MITSUBISHI ELECTRIC

Programmable Controller

CC-Link IE TSN Remote I/O Module
User's Manual
(CC-Link IE TSN Communication Mode)

-NZ2GN2S1-16D
-NZ2GN2S1-32D
-NZ2GN2B1-16D
-NZ2GN2B1-32D
-NZ2GNCF1-32D
-NZ2GNCE3-32D
-NZ2GN12A4-16D
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-NZ2GN2S1-16T
-NZ2GN2S1-32T
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-NZ2GN12A42-16DTE

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

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

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

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

⚠ **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

- In the case of a communication failure in the network, data of the master station are held. Check Data link status (each station) (SW00B0 to SW00B7) and configure an interlock circuit in the program to ensure that the entire system will operate safely.
- When the module is disconnected due to a communication failure in the network or the CPU module is in the STOP state, outputs are held or turned off according to the output HOLD/CLEAR setting. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even in such a case. If not, an accident may occur due to an incorrect output or malfunction.
- Outputs may remain on or off due to a failure of the module. Configure an external circuit for monitoring output signals that could cause a serious accident.
- Do not use any "use prohibited" signals as a remote input or output signal. These signals are reserved for system use. Do not write any data to the "use prohibited" areas in the remote register. If these operations are performed, an accident may occur due to an incorrect output or malfunction.

[Design Precautions]

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.

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

[Installation Precautions]

⚠ CAUTION

● Use the module in an environment that meets the general specifications in this manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
● Do not directly touch any conductive parts and electronic components of the module. Doing so can cause malfunction or failure of the module.
● Securely connect the cable connectors. Poor contact may cause malfunction.
● After the first use of the product, do not connect/remove the connector more than 50 times (IEC 61131-2/JIS B 3502 compliant). Exceeding the limit may cause malfunction.
● Securely fix the waterproof/dustproof module with the mounting screws. If not, the module will be greatly affected by vibration, causing failure of the module.

[Wiring Precautions]

⚠ WARNING

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

[Wiring Precautions]

⚠CAUTION

● Individually ground the FG terminal of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.

● Tighten any unused terminal screws within the specified torque range. Undertightening can cause a short circuit due to contact with a solderless terminal.

● Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when a terminal block screw comes loose, resulting in failure.

● Before wiring to the module or to loads, check the rated voltage and terminal layout of the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.

● Tighten the terminal block screws within the specified torque range. Undertightening can cause short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.

● Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.

● Place the cables in a duct or clamp them. If not, dangling cables may swing or inadvertently be pulled, resulting in malfunction or damage to modules or cables.
In addition, the weight of the cables may put stress on modules in an environment of strong vibrations and shocks.

● Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.

● When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.

● When an overcurrent caused by an error of an external device or a failure of the programmable controller flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.

● Mitsubishi programmable controllers must be installed in control panels. Wiring and replacement of a module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring methods, refer to "INSTALLATION AND WIRING" in this manual.

● When attaching waterproof caps to the waterproof/dustproof module, tighten the caps within the specified torque range. Undertightening can cause short circuit, fire, or malfunction. Overtightening can damage the cap, resulting in short circuit or malfunction.

● For the waterproof/dustproof module, periodically check the connectors (such as I/O connectors, communication connectors, and power supply connectors) and the screws of indicator cover. Retighten any connectors and screws that are loose.

● The waterproof/dustproof module is compliant with IP67 only when all necessary waterproof connectors and caps have been installed and the indicator cover has been properly tightened with screws.

● For the waterproof/dustproof module, do not remove the gasket from the indicator cover to keep waterproofing of the cover.

● Attach waterproof caps to the waterproof/dustproof module to prevent dirt and dust from entering the module, or prevent the static electricity from causing the module to fail or malfunction.

[Wiring Precautions]

⚠CAUTION

- For waterproof cables used for the waterproof/dustproof module, use UL listed cables in the categories "CYJV" and "PVVA", with the suitable voltage, current, and temperature rating (the operating temperature range of the cables: 75℃ or higher).
- Do not replace or wire the waterproof/dustproof module immediately after powering off the system because the connector parts of the module can get really hot depending on the load conditions.

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Shut off the external power supply (all phases) used in the system before cleaning the module, retightening the terminal block screws or connector screws, or operating the IP address/station number setting switches. Failure to do so may cause the module to fail or malfunction.

[Startup and Maintenance Precautions]

⚠CAUTION

- Do not disassemble or modify the module. Doing so may cause failure, malfunction, injury, or a fire.
- Do not drop or apply strong shock to the module. Doing so may damage the module.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) 25cm or more away from wiring as well as away in all directions from the programmable controller. Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing a module. Failure to do so may cause the module to fail or malfunction.
- After the first use of the product, do not mount/remove the terminal block to/from the module more than 50 times (IEC 61131-2/JIS B 3502 compliant). Exceeding the limit may cause malfunction.
- After the first use of the product, do not connect/remove the connector more than 50 times (IEC 61131-2/JIS B 3502 compliant). Exceeding the limit may cause malfunction.
- Before handling the module or connection cables, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or 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.

[Disposal Precautions]

⚠CAUTION

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

CONDITIONS OF USE FOR THE PRODUCT

(1) MELSEC programmable controller ("the PRODUCT") shall be used in conditions;

 i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and

 ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI ELECTRIC SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI ELECTRIC USER'S, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

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

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

INTRODUCTION

Thank you for purchasing the CC-Link IE TSN remote I/O module and the waterproof/dustproof remote I/O module (hereafter referred to as I/O module).

This manual describes the procedures, system configuration, parameter settings, functions, and troubleshooting required to use the following modules in CC-Link IE TSN communication mode.

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the I/O module to handle the product correctly.

When applying the program examples introduced 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.

CC-Link IE TSN communication mode

When using the I/O module as a remote station on CC-Link IE TSN, select CC-Link IE TSN communication mode.
To operate the I/O module in CC-Link IE TSN communication mode, set the function setting switch 1 to OFF. (☞ Page 121 Function setting switch setting)

Relevant products

NZ2GN2S1-16D, NZ2GN2S1-32D, NZ2GN2B1-16D, NZ2GN2B1-32D, NZ2GNCF1-32D, NZ2GNCE3-32D, NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN2S1-16T, NZ2GN2S1-32T, NZ2GN2B1-16T, NZ2GN2B1-32T, NZ2GNCF1-32T, NZ2GN2S1-16TE, NZ2GN2S1-32TE, NZ2GN2B1-16TE, NZ2GN2B1-32TE, NZ2GN12A2-16T, NZ2GN12A2-16TE, NZ2GN2S1-32DT, NZ2GN2B1-32DT, NZ2GNCE3-32DT, NZ2GN2S1-32DTE, NZ2GN2B1-32DTE, NZ2GN12A42-16DT, NZ2GN12A42-16DTE

> **Point**
>
> Unless otherwise specified, this manual describes the program examples in which the remote I/O signals and remote registers are assigned for an I/O module as follows.
> • Remote input signals: RX0 to RX1F
> • Remote output signals: RY0 to RY1F
> • Remote register: RWr0 to RWr8F
> • Remote register: RWw0 to RWw8F
> For the assignment of remote I/O signals and remote registers, refer to the following.
> ☞ Page 207 Program Example

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RELEVANT MANUALS

Manual name [manual number]	Description	Available form
CC-Link IE TSN Remote I/O Module User's Manual (CC-Link IE TSN Communication Mode) [SH-082135ENG] (this manual)	Part names, specifications, procedures before operation, system configuration, installation, wiring, parameter settings, functions, programming, troubleshooting, and I/O signals of the I/O module to be used in CC-Link IE TSN communication mode	Print book
		e-Manual PDF
CC-Link IE TSN Remote I/O Module User's Manual (CC-Link IE Field Network Communication Mode) [SH-082240ENG]	Part names, specifications, procedures before operation, system configuration, installation, wiring, parameter settings, functions, programming, troubleshooting, I/O signals, and remote buffer memory of the I/O module to be used in CC-Link IE Field Network communication mode	Print book
		e-Manual PDF
MELSEC iQ-R CC-Link IE TSN User's Manual (Startup) [SH-082127ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of CC-Link IE TSN	Print book
		e-Manual PDF
MELSEC iQ-R CC-Link IE TSN User's Manual (Application) [SH-082129ENG]	Functions, parameter settings, troubleshooting, I/O signals, and buffer memory of CC-Link IE TSN	Print book
		e-Manual PDF
MELSEC iQ-R Inter-Module Synchronization Function Reference Manual [SH-081401ENG]	Inter-module synchronization function, which controls multiple modules synchronously	e-Manual PDF
GX Works3 Operating Manual [SH-081215ENG]	System configuration, parameter settings, and online operations of GX Works3	e-Manual PDF
SLMP Reference Manual [SH-080956ENG]	The protocol (SLMP) used for data reading or writing from an external device to the Ethernet-equipped module	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.
- The hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
CC-Link IE TSN Class[1]	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.
Cyclic transmission	A function by which data are periodically exchanged among stations on the same network using link devices
Data link	Communications performed by cyclic transmission and transient transmission
Device station	A station other than a master station: a local station, a remote station
Engineering tool	A tool used for setting up programmable controllers, programming, debugging, and maintenance
Link device	A device (RX, RY, RWr, RWw, LB, or LW) in a module on CC-Link IE TSN
Local station	A station that performs cyclic transmission and transient transmission with the master station and other local stations.
Master station	A station that controls the entire network. This station can perform cyclic transmission and transient transmission with all stations. Only one master station can be used in a network.
Multicast filter	A filter function that selects whether or not the own station sends cyclic data of multicast to the subsequent stations after receiving them. Since the master station sets the multicast filter according to the system configuration, parameter settings for this filter function are not required.
Multicast mode	Cyclic data are sent to multiple stations in this communication mode.
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 station	A station reserved for future use. This station is not actually connected, but counted as a connected station.
SLMP	A SeamLess Message Protocol. This protocol is used to access an SLMP-compatible device or a programmable controller connected to an SLMP-compatible device from an external device.
Transient transmission	A function of communication with another station, which is used when requested by a dedicated instruction or an engineering tool

