sn - 1) × 5150 + 14000 + nh + nrp
2	—
3	{(42 × n3) + (20 × n4) + nds} × 80 + 14000 + nh + nrp
4	{(42 × n5) + (20 × n6) + ndl} × 80 + (Sn - 1) × 5150 + 14000 + nh + nrp
5	{(Sn - 1) × 5150 + 187440} × n7
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 "Basic Period" or "Normal-Speed"

Round up values in No.5 that are less than 1 μs.

Point

The maximum response time during time-managed polling of a device station is a time from when the device station receives a request from the master station to when it returns a response to the master station.
☞ Manual for a device station used

The following table shows details on the variables.
For each variable to be used, round it up to one decimal point before assigning to the calculation formula.

Variable name	Description
n1	Value of (ndm + (16 × n2)) / 1488 rounded up to the nearest integer 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 The switching hub delay time changes depending on the hub models and settings. Use the following values as guides. • When the communication speed of the master station is set to 1 Gbps: 50000 • When the communication speed of the master station is set to 100 Mbps: 160000
nrp	• When "Network Topology" under "Basic Settings" is set to "Line/Star": 0 • When "Network Topology" under "Basic Settings" is set to "Ring" (the communication speed of the master station is 1 Gbps): 13000 • When "Network Topology" under "Basic Settings" is set to "Ring" (the communication speed of the master station is 100 Mbps): 130000
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 the master station) / (11744 × Ln) rounded up to the nearest integer • LWxmb: Value of (Total number of points of "LW Setting" excluding the 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

A

Variable name	Description
ndl	(RXI / 8) + (RWrI × 2) + (LBI / 8) + (LWI × 2) + 8 • RXI: Number of points of "RX Setting" of main modules of the device station[1] to be used as the maximum number of link points • RWrI: Number of points of "RWr Setting" of main modules of the device station[1] to be used as the maximum number of link points • LBI: Number of points of "LB Setting" of the device station[1] to be used as the maximum number of link points • LWI: Number of points of "LW Setting" of the device station[1] 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 cases: 0

[1] A device station with the maximum value as a result of calculating (("RX Setting" + "LB Setting") / 8) + (("RWr Setting" + "LW Setting") × 2) for each device station

■Cyclic processing time

• α_p

A calculation formula depends on the conditions for a model used and the communication speed of the master station as follows:

Condition		Calculation formula
NZ81GN11-SX	1 Gbps	p1 + p2 + p3 + kp
NZ81GN11-T2	1 Gbps	p1 + p2 + p3 + kp
	100 Mbps	p1 + p2 + p3 + kp or 340000, whichever is larger

The following table shows details on the variables.

Variable name	Description
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 the 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, p1 = 0.
p2	LB/LW processing time {((Total number of points of "LB Setting" excluding the master station) / 8) + ((Total number of points of "LW Setting" excluding the 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 the total number of points of "LB Setting" = total number of points of "LW Setting" = 0, p2 = 0.
p3	Diagnostic information processing time Sn × 40
kp	78000
Sn	Number of device stations
Ln	Number of local stations

Multicast mode

A calculation formula for the communication cycle interval [ns] depends on the conditions for a model used and the communication speed of the master station as follows:

Model	Communication speed	Calculation formula
NZ81GN11-SX	1 Gbps	$\alpha_c + \alpha_p$ or 125000, whichever is larger
NZ81GN11-T2	1 Gbps	$\alpha_c + \alpha_p$ or 125000, whichever is larger
	100 Mbps	$\alpha_c + \alpha_p$

- α_c: Cyclic transmission time [ns] (☞ Page 285 Cyclic transmission time)
- α_p: Cyclic processing time [ns] (☞ Page 289 Cyclic processing time)

Round up values of α_c and α_p that are less than 1 µs.

■Cyclic transmission time

- α_c

A calculation formula depends on the conditions for a model used, the communication speed of the master station, and "Network Configuration Settings" in the parameter as follows:

Model	Communication speed	Network configuration setting	Calculation formula
NZ81GN11-SX	1 Gbps	—	The value in No.1 or No.2, whichever is larger
NZ81GN11-T2	1 Gbps 100 Mbps	When a CC-Link IE TSN Class A device station set to "Basic Period" or "Normal-Speed" does not exist	The value in No.1 or No.2, whichever is larger + No.5
		When a CC-Link IE TSN Class A device station set to "Basic Period" or "Normal-Speed" exists	The value in No.1 or No.2, whichever is larger + No.5 + No.6

Details on the calculation formulas for No.1 to No.6 are shown in the following tables.