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

Term in the windows	Replacement term
Authentication Class	CC-Link IE TSN Class

GENERIC TERMS AND ABBREVIATIONS

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

Generic term/abbreviation	Description
A/D converter module	An abbreviation for the CC-Link IE TSN analog-digital converter module
CC-Link IE TSN remote module	A generic term for an A/D converter module, a D/A converter module, an I/O module
D/A converter module	An abbreviation for the CC-Link IE TSN digital-analog converter module
I/O combined module	A generic term for modules that can input and output a digital signal
I/O combined module (except for waterproof module)	A generic term for modules except for waterproof/dustproof modules that can input and output a digital signal
I/O combined module (waterproof module)	A generic term for waterproof/dustproof modules that can input and output a digital signal
I/O module	An abbreviation for the CC-Link IE TSN remote I/O module
I/O module (except for waterproof module)	An abbreviation for the CC-Link IE TSN remote I/O module that is not waterproof or dustproof
I/O module (waterproof module)	An abbreviation for the CC-Link IE TSN waterproof/dustproof remote I/O module
Input module	A generic term for modules that can input a digital signal
Input module (except for waterproof module)	A generic term for modules except for waterproof/dustproof modules that can input a digital signal
Input module (waterproof module)	A generic term for waterproof/dustproof modules that can input a digital signal
Output module	A generic term for modules that can output a digital signal
Output module (except for waterproof module)	A generic term for modules except for waterproof/dustproof modules that can output a digital signal
Output module (waterproof module)	A generic term for waterproof/dustproof modules that can output a digital signal
RWr	An abbreviation for the remote register of link device. Word data (16-bit data) input from a device station to the master station. (For some areas in a local station, data are input in the opposite direction.)
RWw	An abbreviation for the remote register of link device. Word data (16-bit data) output from the master station to a device station. (For some areas in a local station, data are output in the opposite direction.)
RX	An abbreviation for remote input of link device. Bit data input from a device station to the master station. (For some areas in a local station, data are input in the opposite direction.)
RY	An abbreviation for remote output of link device. Bit data output from the master station to a device station. (For some areas in a local station, data are output in the opposite direction.)

1 PRODUCT LINEUP

1.1 List of Products

Input modules

Module name		Input specifications	Module power supply current	Weight	Model	Reference
DC input module	Positive common/ negative common shared type	Spring clamp terminal block 24VDC, 16 points	110mA	0.15kg	NZ2GN2S1-16D	☞ Page 22 NZ2GN2S1-16D DC input module
		Spring clamp terminal block 24VDC, 32 points	110mA	0.20kg	NZ2GN2S1-32D	☞ Page 25 NZ2GN2S1-32D DC input module
		Screw terminal block 24VDC, 16 points	110mA	0.21kg	NZ2GN2B1-16D	☞ Page 28 NZ2GN2B1-16D DC input module
		Screw terminal block 24VDC, 32 points	110mA	0.31kg	NZ2GN2B1-32D	☞ Page 31 NZ2GN2B1-32D DC input module
		40-pin connector 24VDC, 32 points	110mA	0.20kg	NZ2GNCF1-32D	☞ Page 34 NZ2GNCF1-32D DC input module
	Positive common type	Sensor connector (e-CON) 24VDC, 32 points	110mA	0.25kg	NZ2GNCE3-32D	☞ Page 37 NZ2GNCE3-32D DC input module
		Waterproof connector 24VDC, 16 points	250mA	0.41kg	NZ2GN12A4-16D	☞ Page 41 NZ2GN12A4-16D DC input module
	Negative common type	Waterproof connector 24VDC, 16 points	250mA	0.41kg	NZ2GN12A4-16DE	☞ Page 44 NZ2GN12A4-16DE DC input module

Output modules

Module name		Output specifications	Module power supply current	Weight	Model	Reference
Transistor output module	Sink type	Spring clamp terminal block 12/24VDC, 0.5A/point, 16 points	110mA	0.15kg	NZ2GN2S1-16T	☞ Page 47 NZ2GN2S1-16T transistor output module
		Spring clamp terminal block 12/24VDC, 0.5A/point, 32 points	120mA	0.18kg	NZ2GN2S1-32T	☞ Page 50 NZ2GN2S1-32T transistor output module
		Screw terminal block 12/24VDC, 0.5A/point, 16 points	110mA	0.21kg	NZ2GN2B1-16T	☞ Page 53 NZ2GN2B1-16T transistor output module
		Screw terminal block 12/24VDC, 0.5A/point, 32 points	120mA	0.29kg	NZ2GN2B1-32T	☞ Page 56 NZ2GN2B1-32T transistor output module
		40-pin connector 12/24VDC, 0.1A/point, 32 points	120mA	0.16kg	NZ2GNCF1-32T	☞ Page 59 NZ2GNCF1-32T transistor output module
		Waterproof connector 12/24VDC, 4A/point (Y0 to Y3), 2A/point (Y4 to YF), 16 points	110mA	0.42kg	NZ2GN12A2-16T	☞ Page 62 NZ2GN12A2-16T transistor output module
	Source type	Spring clamp terminal block 12/24VDC, 0.5A/point, 16 points	110mA	0.15kg	NZ2GN2S1-16TE	☞ Page 65 NZ2GN2S1-16TE transistor output module
		Spring clamp terminal block 12/24VDC, 0.5A/point, 32 points	120mA	0.18kg	NZ2GN2S1-32TE	☞ Page 68 NZ2GN2S1-32TE transistor output module
		Screw terminal block 12/24VDC, 0.5A/point, 16 points	110mA	0.21kg	NZ2GN2B1-16TE	☞ Page 71 NZ2GN2B1-16TE transistor output module
		Screw terminal block 12/24VDC, 0.5A/point, 32 points	120mA	0.29kg	NZ2GN2B1-32TE	☞ Page 74 NZ2GN2B1-32TE transistor output module
		Waterproof connector 12/24VDC, 4A/point (Y0 to Y3), 2A/point (Y4 to YF), 16 points	110mA	0.42kg	NZ2GN12A2-16TE	☞ Page 77 NZ2GN12A2-16TE transistor output module

I/O combined module

Module name		Input specifications	Output specifications	Module power supply current	Weight	Model	Reference
DC input/transistor output module	• Input part: Positive common type • Output part: Sink type	Spring clamp terminal block 24VDC, 16 points	Spring clamp terminal block 24VDC, 0.5A/point, 16 points	110mA	0.20kg	NZ2GN2S1-32DT	☞ Page 80 NZ2GN2S1-32DT DC input/transistor output module
		Screw terminal block 24VDC, 16 points	Screw terminal block 24VDC, 0.5A/point, 16 points	110mA	0.31kg	NZ2GN2B1-32DT	☞ Page 84 NZ2GN2B1-32DT DC input/transistor output module
		Sensor connector (e-CON) 24VDC, 16 points	Sensor connector (e-CON) 24VDC, 0.5A/point, 16 points	110mA	0.25kg	NZ2GNCE3-32DT	☞ Page 88 NZ2GNCE3-32DT DC input/transistor output module
		Waterproof connector 24VDC, 8 points	Waterproof connector 12/24VDC, 4A/point (Y8 to YB), 2A/point (YC to YF), 8 points	160mA	0.42kg	NZ2GN12A42-16DT	☞ Page 93 NZ2GN12A42-16DT DC input/transistor output module
	• Input part: Negative common type • Output part: Source type	Spring clamp terminal block 24VDC, 16 points	Spring clamp terminal block 24VDC, 0.5A/point, 16 points	110mA	0.20kg	NZ2GN2S1-32DTE	☞ Page 97 NZ2GN2S1-32DTE DC input/transistor output module
		Screw terminal block 24VDC, 16 points	Screw terminal block 24VDC, 0.5A/point, 16 points	110mA	0.31kg	NZ2GN2B1-32DTE	☞ Page 101 NZ2GN2B1-32DTE DC input/transistor output module
		Waterproof connector 24VDC, 8 points	Waterproof connector 12/24VDC, 4A/point (Y8 to YB), 2A/point (YC to YF), 8 points	160mA	0.42kg	NZ2GN12A42-16DTE	☞ Page 105 NZ2GN12A42-16DTE DC input/transistor output module

2 PART NAMES

This section describes part names of the I/O module.

- Spring clamp terminal block type
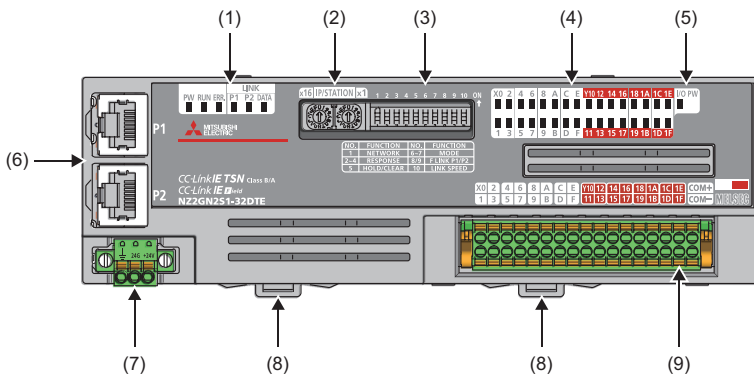
- Screw terminal block type
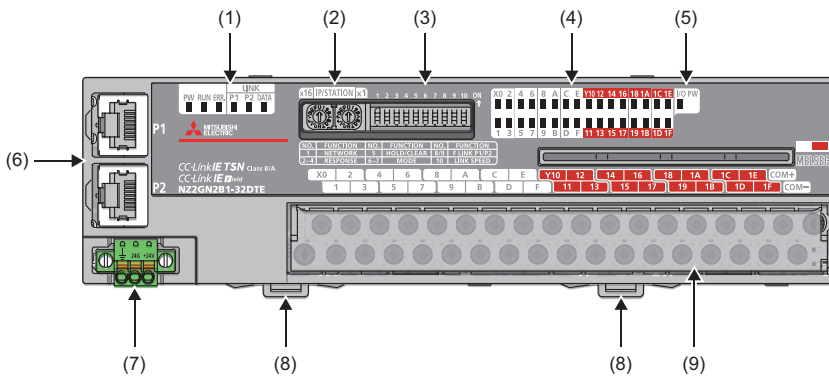
- 40-pin connector type
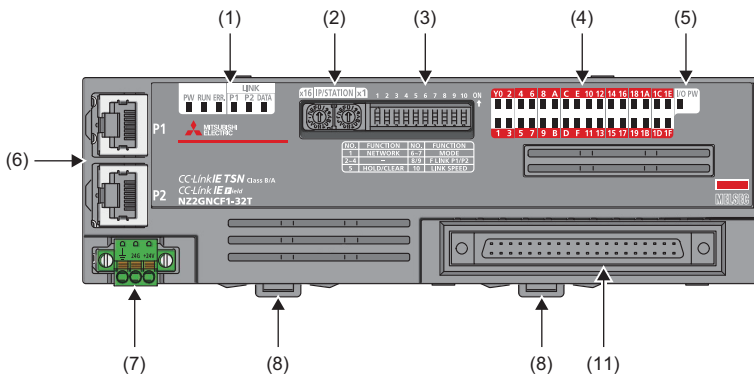
- Sensor connector (e-CON) type
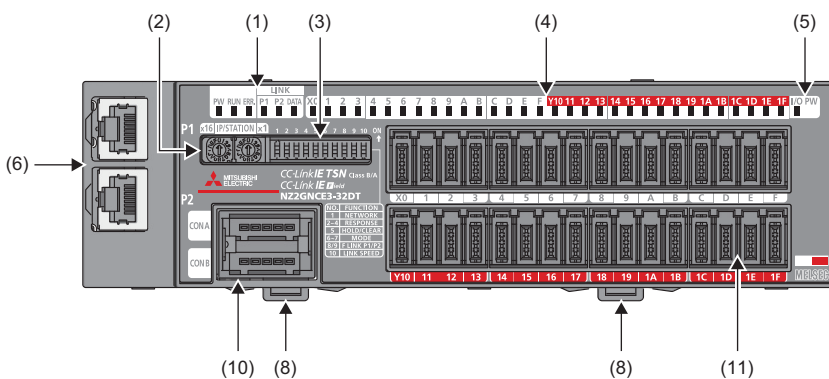
• Waterproof/dustproof connector type
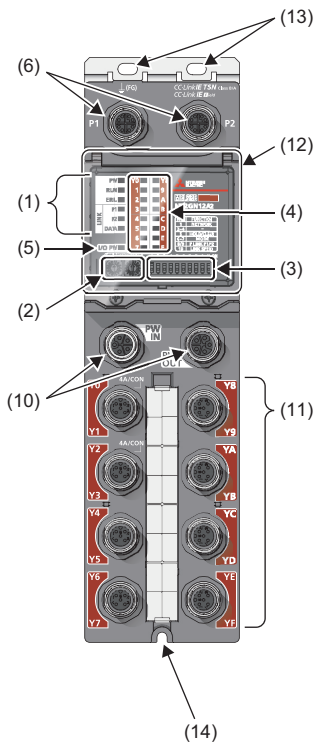
No.	Name	Application
(1)	PW LED	Indicates the power supply status of the I/O module. On: Power supply ON Off: Power supply OFF
	RUN LED	Indicates the operating status of the I/O module. On: Operating normally. Flashing: Operating in unit test mode or during indicator display Off: A major error has occurred.
	ERR. LED	Indicates the error status of the I/O module. On: A moderate error or major error has occurred. Flashing: A minor error has occurred. Off: Operating normally.
	P1 LINK LED	Indicates the link status for P1. On: Link-up Off: Linkdown in progress
	P2 LINK LED	Indicates the link status for P2. On: Link-up Off: Linkdown in progress
	DATA LINK LED	Indicates the data link status of the I/O module. On: Cyclic transmission being performed Flashing: Cyclic transmission stopped Off: Disconnected
(2)	IP address/station number setting switch	Sets the fourth octet of the IP address. ☞ Page 119 Setting the IP address/station number setting switches
(3)	Function setting switch	Sets functions of the I/O module. ☞ Page 121 Function setting switch setting
(4)	■16-point module X0 LED to XF LED ■32-point module X0 LED to X1F LED	Indicates the ON/OFF status of the inputs.[*1] On: Input ON Off: Input OFF
	■16-point module Y0 LED to YF LED ■32-point module Y0 LED to Y1F LED	Indicates the ON/OFF status of the outputs.[*2] On: Output ON Off: Output OFF
(5)	I/O PW LED	Indicates the status of the power supply from the external power supply. On: External power supply ON Off: External power supply OFF

No.	Name	Application
(6)	P1	A port for the connection to CC-Link IE TSN (RJ45 connector/M12 waterproof connector) Connect an Ethernet cable. (☞ Page 135 Wiring of Ethernet Cable) There are no restrictions on the connection order of the cables for P1 and P2.
	P2	Same as P1
(7)	Terminal block for module power supply and FG	A terminal block to connect the module power supply (24VDC) and FG.
(8)	DIN rail hook	A hook to mount an I/O module on a DIN rail
(9)	I/O terminal block	A terminal block for I/O power supply and I/O signals
(10)	Connector for module power supply and FG	A connector for the module power supply (24VDC) and FG
(11)	Connector for I/O	A connector for the I/O power supply and I/O signals
(12)	Indicator cover	A protective cover for LEDs and switches
(13)	FG metal fitting/mounting metal fitting	A metal fitting for FG connection or mounting the module
(14)	Module mounting hole	A hole for a module mounting screw

*1 The status of actual input signals that are externally input is indicated on the LEDs regardless of the status of the remote input signal.

*2 Output commands from the I/O module are indicated on the LEDs regardless of the status of the external power supply.

I/O module status and LED status

The following table lists the correspondence between the I/O module status and the LED status.

I/O module status		LED status			
		PW LED	RUN LED	DATA LINK LED	ERR. LED
Disconnected		On	On	Off	*1
Data link in operation		On	On	On	*1
Reserved station setting in progress		On	On	Flashing	*1
Data link stop		On	On	Flashing	*1
Network initial setting in progress[*2]		On	On	Flashing	*1
Unit test	In progress	On	Flashing	Off	Off
	Normal completion	On	On	Off	Off
	Abnormal completion	On	On	Off	On
Error	Major error	On	Off	*1	On
	Moderate error	On	On	*1	On
	Minor error	On	On	*1	Flashing
During indicator display		On	Flashing	*1	*1

*1 Either of On, Flashing, or Off.

*2 If the master station becomes absent during network initial setting, the DATA LINK LED may flash continuously.

2 PART NAMES

3 SPECIFICATIONS

This chapter describes the specifications of the I/O module.

3.1 General Specifications

I/O module (except for waterproof module)

Item	Specifications					
Operating ambient temperature	0 to 55℃					
Storage ambient temperature	-25 to 75℃					
Operating ambient humidity	5 to 95%RH, non-condensing					
Storage ambient humidity						
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2	—	Frequency	Constant acceleration	Half amplitude	Number of sweeps
		Under intermittent vibration	5 to 8.4Hz	—	3.5mm	10 times each in X, Y, and Z directions
			8.4 to 150Hz	9.8m/s²	—	
		Under continuous vibration	5 to 8.4Hz	—	1.75mm	—
			8.4 to 150Hz	4.9m/s²	—	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147m/s², 3 times each in X, Y, and Z directions)					
Operating atmosphere	No corrosive gases, flammable gases, less conductive dust					
Operating altitude[*1]	0 to 2000m					
Installation location	Inside a control panel[*2]					
Overvoltage category[*3]	Ⅱ or less					
Pollution degree[*4]	2 or less					
Equipment class	Class Ⅰ					

*1 Do not use or store the I/O module (except for the waterproof module) under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction. When using the I/O module under pressure, please consult your local Mitsubishi representative.

*2 If the environment satisfies the operating ambient temperature, operating ambient humidity and other conditions, the module can be used even outside the control panel.

*3 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 within premises.
Category Ⅱ applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for the equipment with the rated voltage of 300V or less is 2500V.

*4 This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used. Pollution degree 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

Point

For compliance with the EMC Directive, refer to the following:

I/O module (waterproof module)

Item	Specifications					
Operating ambient temperature	0 to 55℃					
Storage ambient temperature	-25 to 75℃					
Operating ambient humidity	Compliant with IP67[1]					
Storage ambient humidity	5 to 95%RH, non-condensing					
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2	—	Frequency	Constant acceleration	Half amplitude	Number of sweeps
		Under intermittent vibration	5 to 8.4Hz	—	3.5mm	10 times each in X, Y, and Z directions
			8.4 to 150Hz	9.8m/s²	—	
		Under continuous vibration	5 to 8.4Hz	—	1.75mm	—
			8.4 to 150Hz	4.9m/s²	—	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147m/s², 3 times each in X, Y, and Z directions)					
Operating atmosphere	No corrosive gases, flammable gases, less conductive dust					
Operating altitude[2]	0 to 2000m					
Installation location	Inside a control panel[3]					
Overvoltage category[4]	Ⅱ or less					
Pollution degree[5]	2 or less					
Equipment class	Class Ⅰ					

*1 Only when all necessary waterproof connectors and caps have been installed and the indicator cover for the IP address/station number setting switches and the function setting switches has been properly tightened with screws, the module is compliant with IP67. For the tightening torque range of the cover screws for the switches, refer to the following.
☞ Page 118 Indicator cover of the I/O module (waterproof module),Page 152 Attaching Waterproof Caps
*2 Do not use or store the I/O module (waterproof module) under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction.
*3 If the environment satisfies the operating ambient temperature, operating ambient humidity and other conditions, the module can be used even outside the control panel.
*4 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 within premises. Category Ⅱ applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for the equipment with the rated voltage of 300V or less is 2500V.
*5 This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used. Pollution degree 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

Point

For compliance with the EMC Directive, refer to the following:
☞ Page 285 EMC and Low Voltage Directives

3.2 Ethernet Communication Specifications

The following table shows the Ethernet communication specifications for the I/O module.