- NZ81GN11-SX, 1 Gbps

No.	Calculation formula
1	$\{(50 \times n1l) + (16 \times n2l) + ndml\} \times 8 + (Sn - 1) \times 830 + 14000 + nh + nrp +$ (the value in No.3 or No.4, whichever is larger)
2	$\{(30 \times n1l) + (16 \times n2l) + ndml\} \times 4 + (1661 \times n1l) + (Sn - 1) \times 830 + 14300 + nrp +$ (the value in No.3 or No.4, whichever is larger)
3	$\{(50 \times n3) + (20 \times n4) + nds\} \times 8 + 14000$
4	$\{(50 \times n5) + (20 \times n6) + ndl\} \times 8 + (Sn - 1) \times 830 + 14000$

- NZ81GN11-T2, 1 Gbps

No.	Calculation formula
1	$\{(50 \times (n1r + n1l)) + (16 \times (n2r + n2l)) + (ndmr + ndml)\} \times 8 + (Sn - 1) \times 830 + 14000 + nh + nrp +$ (the value in No.3 or No.4, whichever is larger)
2	$\{(30 \times (n1r + n1l)) + (16 \times (n2r + n2l)) + (ndmr + ndml)\} \times 4 + (1661 \times (n1r + n1l)) + (Sn - 1) \times 830 + 14300 + nh + nrp +$ (the value in No.3 or No.4, whichever is larger)
3	$\{(50 \times n3) + (20 \times n4) + nds\} \times 8 + 14000 + nh$
4	$\{(50 \times n5) + (20 \times n6) + ndl\} \times 8 + (Sn - 1) \times 830 + 14000 + nh$
5	$\{(Sn - 1) \times 830 + 39102\} \times n7$
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 "Basic Period" or "Normal-Speed"

- NZ81GN11-T2, 100 Mbps

No.	Calculation formula
1	$\{(42 \times (n1r + n1l)) + (16 \times (n2r + n2l)) + (ndmr + ndml)\} \times 80 + (Sn - 1) \times 5150 + 14000 + nh + nrp +$ (the value in No.3 or No.4, whichever is larger)
2	—
3	$\{(42 \times n3) + (20 \times n4) + nds\} \times 80 + 14000 + nh$
4	$\{(42 \times n5) + (20 \times n6) + ndl\} \times 80 + (Sn - 1) \times 5150 + 14000 + nh$
5	$\{(Sn - 1) \times 5150 + 187440\} \times n7$
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 "Basic Period" or "Normal-Speed"

Round up values in No.5 that are less than 1 µs.

Point

A

The maximum response time during time-managed polling of a device station is a time from when the device station receives a request from the master station to when it returns a response to the master station.

☞ Manual for a device station used

The following table shows details on the variables.

For each variable to be used, round it up to one decimal point before assigning to the calculation formula.

Variable name	Description
n1r	Value of (ndmr + (16 × n2r)) / 1488 rounded up to the nearest integer or Rn, whichever is larger
n1l	Value of (ndml + (16 × n2l)) / 1488 rounded up to the nearest integer
n2r	RYlb + RWwlb + LBmb + LWmb + 1 + DIm • 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	■NZ81GN11-SX RYlb + RWwlb + LBmb + LWmb + 1 + DIm • RYlb: Value of (Total number of points of "RY Setting"[*1]) / 11776 rounded up to the nearest integer • RWwlb: Value of (Total number of points of "RWw Setting"[*1]) / 736 rounded up to the nearest integer • LBmb: {Value rounded up to the nearest multiple of 2 of [(Number of points of "LB Setting" set in the master station) / 8 / BWCm]} / 1472 rounded up to the nearest integer • LWmb: {Value rounded up to the nearest multiple of 2 of [(Number of points of "LW Setting" set in the master station) × 2 / BWCm]} / 1472 rounded up to the nearest integer ■NZ81GN11-T2 RYlb + RWwlb + LBmb + LWmb + 1 • RYlb: Value of (Total number of points of "RY Setting"[*1]) / 11776 rounded up to the nearest integer • RWwlb: Value of (Total number of points of "RWw Setting"[*1]) / 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 module) / 8) + ((Total number of points of "RWw Setting" set in the remote station (main module) × 2)
ndml	■NZ81GN11-SX [(Total number of points of "RY Setting"[*1]) / 8] + [(Total number of points of "RWw Setting"[*1]) × 2] + [(Number of points of "LB Setting" set in the master station) / 8] / Value rounded up to the nearest multiple of 2 of BWCm + [(Number of points of "LW Setting" set in the master station) × 2] / Value rounded up to the nearest multiple of 2 of BWCm + 24 + DIm × 8 ■NZ81GN11-T2 ((Total number of points of "RY Setting"[*1]) / 8) + (Total number of points of "RWw Setting"[*1] × 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
BWCm	■NZ81GN11-SX only "Multiple Period Setting" for "Communication Period Setting (LB/LW)" of the master station • When "LB/LW Points Extended Setting" is set to "Not to Extend," or to "Extend" and "Communication Period Setting (LB/LW)" to "Basic Period" for the master station: 1 • Other cases: Value of N set for 'N times' in "Basic Settings" ⇨ "Communication Period Setting" ⇨ "Multiple Period Setting"
BWCs(i)	■NZ81GN11-SX only "Multiple Period Setting" for "Communication Period Setting (LB/LW)" of station No.i • When "LB/LW Points Extended Setting" is set to "Not to Extend," or to "Extend" and "Communication Period Setting (LB/LW)" to "Basic Period" for station No.i: 1 • Other cases: Value of N set for 'N times' in "Basic Settings" ⇨ "Communication Period Setting" ⇨ "Multiple Period Setting"
DIm	■NZ81GN11-SX only • When "LB/LW Points Extended Setting" is set to "Not to Extend," or to "Extend" and "Communication Period Setting (LB/LW)" to "Basic Period" for the master station: 0 • When "LB/LW Points Extended Setting" is set to "Extend," and "Communication Period Setting (LB/LW)" to "Normal-Speed" or "Low-Speed" for the master station: 1
DIs	■NZ81GN11-SX only • When "LB/LW Points Extended Setting" is set to "Extend": Number of device stations with "Communication Period Setting (LB/LW)" set to "Normal-Speed" or "Low-Speed" • Other cases: 0
DIb	■NZ81GN11-SX only • When "LB/LW Points Extended Setting" is set to "Extend," and "Communication Period Setting (LB/LW)" to "Normal-Speed" or "Low-Speed" for the device station to be used as the maximum number of link points: 8 • Other cases: 0