Item			Description
Transmission specifications	Data transmission speed		1Gbps or 100Mbps[*1]
	Communication mode	1000BASE-T	Full-duplex
		100BASE-TX	
	Interface		• RJ45 connector (AUTO MDI/MDI-X) • M12 waterproof connector (AUTO MDI/MDI-X)
	Maximum frame size		1518 bytes
	Maximum segment length		100m[*2]
	Number of cascade connections	1000BASE-T	Check with the manufacturer of the switching hub to be used.
		100BASE-TX	
	IP version		IPv4

*1 The data transmission speed can be switched by using the communication speed setting function.
The availability of communication speed setting function varies depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 For the maximum segment length (length between switching hubs), check with the manufacturer of the switching hub to be used.

3

3.3 Performance Specifications

Input module

NZ2GN2S1-16D DC input module

Item		NZ2GN2S1-16D
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*6]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*6]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*6]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*8]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*7]
Number of input points		16 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.6mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF → ON	0ms[*1]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON → OFF	
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*2]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		16 points/common (Common terminal: terminal number 17, 18) (1-wire, spring clamp terminal block type) Positive common/negative common shared type
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	18-point two-piece spring clamp terminal block
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*3]
	For I/O	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*3]
Applicable solderless terminal[*4]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
	Terminal block for input	☞ Page 138 Applicable solderless terminal
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*5]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.15kg

*1 If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.

*2 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*3 Use bar solderless terminals for wiring.

*4 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*5 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 250 Input module (16-point module))

*6   This can be used for the module with the firmware version "08" or later.

*7   Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*8   For details on time-managed polling, refer to the following.
    📖 User's manual for the master station used

■External wiring

Terminal block for module
power supply and FG[*1]

UNIT POWER
CABLE

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

Module power
supply

Terminal block
for input[*1]

1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	COM
18	COM

*1   Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for input

Terminal number	Signal name
1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	COM
18	COM

NZ2GN2S1-32D DC input module

Item		NZ2GN2S1-32D
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[7]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[7]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[7]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[9]		512µs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[1][8]
Number of input points		32 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.0mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF → ON	0ms[2]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON → OFF	
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[3]		Noise voltage 500Vp-p, noise width 1µs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		32 points/common (Common terminal: terminal number 33, 34) (1-wire, spring clamp terminal block type) Positive common/negative common shared type
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	2-piece spring clamp terminal block
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[4]
	For I/O	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[4]
Applicable solderless terminal[5]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
	Terminal block for input	☞ Page 138 Applicable solderless terminal
Multicast filter		Available[1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[6]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.20kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 If the input response time is set to "0ms", the actual input response time is 80µs at OFF → ON, and 160µs at ON → OFF.

*3 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.
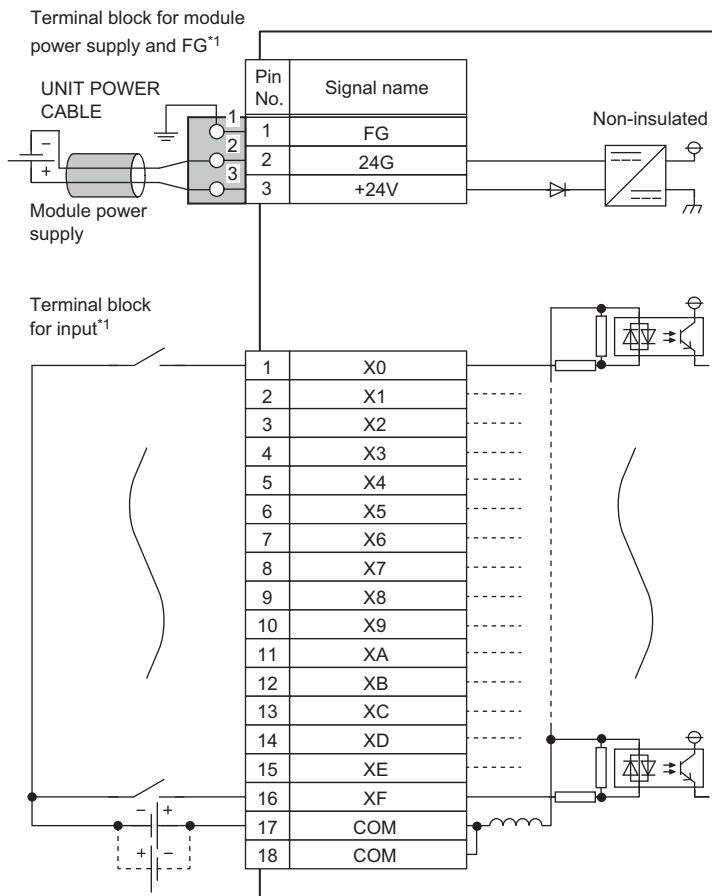
*4 Use bar solderless terminals for wiring.

*5 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*6 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 251 Input module (32-point module))
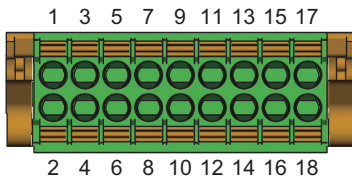
*7 This can be used for the module with the firmware version "08" or later.

*8 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*9 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

3

■External wiring

Terminal block for module
power supply and FG[*1]

Pin No.	Signal name
1	FG
2	24G
3	+24V

UNIT POWER CABLE

Module power supply

Non-insulated

Terminal block for input[*1]

1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	X10
18	X11
19	X12
20	X13
21	X14
22	X15
23	X16
24	X17
25	X18
26	X19
27	X1A
28	X1B
29	X1C
30	X1D
31	X1E
32	X1F
33	COM
34	COM

*1 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for input

Terminal number	Signal name	Terminal number	Signal name
1	X0	17	X10
2	X1	18	X11
3	X2	19	X12
4	X3	20	X13
5	X4	21	X14
6	X5	22	X15
7	X6	23	X16
8	X7	24	X17
9	X8	25	X18
10	X9	26	X19
11	XA	27	X1A
12	XB	28	X1B
13	XC	29	X1C
14	XD	30	X1D
15	XE	31	X1E
16	XF	32	X1F
—		33	COM
		34	COM

NZ2GN2B1-16D DC input module

Item		NZ2GN2B1-16D
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*6]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*6]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*6]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*8]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*7]
Number of input points		16 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.6mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF $\rightarrow$ ON	0ms[*1]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON $\rightarrow$ OFF	
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*2]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		16 points/common (Common terminal: terminal number 17, 18) (1-wire, screw terminal block type) Positive common/negative common shared type
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	18-point two-piece terminal block Tightening torque range for terminal screw (M3 $\times$ 5.2 screw): 0.43 to 0.57N·m Tightening torque range for terminal block mounting screw (M3.5 screw): 0.68 to 0.92N·m
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5m㎡ (22 to 16 AWG), terminal slot size: 2.4mm $\times$ 1.5mm[*3]
	For I/O	Stranded wire: 0.3 to 2.0m㎡ (22 to 14 AWG)
Applicable solderless terminal	Terminal block for module power supply and FG[*4]	☞ Page 129 Applicable solderless terminal
	Terminal block for input	☞ Page 141 Applicable solderless terminal
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*5]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.21kg

*1 If the input response time is set to "0ms", the actual input response time is 80μs at OFF $\rightarrow$ ON, and 160μs at ON $\rightarrow$ OFF.

*2 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*3 Use bar solderless terminals for wiring.

*4 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*5 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 250 Input module (16-point module))
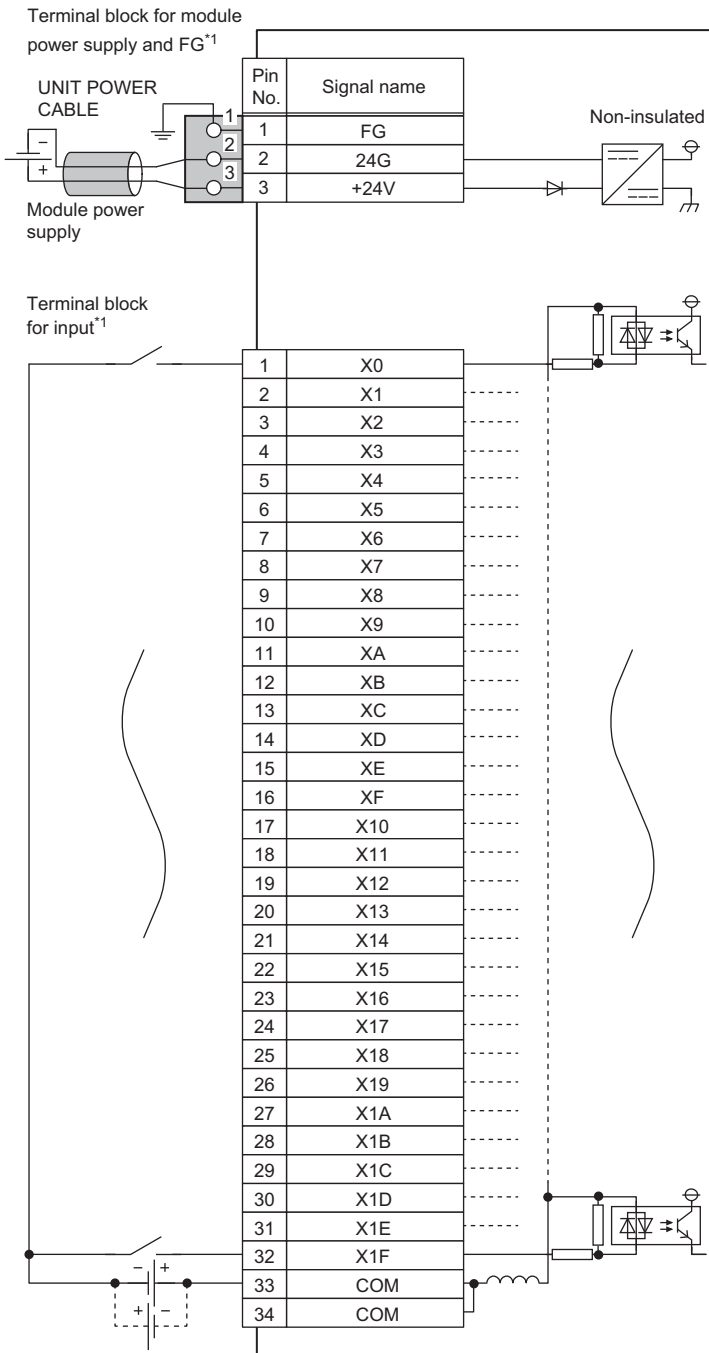
*6 This can be used for the module with the firmware version "08" or later.

*7 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

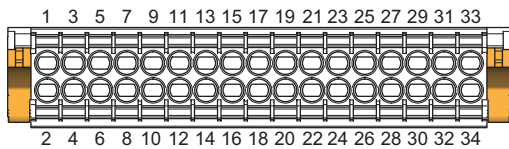*8 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■External wiring

Terminal block for module power supply and FG[1]

UNIT POWER CABLE

Module power supply

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

Terminal block for input[1]

1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	COM
18	COM

*1 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for input

Terminal number	Signal name
1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	COM
18	COM

NZ2GN2B1-32D DC input module

Item		NZ2GN2B1-32D
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*7]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*7]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*7]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*9]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1][*8]
Number of input points		32 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.0mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF $\rightarrow$ ON	0ms[*2]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON $\rightarrow$ OFF	
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*3]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		32 points/common (Common terminal: terminal number 33, 34) (1-wire, screw terminal block type) Positive common/negative common shared type
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	34-point two-piece terminal block Tightening torque range for terminal screw (M3 × 5.2 screw): 0.43 to 0.57N·m Tightening torque range for terminal block mounting screw (M3.5 screw): 0.68 to 0.92N·m
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*4]
	For I/O	Stranded wire: 0.3 to 2.0mm² (22 to 14 AWG)
Applicable solderless terminal	Terminal block for module power supply and FG[*5]	☞ Page 129 Applicable solderless terminal
	Terminal block for input	☞ Page 141 Applicable solderless terminal
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*6]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.31kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 If the input response time is set to "0ms", the actual input response time is 80μs at OFF $\rightarrow$ ON, and 160μs at ON $\rightarrow$ OFF.

*3 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*4 Use bar solderless terminals for wiring.

*5 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*6 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 251 Input module (32-point module))
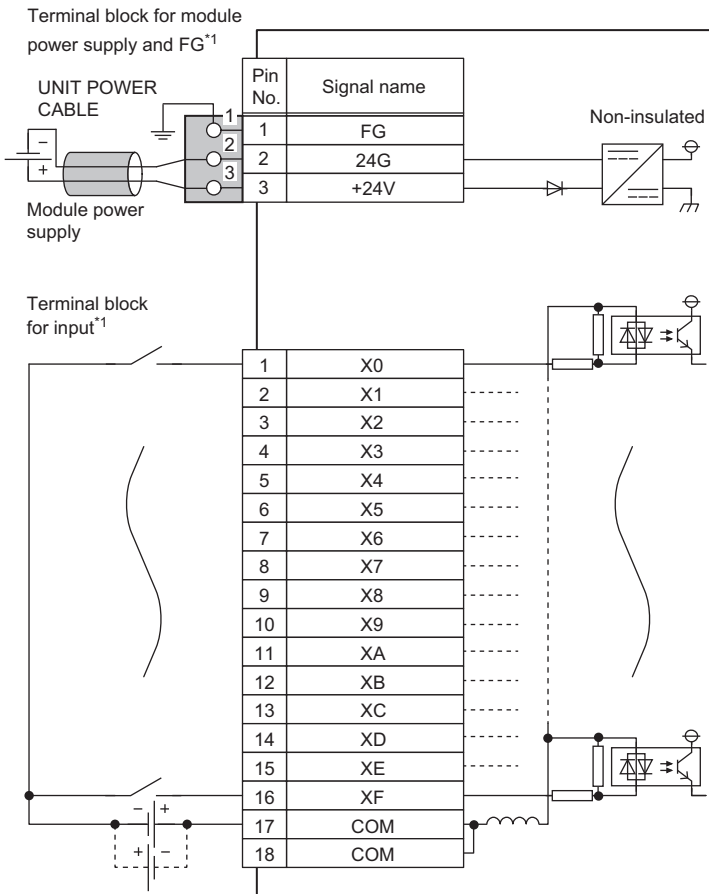
*7 This can be used for the module with the firmware version "08" or later.

*8 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

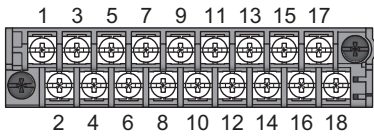*9 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■External wiring

Terminal block for module
power supply and FG[*1]

Pin No.	Signal name
1	FG
2	24G
3	+24V

UNIT POWER
CABLE

Module power
supply

Non-insulated

Terminal block
for input

No.	Signal name
1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	X10
18	X11
19	X12
20	X13
21	X14
22	X15
23	X16
24	X17
25	X18
26	X19
27	X1A
28	X1B
29	X1C
30	X1D
31	X1E
32	X1F
33	COM
34	COM

*1 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for input

Terminal number	Signal name	Terminal number	Signal name
1	X0	17	X10
2	X1	18	X11
3	X2	19	X12
4	X3	20	X13
5	X4	21	X14
6	X5	22	X15
7	X6	23	X16
8	X7	24	X17
9	X8	25	X18
10	X9	26	X19
11	XA	27	X1A
12	XB	28	X1B
13	XC	29	X1C
14	XD	30	X1D
15	XE	31	X1E
16	XF	32	X1F
—		33	COM
		34	COM

NZ2GNCF1-32D DC input module

Item		NZ2GNCF1-32D
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[8]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[8]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[8]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[10]		512µs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[1][9]
Number of input points		32 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.6mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%[7]
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF → ON	0ms[2]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON → OFF	
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[3]		Noise voltage 500Vp-p, noise width 1µs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		32 points/common (Common terminal: pin number B1, B2) (1-wire, 40-pin connector type) Positive common/negative common shared type
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	40-pin connector
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[4]
	For I/O	40-pin connector The size depends on the connector plug used (sold separately). (☞ Page 143 Wiring of 40-pin connector)
Applicable solderless terminal[5]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
Multicast filter		Available[1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[6]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.20kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 If the input response time is set to "0ms", the actual input response time is 80µs at OFF → ON, and 160µs at ON → OFF.

*3 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*4 Use bar solderless terminals for wiring.

*5 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*6 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 251 Input module (32-point module))
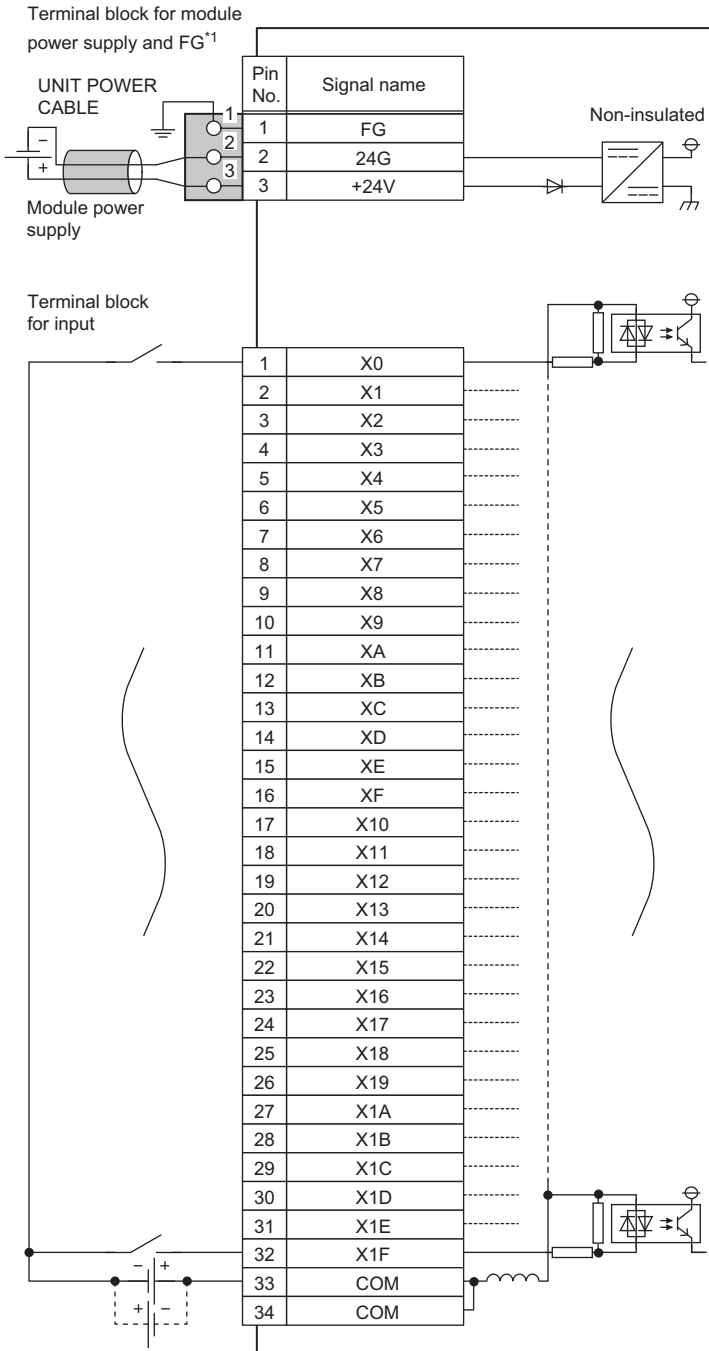
*7 For the points for downward installation, horizontal installation (upside down), and upward installation, refer to the derating chart below.

Graph: Maximum number of simultaneous ON points (points) vs Ambient temperature (℃)

- 32 points, 45℃
- 32 points, 55℃
- 28 points, 55℃

Input voltage
● 28.8VDC
▲ 26.4VDC

*8   This can be used for the module with the firmware version "08" or later.