Variable name	Description
nh	Switching hub delay time × Number of switching hubs connected to the network The switching hub delay time changes depending on the hub models and settings. Use the following values as guides. • When the communication speed of the master station is set to 1 Gbps: 50000 • When the communication speed of the master station is set to 100 Mbps: 160000
nrp	• When "Network Topology" under "Basic Settings" is set to "Line/Star": 0 • When "Network Topology" under "Basic Settings" is set to "Ring" (the communication speed of the master station is 1 Gbps): 13000 • When "Network Topology" under "Basic Settings" is set to "Ring" (the communication speed of the master station is 100 Mbps): 130000
n3	$Sn \times nhs$ • nhs: Value of $(nds + (20 \times n4)) / (1488 \times Sn)$ rounded up to the nearest integer
n4	■NZ81GN11-SX $Sn \times (RXb + RWrb) + Ln \times (LBxmb + LWxmb) + Sn + DIs$ • RXb: Value of (Total number of points of "RX Setting" of main modules) / $(11744 \times Sn)$ rounded up to the nearest integer • RWrb: Value of (Total number of points of "RWr Setting" of main modules) / $(734 \times Sn)$ rounded up to the nearest integer • LBxmb: Value of $[\{ \sum_{i=1}^{120}$ Value rounded up to the nearest multiple of 2 of (Number of points of "LB Setting" in the station number i / 8 / BWCs(i))} / $(1468 \times Ln)]$ rounded up to the nearest integer • LWxmb: Value of (Total number of points of "LW Setting" excluding the master station) / $(734 \times Ln)$ rounded up to the nearest integer Value of $[\{ \sum_{i=1}^{120}$ Value rounded up to the nearest multiple of 2 of (Number of points of "LW Setting" in the station number i × 2 / BWCs(i))} / $(1468 \times Ln)]$ rounded up to the nearest integer ■NZ81GN11-T2 $Sn \times (RXb + RWrb) + Ln \times (LBxmb + LWxmb) + Sn$ • RXb: Value of (Total number of points of "RX Setting" of main modules) / $(11744 \times Sn)$ rounded up to the nearest integer • RWrb: Value of (Total number of points of "RWr Setting" of main modules) / $(734 \times Sn)$ rounded up to the nearest integer • LBxmb: Value of (Total number of points of "LB Setting" excluding the master station) / $(11744 \times Ln)$ rounded up to the nearest integer • LWxmb: Value of (Total number of points of "LW Setting" excluding the master station) / $(734 \times Ln)$ rounded up to the nearest integer
nds	■NZ81GN11-SX [(Total number of points of "RX Setting" of main modules) / 8] + [(Total number of points of "RWr Setting" of main modules) × 2] $+ \sum_{i=1}^{120}$ {Value rounded up to the nearest multiple of 2 of [(Number of points of "LB Setting" in the station number i) / 8 / BWCs(i)]} $+ \sum_{i=1}^{120}$ {Value rounded up to the nearest multiple of 2 of [(Number of points of "LW Setting" in the station number i) × 2 / BWCs(i)]} $+ 8 \times Sn + 8 \times DIs$ ■NZ81GN11-T2 ((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	$(ndl + 20 \times n6) / 1488$
n6	■NZ81GN11-SX $[ndl - (8 + DIb)] / 1468 + 1 + DIsm$ DIsm: • When "LB/LW Points Extended Setting" is set to "Extend," and "Communication Period Setting (LB/LW)" to "Normal-Speed" or "Low-Speed" for the device station[2] to be used as the maximum number of link points: 1 • Other cases: 0 ■NZ81GN11-T2 $(ndl - 8) / 1468 + 1$
ndl	■NZ81GN11-SX $(RXl / 8) + (RWrl \times 2) + LBl + LWl + 8 + DIb$ • 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: Value rounded up to the nearest multiple of 2 of the number of points of "LB Setting" of the device station[2] to be used as the maximum number of link points / 8 / BWCs(i) • LWl: Value rounded up to the nearest multiple of 2 of the number of points of "LW Setting" of the device station[2] to be used as the maximum number of link points × 2 / BWCs(i) • i: Station number of the device station[2] to be used as the maximum number of link points ■NZ81GN11-T2 $(RXl / 8) + (RWrl \times 2) + (LBl / 8) + (LWl \times 2) + 8$ • 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