*9   Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

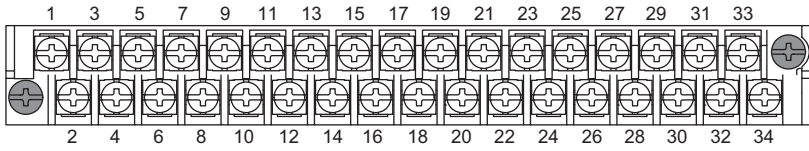*10 For details on time-managed polling, refer to the following.
     📖 User's manual for the master station used

■External wiring

Terminal block for module power supply and FG[*1]

UNIT POWER CABLE

Module power supply

Connector for input[*1]

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

Pin	Signal
B20	X0
B19	X1
B18	X2
B17	X3
B16	X4
B15	X5
B14	X6
B13	X7
B12	X8
B11	X9
B10	XA
B9	XB
B8	XC
B7	XD
B6	XE
B5	XF
A20	X10
A19	X11
A18	X12
A17	X13
A16	X14
A15	X15
A14	X16
A13	X17
A12	X18
A11	X19
A10	X1A
A9	X1B
A8	X1C
A7	X1D
A6	X1E
A5	X1F
B2	COM
B1	COM

*1   Only one wire can be inserted into a wire insertion opening for the following: terminal block for module power supply and FG, connector for input. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

3

■Connector for input
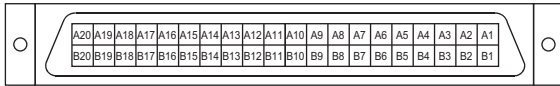
Terminal number	Signal name	Terminal number	Signal name
B20	X0	A20	X10
B19	X1	A19	X11
B18	X2	A18	X12
B17	X3	A17	X13
B16	X4	A16	X14
B15	X5	A15	X15
B14	X6	A14	X16
B13	X7	A13	X17
B12	X8	A12	X18
B11	X9	A11	X19
B10	XA	A10	X1A
B9	XB	A9	X1B
B8	XC	A8	X1C
B7	XD	A7	X1D
B6	XE	A6	X1E
B5	XF	A5	X1F
B4	Empty	A4	Empty
B3	Empty	A3	Empty
B2	COM	A2	Empty
B1	COM	A1	Empty

NZ2GNCE3-32D DC input module

Item		NZ2GNCE3-32D
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[7]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[1][6]
Number of input points		32 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.6mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF → ON	0ms[2]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON → OFF	
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[3]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		32 points/common (3-wire, sensor connector (e-CON)) Positive common type
External interface	Communication part	RJ45 connector
	Module power supply part	One-touch connector for power supply and FG (5 pins, crimping type)
	I/O part	Sensor connector (e-CON) (4 pins, crimping type)
Applicable wire size	For power supply	0.66 to 0.98mm² (18 AWG) [Finishing outer diameter: ϕ2.2 to 3.0mm (A6CON-PW5P), ϕ2.0 to 2.3mm (A6CON-PW5P-SOD)] Strand diameter: 0.16mm or longer Insulating coating material: PVC (heat resistant vinyl)
	For I/O	Sensor connector (e-CON) The size depends on the connector plug used (sold separately). (☞ Page 148 Wiring of sensor connector (e-CON))
Multicast filter		Available[1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[4]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.25kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.
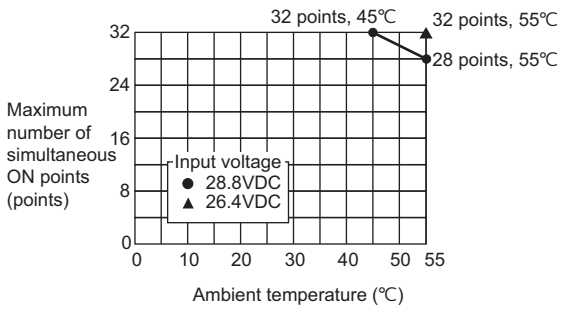
*3 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.
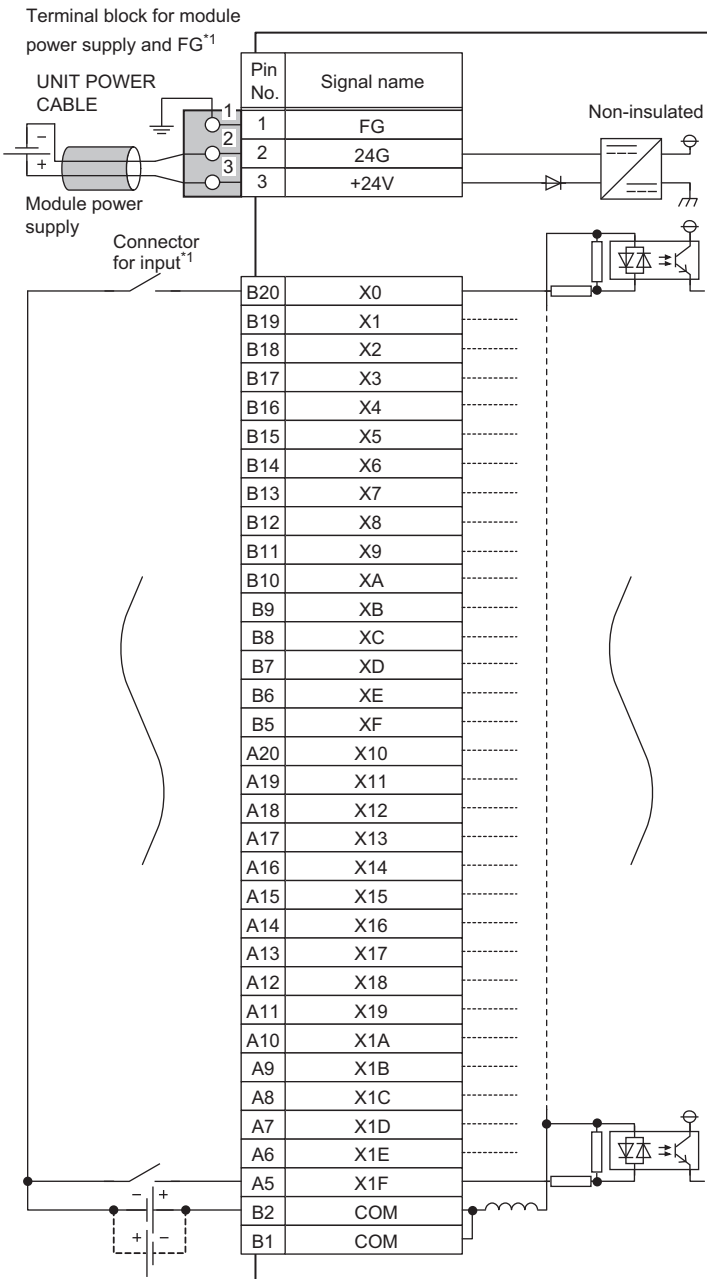
*4 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 251 Input module (32-point module))

*5 This can be used for the module with the firmware version "08" or later.

*6 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*7 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■External wiring

One-touch connector for power supply and FG

UNIT POWER CABLE (IN)

Module power supply

I/O power supply

I/O POWER CABLE (IN)

CON A

Pin No.	Signal name
1	FG
2	+24V (UNIT)
3	24G (UNIT)
4	+24V (I/O)
5	24G (I/O)

Non-insulated

One-touch connector for power supply and FG

UNIT POWER CABLE (OUT)

I/O POWER CABLE (OUT)

CON B

Pin No.	Signal name
1	FG
2	+24V (UNIT)
3	24G (UNIT)
4	+24V (I/O)
5	24G (I/O)

Operation switching input *1

3-wire sensor with an operation switching input (sink output)

CON 1 — Brown, Blue, Black

3-wire sensor (sink output)

CON 2 — Brown, Blue, Black

2-wire sensor (sink output)

CON 3 — Blue, Brown

CON 32

Detection circuit

• When an online connector is connected

One-touch connector for power supply and FG

UNIT POWER CABLE (IN)

Module power supply

I/O power supply

I/O POWER CABLE (IN)

CON A

Pin No.	Signal name
1	FG
2	+24V (UNIT)
3	24G (UNIT)
4	+24V (I/O)
5	24G (I/O)

One-touch connector for power supply and FG

UNIT POWER CABLE (OUT)

I/O POWER CABLE (OUT)

Online connector for power supply and FG

CON B

Pin No.	Signal name
1	FG
2	+24V (UNIT)
3	24G (UNIT)
4	+24V (I/O)
5	24G (I/O)

*1   The colors of leads correspond to IEC 60947-5-2.

■Connector for module power supply and FG

Terminal number[1]		Signal name
CON A CON B	1	FG
	2	+24V (UNIT)
	3	24G (UNIT)
	4	+24V (I/O)
	5	24G (I/O)

*1 A non-wired connector must be connected to the empty slot of the connector for module power supply and FG.