A

Variable name	Description
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 cases: 0

*1 Including values from the smallest value set in "Start" to the largest value set in "End" in "Network Configuration Settings"

*2 A device station with the maximum value as a result of calculating the following for each device station

■ NZ81GN11-SX: Total of the following five values:

· "RX Setting" / 8

· Value rounded up to the nearest multiple of 2 of "LB Setting" / 8 / BWCs(i)

· "RWr Setting" $\times$ 2

· Value rounded up to the nearest multiple of 2 of "LW Setting" $\times$ 2 / BWCs(i)

· When "LB/LW Points Extended Setting" is set to "Extend," and "Communication Period Setting (LB/LW)" to "Normal-Speed" or "Low-Speed" for the applicable station: 8, other cases: 0

■ NZ81GN11-T2: (("RX Setting" + "LB Setting") / 8) + (("RWr Setting" + "LW Setting") $\times$ 2)

■Cyclic processing time

• α_p

A calculation formula depends on the conditions for a model used and the communication speed of the master station as follows:

Condition		Calculation formula
NZ81GN11-SX	1 Gbps	p1 + p2 + p3 + p4 + kp
NZ81GN11-T2	1 Gbps	p1 + p2 + p3 + kp
	100 Mbps	p1 + p2 + p3 + kp or 340000, whichever is larger

The following table shows details on the variables.

Variable name	Description
p1	RX/RY/RWr/RWw processing time {((Total number of points of "RX Setting") + (Total number of points of "RY Setting"[*1])) / 8 + ((Total number of points of "RWr Setting") + (Total number of points of "RWw Setting"[*1])) × 2} × 5 + (Sn × 3300) However, if the total number of points of "RY Setting"[*1] = total number of points of "RX Setting" = total number of points of "RWr Setting" = total number of points of "RWw Setting"[*1] = 0, p1 = 0.
p2	LB/LW processing time ■When "LB/LW Points Extended Setting" is set to "Extend" for an NZ81GN11-SX $$\sum_{i=1}^{120} \{\text{Value rounded up to the nearest multiple of 2 of } [(\text{Number of points of "LB Setting" in the station number i}) / 8 / BWCs(i)]^{*2}\}$$ $$+ \sum_{i=1}^{120} \{\text{Value rounded up to the nearest multiple of 2 of } [(\text{Number of points of "LW Setting" of station No.i}) \times 2 / BWCs(i)]^{*2}\}$$ + Value rounded up to the nearest multiple of 2 of [(Number of points of "LB Setting" set in the master station) / 8 / BWCm]^{*2} × Ln + Value rounded up to the nearest multiple of 2 of [(Number of points of "LW Setting" set in the master station) × 2 / BWCm]^{*2} × Ln × 5 + {[(Total number of points of "LB Setting" excluding the master station) / 8] + [(Total number of points of "LW Setting" excluding the 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 × px) However, if the total number of points of "LB Setting" = total number of points of "LW Setting" = 0, p2 = 0. • px: 6000 when "Communication Period Setting (LB/LW)" is set to "Basic Period" for all stations, and 9500 for other settings ■Other cases {((Total number of points of "LB Setting" excluding the master station) / 8) + ((Total number of points of "LW Setting" excluding the 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 the total number of points of "LB Setting" = total number of points of "LW Setting" = 0, p2 = 0.
p3	Diagnostic information processing time Sn × 40
p4	Division information processing time • When "LB/LW Points Extended Setting" is set to "Extend" for an NZ81GN11-SX: Number of stations with "Communication Period Setting (LB/LW)" set to "Normal-Speed" or "Low-Speed" × 40 • Other cases: 0
kp	78000
Sn	Number of device stations
Ln	Number of local stations

*1 Including values from the smallest value set in "Start" to the largest value set in "End" in "Network Configuration Settings"

*2 '0' when setting "Communication Period Setting (LB/LW)" to "Basic Period" for the relevant station

Appendix 9 Windows User Account Control

The user account control (UAC) is provided to protect the system from being destroyed (e.g. prevention of start-up of a program which will execute an unintended operation).

Confirmation message

When enabling the user account control function, a message for the user account control appears at the following timings:
- Installing/uninstalling a software package
- Starting the CC IE TSN utility
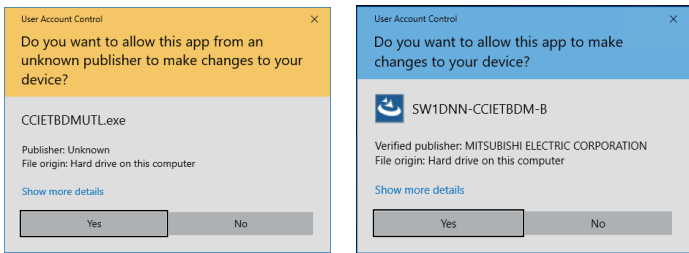
When a message appears, click the [Yes] button.

Methods for displaying a message

If a software package cannot be installed or if a message for the user account control does not appear when starting the CC IE TSN utility, enable the user account control setting by the following procedures.

Method for enabling the user account control function

1. Select [System and Security] ⇨ [Change User Account Control settings] in the control panel of Windows.

2. Set the slide bar to an item other than "Never notify" and click the [OK] button.

Method for setting the local security policy

1. Select [System and Security] ⇨ [Administrative Tools] ⇨ [Local Security Policy] in the control panel of Windows.

2. Select [Local Policies] ⇨ [Security Options] in the "Local Security Policy" screen.

3. Set the following policies:

Policy	Security setting
User Account Control: Detect application installations and prompt for elevation	Enabled
User Account Control: Run all administrators in Admin Approval Mode	Enabled
User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode	Prompt for consent for non-Windows binaries

Appendix 10 Behavior When Entering Power Save Mode or Enabling Fast Startup

This board does not support the power save mode (hibernate, sleep) and the fast startup. The following explains the behavior of a board on each function.

Behavior when entering the power save mode (hibernate, sleep)

Behavior when entering the hibernation/sleep mode

The following explains the behavior of a board when a personal computer enters the power save mode (hibernate, sleep).
- The board stops its operation and is disconnected from the network.
- The board is not reconnected even after the personal computer returns from the power save mode (hibernate, sleep).
- After the return from the power save mode (hibernate, sleep), "-28141(9213H) System sleep error" occurs when accessing the board from the utility or an application program, which includes MELSEC data link library function.

Corrective action

When the personal computer is set to enter the power save mode (hibernate, sleep), the setting is changed by MELSECPowerManager.
For details on MELSECPowerManager, refer to the following:
☞ Page 292 MELSECPowerManager

Behavior when the fast startup function is enabled

Behavior when enabling the fast startup

The following explains the behavior of a board when the fast startup is enabled.
- The board is not reconnected even after the fast startup.
- After the fast startup, "-28141(9213H) System sleep error" occurs when accessing the board from the utility or an application program, which includes MELSEC data link library function.

Corrective action

When the fast startup function is enabled on the personal computer, the setting is changed by MELSECPowerManager.
For details on MELSECPowerManager, refer to the following:
☞ Page 292 MELSECPowerManager

A

Appendix 11 MELSECPowerManager

MELSECPowerManager is a service application which monitors the Windows Power Options settings every 30 seconds to prevent a personal computer from entering the power save mode (hibernate, sleep) or enabling the fast startup function. When a personal computer is set to enter the power save mode (hibernate, sleep) or the fast startup function is enabled, the following message appears and the setting is changed by MELSECPowerManager.
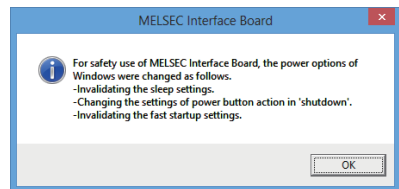
Installing MELSECPowerManager

MELSECPowerManager is installed automatically when installing the software package.
The operation starts after restarting the operating system.

Uninstalling MELSECPowerManager

MELSECPowerManager is uninstalled automatically when uninstalling the software package.
However, MELSECPowerManager cannot be uninstalled when other Mitsubishi Electric network interface boards are installed in a personal computer. Uninstall all the software packages on the personal computer to uninstall it.

Checking MELSECPowerManager

MELSECPowerManager can be checked by selecting [Administrative Tools] ⇨ [Services] in Windows.
Check that "MELSECPowerManager" is displayed and "Running" is displayed under "Status."