■Connector for input

Terminal number		Signal name	Terminal number		Signal name	Terminal number		Signal name	Terminal number		Signal name
CON1 (X0)	1	+24V	CON9 (X8)	1	+24V	CON17 (X10)	1	+24V	CON25 (X18)	1	+24V
	2	+V		2	+V		2	+V		2	+V
	3	24G		3	24G		3	24G		3	24G
	4	X0		4	X8		4	X10		4	X18
CON2 (X1)	1	+24V	CON10 (X9)	1	+24V	CON18 (X11)	1	+24V	CON26 (X19)	1	+24V
	2	+V		2	+V		2	+V		2	+V
	3	24G		3	24G		3	24G		3	24G
	4	X1		4	X9		4	X11		4	X19
CON3 (X2)	1	+24V	CON11 (XA)	1	+24V	CON19 (X12)	1	+24V	CON27 (X1A)	1	+24V
	2	+V		2	+V		2	+V		2	+V
	3	24G		3	24G		3	24G		3	24G
	4	X2		4	XA		4	X12		4	X1A
CON4 (X3)	1	+24V	CON12 (XB)	1	+24V	CON20 (X13)	1	+24V	CON28 (X1B)	1	+24V
	2	+V		2	+V		2	+V		2	+V
	3	24G		3	24G		3	24G		3	24G
	4	X3		4	XB		4	X13		4	X1B
CON5 (X4)	1	+24V	CON13 (XC)	1	+24V	CON21 (X14)	1	+24V	CON29 (X1C)	1	+24V
	2	+V		2	+V		2	+V		2	+V
	3	24G		3	24G		3	24G		3	24G
	4	X4		4	XC		4	X14		4	X1C
CON6 (X5)	1	+24V	CON14 (XD)	1	+24V	CON22 (X15)	1	+24V	CON30 (X1D)	1	+24V
	2	+V		2	+V		2	+V		2	+V
	3	24G		3	24G		3	24G		3	24G
	4	X5		4	XD		4	X15		4	X1D
CON7 (X6)	1	+24V	CON15 (XE)	1	+24V	CON23 (X16)	1	+24V	CON31 (X1E)	1	+24V
	2	+V		2	+V		2	+V		2	+V
	3	24G		3	24G		3	24G		3	24G
	4	X6		4	XE		4	X16		4	X1E

Terminal number		Signal name	Terminal number		Signal name	Terminal number		Signal name	Terminal number		Signal name
CON8 (X7)	1	+24V	CON16 (XF)	1	+24V	CON24 (X17)	1	+24V	CON32 (X1F)	1	+24V
	2	+V		2	+V		2	+V		2	+V
	3	24G		3	24G		3	24G		3	24G
	4	X7		4	XF		4	X17		4	X1F

NZ2GN12A4-16D DC input module

Item		NZ2GN12A4-16D
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*7]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*6]
Number of input points		16 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		7.3mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.0kΩ
Input response time	OFF → ON	0ms[*1]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 10ms)
	ON → OFF	
Withstand voltage		720VDC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*2]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP67
Wiring method for common		16 points/common (2- to 4-wire, waterproof connector type) Positive common type
Current supplied to external devices		0.4A/terminal
External interface	Communication part	M12 waterproof connector, 8 pins, female, X-code
	Module power supply part	M12 waterproof connector, 5 pins, male, female, L-code
	I/O part	M12 waterproof connector, 5 pins, female, A-code
Applicable waterproof connector	For communications	☞ Page 150 List of Recommended Cables/Connectors for I/O Module (Waterproof Module)
	For power supply	
	For I/O	
	Y-branch connector for I/O	
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*3]
Module power supply[*4]	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	250mA or less (24VDC, all points ON)
Weight		0.41kg

*1 If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.

*2 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*3 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 250 Input module (16-point module))

*4 For a power supply to be connected to the waterproof I/O module (such as the module-and-sensor power supply or the load power supply and external power supply for output part), use the power supply that meets the following condition.
SELV (Safety Extra Low Voltage): Product with reinforced insulation from the hazardous potential part (60V or higher)
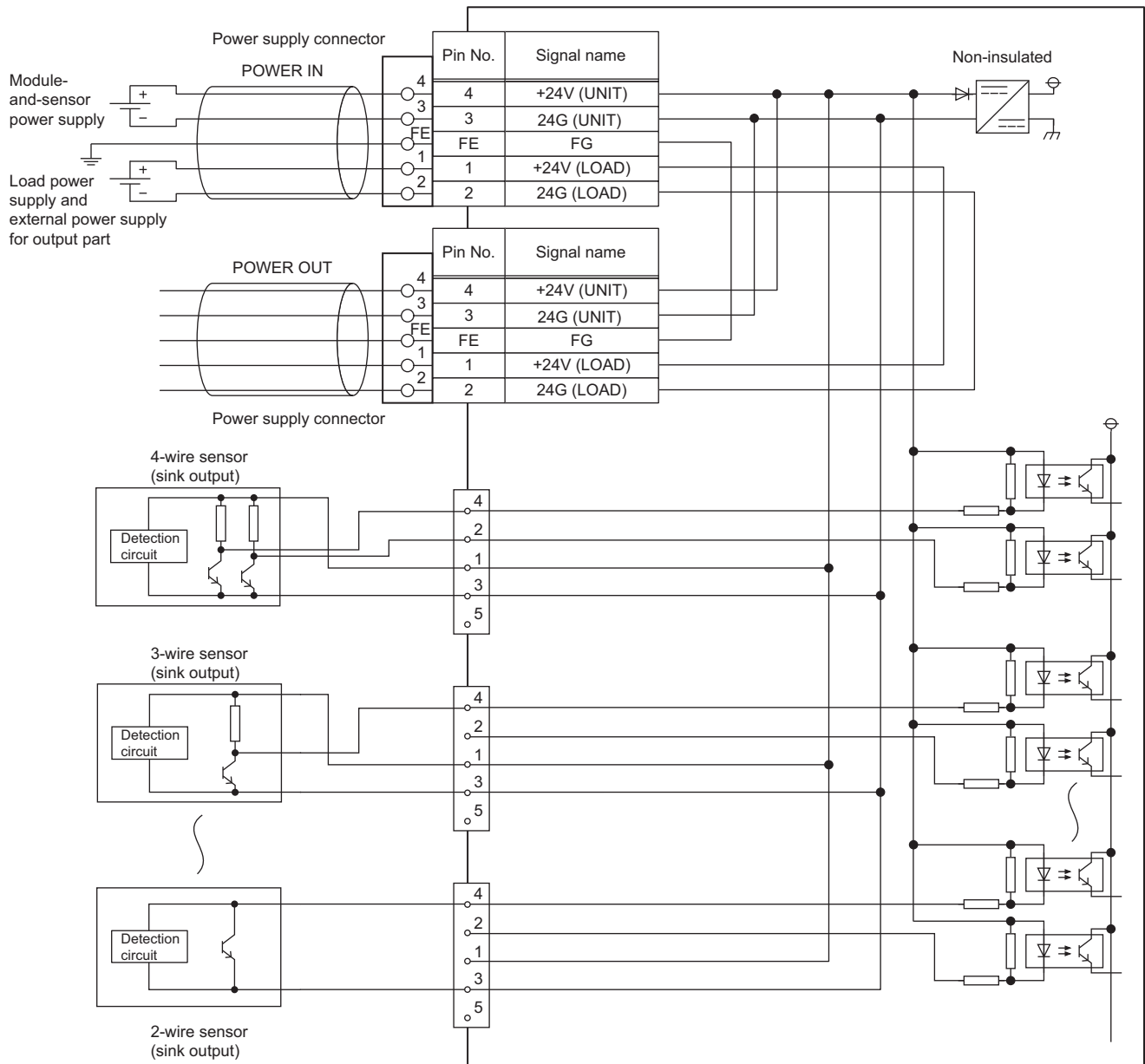
*5 This can be used for the module with the firmware version "08" or later.

*6 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*7 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■External wiring

■Power supply connectors

Pin number		Signal name	Pin number		Signal name
M12 connector, male (IN)	(1)	+24V (LOAD)	M12 connector, female (OUT)	(1)	+24V (LOAD)
	(2)	24G (LOAD)		(2)	24G (LOAD)
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	+24V (UNIT)		(4)	+24V (UNIT)
	FE	FG		FE	FG

■Connector for input

Pin number		Signal name	Pin number		Signal name
X0 X1	(1)	+24V (UNIT)	X8 X9	(1)	+24V (UNIT)
	(2)	X1		(2)	X9
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	X0		(4)	X8
	(5)	Empty		(5)	Empty
X2 X3	(1)	+24V (UNIT)	XA XB	(1)	+24V (UNIT)
	(2)	X3		(2)	XB
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	X2		(4)	XA
	(5)	Empty		(5)	Empty
X4 X5	(1)	+24V (UNIT)	XC XD	(1)	+24V (UNIT)
	(2)	X5		(2)	XD
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	X4		(4)	XC
	(5)	Empty		(5)	Empty
X6 X7	(1)	+24V (UNIT)	XE XF	(1)	+24V (UNIT)
	(2)	X7		(2)	XF
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	X6		(4)	XE
	(5)	Empty		(5)	Empty

NZ2GN12A4-16DE DC input module

Item		NZ2GN12A4-16DE
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*7]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*6]
Number of input points		16 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		7.3mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.0kΩ
Input response time	OFF → ON	0ms[*1]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 10ms)
	ON → OFF	
Withstand voltage		720VDC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*2]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP67
Wiring method for common		16 points/common (2- to 4-wire, waterproof connector type) Negative common type
Current supplied to external devices		0.4A/terminal
External interface	Communication part	M12 waterproof connector, 8 pins, female, X-code
	Module power supply part	M12 waterproof connector, 5 pins, male, female, L-code
	I/O part	M12 waterproof connector, 5 pins, female, A-code
Applicable waterproof connector	For communications	☞ Page 150 List of Recommended Cables/Connectors for I/O Module (Waterproof Module)
	For power supply	
	For I/O	
	Y-branch connector for I/O	
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*3]
Module power supply[*4]	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	250mA or less (24VDC, all points ON)
Weight		0.41kg