Point

- When MELSECPowerManager is disabled, the personal computer may enter the power save mode (hibernate, sleep) automatically depending on its settings. Do not disable MELSECPowerManager because a board does not operate properly if the personal computer enters the power save mode (hibernate, sleep). For the behavior of the board when the personal computer enters the power save mode (hibernate, sleep) or the fast startup is enabled, refer to the following:
  ☞ Page 291 Behavior When Entering Power Save Mode or Enabling Fast Startup
- If MELSECPowerManager is disabled accidentally, select and right-click "MELSECPowerManager" in the "Services" screen, then select [Start] from the shortcut menu.
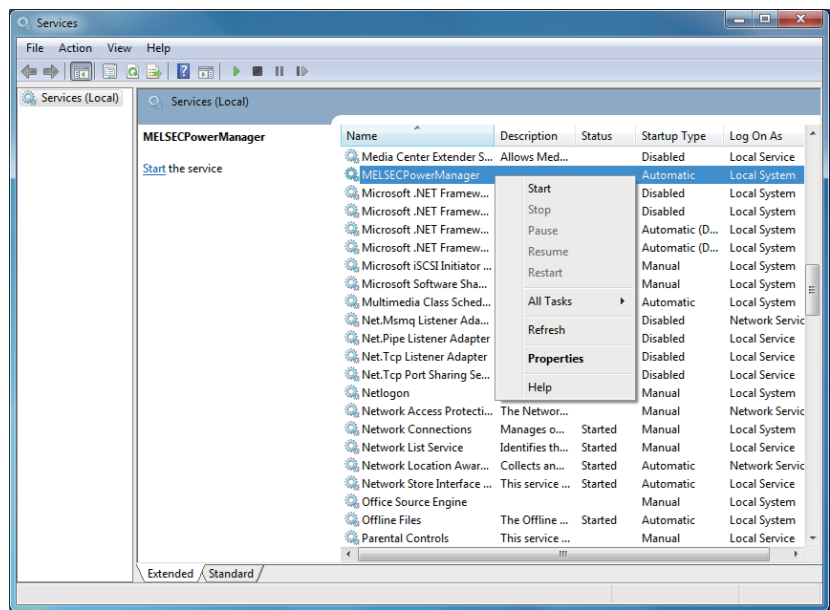
Appendix 12 Unusable Character Strings (Reserved Words)

This section shows the characters and character strings that cannot be used due to the specifications of an operating system or the utility of this product.

Character strings that have predetermined roles and cannot otherwise be used are called reserved words.

Reserved words cannot be used as names.

Precautions

Reserved words are not case-sensitive.

In addition, they cannot be used regardless of the language of an operating system.

Unusable character strings for a file name

Category		Character string
Invalid character	Symbol	Space, ", %, ', *, /, ., :, <, >, ?, \, |, ¡, ¢, £, ¤, \, ¦, §, ¨, ©, ª, «, ¬, ®, ¯, °, ±, ², ³, ´, µ, ¶, ·, ¸, ¹, º, », ¼, ½, ¾, ¿
	Surrogate pair	0xD800 to 0xDBFF, 0xDC00 to 0xDFFF
	Control code	U+0000 to U+001F, U+0080 to U+009F, U+00A0, U+00AD, U+FFFE, U+FFFF
Windows reserved word		COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, AUX, CON, PRN, NUL, CLOCK$, END_MARK

- File names with spaces only cannot be used.
- A period (.) cannot be used at the end of a file name.

Unusable character strings for a path name

Category		Character string
Invalid character	Symbol	", *, /, ,, :, <, >, ?, |, ¡, ¢, £, ¤, \, ¦, §, ¨, ©, ª, «, ¬, -, ®, ¯, °, ±, ², ³, ´, µ, ¶, ·, ¸, ¹, º, », ¼, ½, ¾, ¿
	Surrogate pair	0xD800 to 0xDBFF, 0xDC00 to 0xDFFF
	Control code	U+0000 to U+001F, U+0080 to U+009F, U+00A0, U+00AD, U+FFFE, U+FFFF
Windows reserved word		COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, AUX, CON, PRN, NUL

A

Appendix 13 Software Licenses and Copyrights

This section describes the licenses and copyrights of software used in this product.

MD5 Message-Digest Algorithm

This product includes code that was developed by RSA Data Security, Inc.

Copyright © 1991-2, RSA Data Security, Inc.

License to copy and use this software is granted provided that it is identified as the "RSA Data Security, Inc. MD5 Message-Digest Algorithm" in all material mentioning or referencing this software or this function.

License is also granted to make and use derivative works provided that such works are identified as "derived from the RSA Data Security, Inc. MD5 Message-Digest Algorithm" in all material mentioning or referencing the derived work.

RSA Data Security, Inc. makes no representations concerning either the merchantability of this software or the suitability of this software for any particular purpose. It is provided "as is" without express or implied warranty of any kind.

These notices must be retained in any copies of any part of this documentation and/or software.

Appendix 14 Added and Changed Functions

This section explains the function changes and update method.

For the method for checking the version, refer to the following:

☞ Page 239 Checking Production Information and Firmware Version

Change of hardware function

The following shows the added and changed functions of a board.

Added/changed contents	Firmware version	Software version	Reference
Firmware update	'02' or later	'1.001B' or later	Page 296 Firmware update

A

Firmware update

The firmware of a board installed in a personal computer can be updated by using Firmware Update Tool.

Obtain a firmware update file corresponding to a model to be updated in advance, store it in a folder on a personal computer.

Precautions

Check the system operation before and after the update.

When there is any error for the system operation after the update, revert the firmware to a previous version.

If the software package is also updated, revert it to a previous version.

Target models

- NZ81GN11-SX (firmware version 02 or later)
- NZ81GN11-T2 (firmware version 02 or later)

> **Point**
>
> For the update of a TSN board with firmware version 01, please contact your local Mitsubishi Electric sales office or representative.

Obtaining a firmware update file

Please contact your local Mitsubishi Electric sales office or representative.

Unzip an obtained firmware update information (ZIP file).

The file name of a firmware update file is mmmm_vv.SYF.

'mmmm' and 'vv' indicate a model name and a firmware version, respectively.

Precautions

- Check the file name so that the firmware update file matches the target model. If they do not match, the firmware cannot be updated.
- Do not change the file name of a decompressed firmware update file.

Update method

■Preparation

1. Store a firmware update file in a folder on a personal computer.

Make sure that the total number of characters for the path name and file name of the firmware update file is 259 or less.

2. Update the software package to the latest version.

☞ Page 299 Update of software package

3. Install a board on a slot of the personal computer.

4. Set a channel number and check it by using the utility.

5. Set "Use of Board" and "Model Name" in "Required Settings" of the parameter, and write them to the board.

6. Stop a user program.

> *Point*
> - Stop user programs and separate a board from the system by disconnecting cables not to affect the system. Then, perform the firmware update again.
> - Stop access to a target device the firmware of which is to be updated with the CC IE TSN utility, device monitor utility, or MELSEC data link library function. '-26334 (9922H) reset execution error/firmware update execution error' is returned when accessing the target device during a firmware update file is being transferred.

■Starting Firmware Update Tool

1. Select [Tool] ⇨ [Firmware Update Tool] in the CC IE TSN utility.

Firmware Update Tool starts.

No.	Select	Module Name	Channel No.	File Transfer Progress	Firmware Update Progress	Firmware Version	Result	Error Code
▶ 1	☐		281	0%	0%			
2	☐		282	0%	0%			
3	☐		283	0%	0%			
4	☐		284	0%	0%			

*The target boards are reset after the firmware update is completed. Please check that they start normally.

[Firmware Update File] [Firmware Update File Ver.] [Check Board Status] [Start Update]

Precautions

- If the channel number is duplicated, Firmware Update Tool does not start.
- Multiple pieces of Firmware Update Tool cannot be started.

■Performing firmware update

1. Click the [Firmware Update File] button.

Enter or select an obtained firmware update file.

2. Click the [Check Board Status] button.

For a board that can be accessed to update its firmware, "Firmware Update is available." is displayed in "Result."

It is also displayed for a board the version of which cannot be changed with the set file.

3. Select the checkbox of "Select" for a board to be updated.

Select a board after checking the following:

- Compare "Firmware Update File Ver." and "Firmware Version" of each board, and check if they need to be changed.
- Make sure that the model name of the file name of the firmware update file and "Module Name" of the board match.

4. Click the [Start Update] button.

■Behavior during firmware update

The following processing is performed when starting the firmware update.

It is processed for each board with the checkbox selected in order of "No."

1. The target board enters the offline mode.

During the firmware update, a CC-Link IE TSN interface board is set to offline mode regardless of the parameter setting.

All LEDs of a board being updated are turned OFF.

2. The firmware update is performed.

File Transfer Progress	Firmware Update Progress	Firmware Version	Result
0%	0%		Failure
100%	40%		

• The firmware update file is transferred to the board.
The progress rate is displayed in "File Transfer Progress."
 • The firmware update is performed.
The progress rate is displayed in "Firmware Update Progress."

When the firmware update is completed normally, "Success" is displayed in "Result."

If an error occurs during the firmware update, "Failure" is displayed in "Result."

Even if the update fails, the one for the next board will be processed.

The result is also registered in the system log of Event Viewer as the information event log. (☞ Page 197 Information event)

3. After the processing for all boards is completed, a board updated normally is automatically reset and enters the mode before the firmware update.

Precautions

- Do not forcibly terminate Firmware Update Tool while the firmware is being updated. Otherwise, the firmware update may be interrupted and the board may not operate properly. In this case, reset the board and perform the firmware update again.
- When the following operations are executed during the firmware update, the update may be completed with an error, resulting in failure of the board.
  - Turning OFF the power of a personal computer
  - Restarting an operating system
  - Resetting a board
  - Installing/uninstalling a board

When an error occurs, refer to the following:

☞ Page 209 An error has occurred when terminating the process during the firmware update

■When firmware update fails

Check the error code and perform the firmware update again.

For details on error codes, refer to the following:

☞ Page 208 An error has occurred when updating the firmware

Update of software package

For details of the updated version of software and the functions which are added or changed, please contact your local Mitsubishi Electric sales office or representative.

Obtaining an updated version

Please contact your local Mitsubishi Electric sales office or representative.

Installation method

1. Save the obtained data for installation to the system drive, CD, etc.

2. Start the installer.
Double-click "setup.exe" in the folder.

3. Follow the on-screen instructions to select or enter the necessary information.

Precautions

An updated version is installed in the folder where the software package is already installed.

Manual

For the function and handling method of the updated version of software package, refer to the corresponding manual. The manual is stored in the 'Manual' folder of the software package.
After the installation, the manual can be displayed by selecting [Help] ⇨ [Manual] from the menu in the CC IE TSN utility.

A

Change of a board or personal computer

The following shows the procedures for changing a board or personal computer.
The parameter setting before change can be used by saving it to a file then writing it to a board after change.

Saving the setting before change

1. Start the CC IE TSN utility. (Page 115 Starting the CC IE TSN utility)

2. Read parameters from a board. (Page 122 Reading parameters from a board)

3. Save the parameters to a file. (Page 119 File saving)

4. End the CC IE TSN utility. (Page 115 Ending the CC IE TSN utility)

Changing a board or personal computer

■Updating an operating system

1. Uninstall the software package (SW1DNN-CCIETBDM-B). (Page 43 Uninstallation procedure)

2. Upgrade or update the operating system.

3. Install the software package (SW1DNN-CCIETBDM-B) with the version supporting the changed operating system.
   (Page 38 Installation procedure)

Be sure to check the operation after the installation.

■Replacing a board with another

1. Install a board. (Page 48 Board Installation)

2. Start the CC IE TSN utility. (Page 115 Starting the CC IE TSN utility)

3. Set a channel number. (Page 121 Channel number setting)

4. Test the installed board for any errors. (Page 50 Tests before Wiring (Board Communication Tests))

■Installing a board in another personal computer

1. Install the software package (SW1DNN-CCIETBDM-B). (Page 38 Installation procedure)

2. Install a board. (Page 48 Board Installation)

3. Start the CC IE TSN utility. (Page 115 Starting the CC IE TSN utility)

Precautions

When installing two or more boards, check and set the channel number of each board so that it is not duplicate. (Page 121 Channel number setting)

> **Point**
>
> Channel numbers set by using the utility are saved in a board.
> In addition, channel numbers being set are retained when performing any of the following operations:
> • Restarting a personal computer
> • Changing the board installation position
> • Changing a personal computer to which a board is installed

Writing the setting before change

1. Start the CC IE TSN utility. (Page 115 Starting the CC IE TSN utility)

2. Read the parameters from the file. (Page 119 File reading)

3. Write the parameters to the board. (Page 122 Writing parameters to a board)

INDEX

I

MEMO

REVISIONS

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.

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

 (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
 (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
   1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
   2. Failure caused by unapproved modifications, etc., to the product by the user.
   3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
   4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
   5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
   6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
   7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

 (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
 (2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:
 (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
 (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
 (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
 (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

INFORMATION AND SERVICES

For further information and services, please contact your local Mitsubishi Electric sales office or representative.

Visit our website to find our locations worldwide.

Locations Worldwide

MITSUBISHI ELECTRIC Factory Automation Global Website

www.MitsubishiElectric.com/fa/about-us/overseas/

TRADEMARKS

Microsoft, Visual C++, Visual C#, Visual Studio, and Windows are trademarks of the Microsoft group of companies.

Oracle and Java are registered trademarks of Oracle and/or its affiliates.

The company names, system names and product names mentioned in this manual are either registered trademarks or trademarks of their respective companies.

The trademark symbols (™, ®) may not always appear in this manual.

COPYRIGHTS

The screens (screenshots) are used in accordance with the Microsoft Corporation guideline.

FlexGrid for Windows Forms

Copyright © 2002-2010 ComponentOne LLC.

For the open source software used in this product, refer to the following:

MITSUBISHI ELECTRIC CORPORATION

When exported from Japan, this manual does not require application to the
Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.