*1   If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.
*2   It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.
*3   This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 250 Input module (16-point module))
*4   For a power supply to be connected to the waterproof I/O module (such as the module-and-sensor power supply or the load power supply and external power supply for output part), use the power supply that meets the following condition.
      SELV (Safety Extra Low Voltage): Product with reinforced insulation from the hazardous potential part (60V or higher)
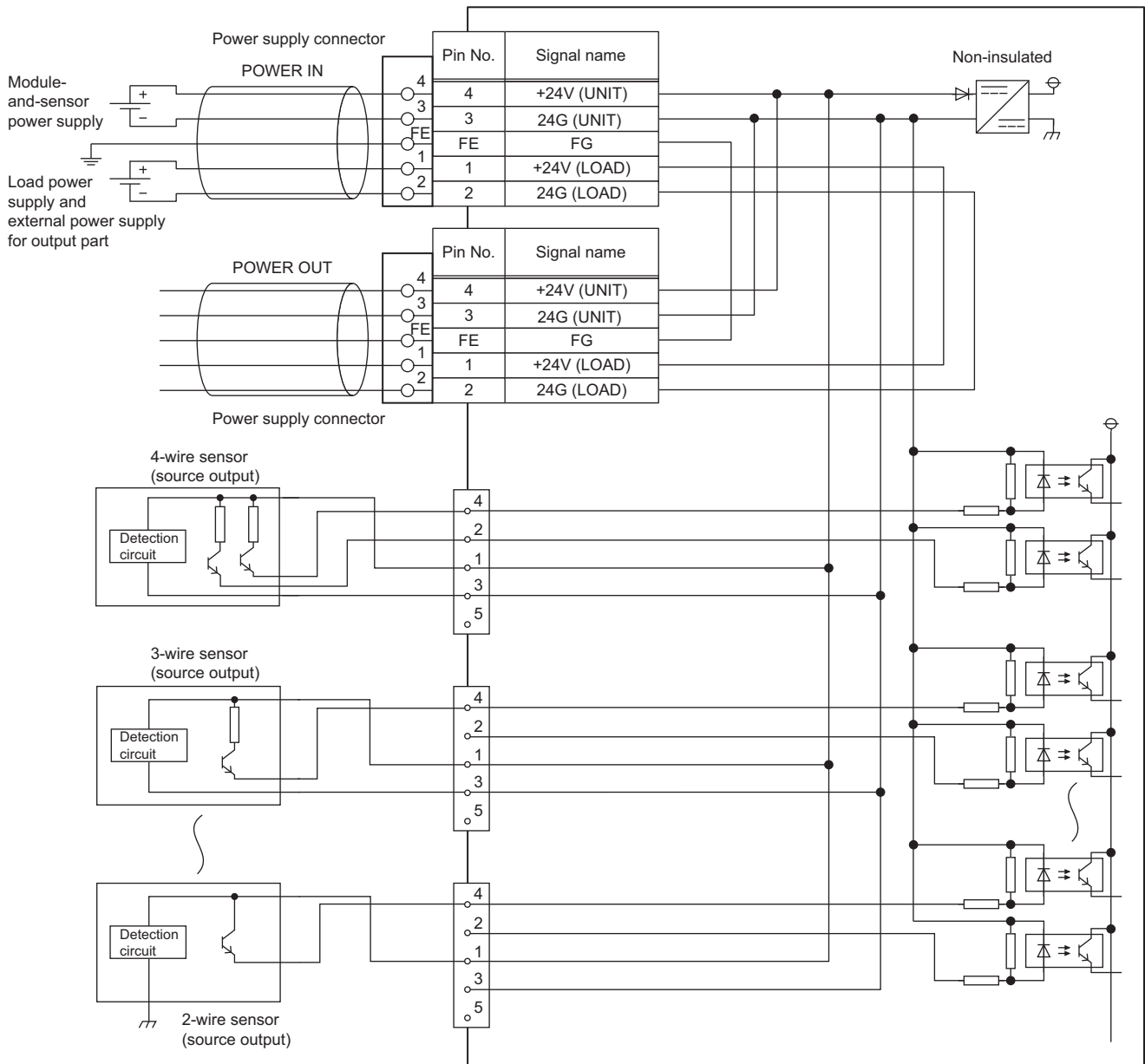*5   This can be used for the module with the firmware version "08" or later.
*6   Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.
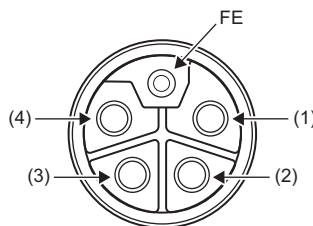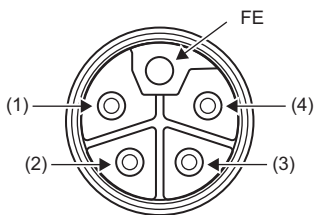*7   For details on time-managed polling, refer to the following.
      📖 User's manual for the master station used

■External wiring

Power supply connector
POWER IN

Module-and-sensor power supply

Load power supply and external power supply for output part

Pin No.	Signal name
4	+24V (UNIT)
3	24G (UNIT)
FE	FG
1	+24V (LOAD)
2	24G (LOAD)

POWER OUT

Pin No.	Signal name
4	+24V (UNIT)
3	24G (UNIT)
FE	FG
1	+24V (LOAD)
2	24G (LOAD)

Power supply connector

Non-insulated

4-wire sensor
(source output)

Detection circuit

3-wire sensor
(source output)

Detection circuit

Detection circuit

2-wire sensor
(source output)

3

■Power supply connectors

Pin number		Signal name	Pin number		Signal name
M12 connector, male (IN)	(1)	+24V (LOAD)	M12 connector, female (OUT)	(1)	+24V (LOAD)
	(2)	24G (LOAD)		(2)	24G (LOAD)
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	+24V (UNIT)		(4)	+24V (UNIT)
	FE	FG		(5)	FG

■Connector for input

Pin number		Signal name	Pin number		Signal name
X0 X1	(1)	+24V (UNIT)	X8 X9	(1)	+24V (UNIT)
	(2)	X1		(2)	X9
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	X0		(4)	X8
	(5)	Empty		(5)	Empty
X2 X3	(1)	+24V (UNIT)	XA XB	(1)	+24V (UNIT)
	(2)	X3		(2)	XB
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	X2		(4)	XA
	(5)	Empty		(5)	Empty
X4 X5	(1)	+24V (UNIT)	XC XD	(1)	+24V (UNIT)
	(2)	X5		(2)	XD
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	X4		(4)	XC
	(5)	Empty		(5)	Empty
X6 X7	(1)	+24V (UNIT)	XE XF	(1)	+24V (UNIT)
	(2)	X7		(2)	XF
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	X6		(4)	XE
	(5)	Empty		(5)	Empty

Output module

NZ2GN2S1-16T transistor output module

Item		NZ2GN2S1-16T
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*4]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*4]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*4]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*6]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*5]
Number of output points		16 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		0.5A/point, 4A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.3VDC (TYP.) 0.5A, 0.6VDC (MAX.) 0.5A
Output response time	OFF → ON	0.1ms or less
	ON → OFF	0.8ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	40mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		16 points/common (Common terminal: terminal number 18) (1-wire, spring clamp terminal block type) Sink type
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5 to 3.5A/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	18-point two-piece spring clamp terminal block
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*1]
	For I/O	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*1]
Applicable solderless terminal[*2]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
	Terminal block for output	☞ Page 138 Applicable solderless terminal
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*3]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.15kg

*1 Use bar solderless terminals for wiring.

*2 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*3 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 252 Output module (16-
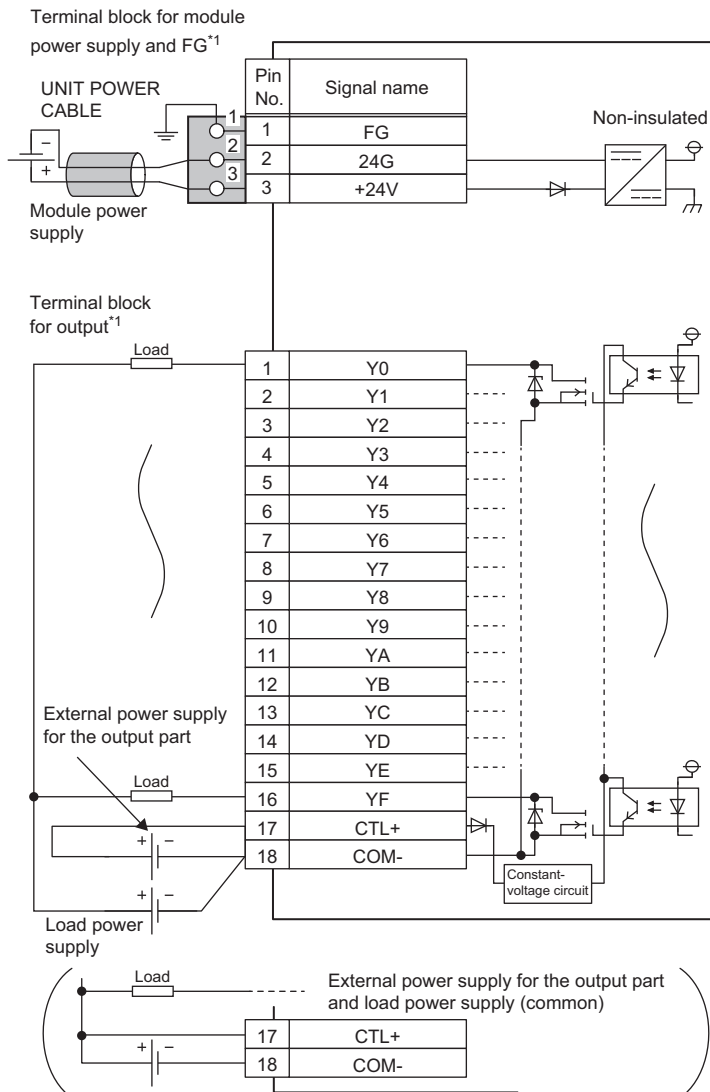
point module))

*4   This can be used for the module with the firmware version "08" or later.
*5   Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.
*6   For details on time-managed polling, refer to the following.
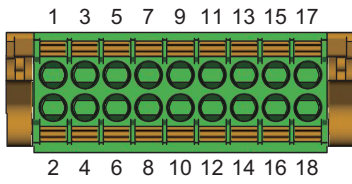   📖 User's manual for the master station used

■External wiring

*1   Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for output

Terminal number	Signal name
1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	YA
12	YB
13	YC
14	YD
15	YE
16	YF
17	CTL+
18	COM-

NZ2GN2S1-32T transistor output module

Item		NZ2GN2S1-32T
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*7]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1*6]
Number of output points		32 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		0.5A/point, 5A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.3VDC (TYP.) 0.5A, 0.6VDC (MAX.) 0.5A
Output response time	OFF → ON	0.1ms or less
	ON → OFF	0.8ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	40mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		32 points/common (Common terminal: terminal number 34) (1-wire, spring clamp terminal block type) Sink type
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5 to 3.5A/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	2-piece spring clamp terminal block
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*2]
	For I/O	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*2]
Applicable solderless terminal[*3]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
	Terminal block for output	☞ Page 138 Applicable solderless terminal
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*4]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	120mA or less (24VDC, all points ON)
Weight		0.18kg

*1   The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2   Use bar solderless terminals for wiring.

*3   Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*4   This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 253 Output module (32-point module))

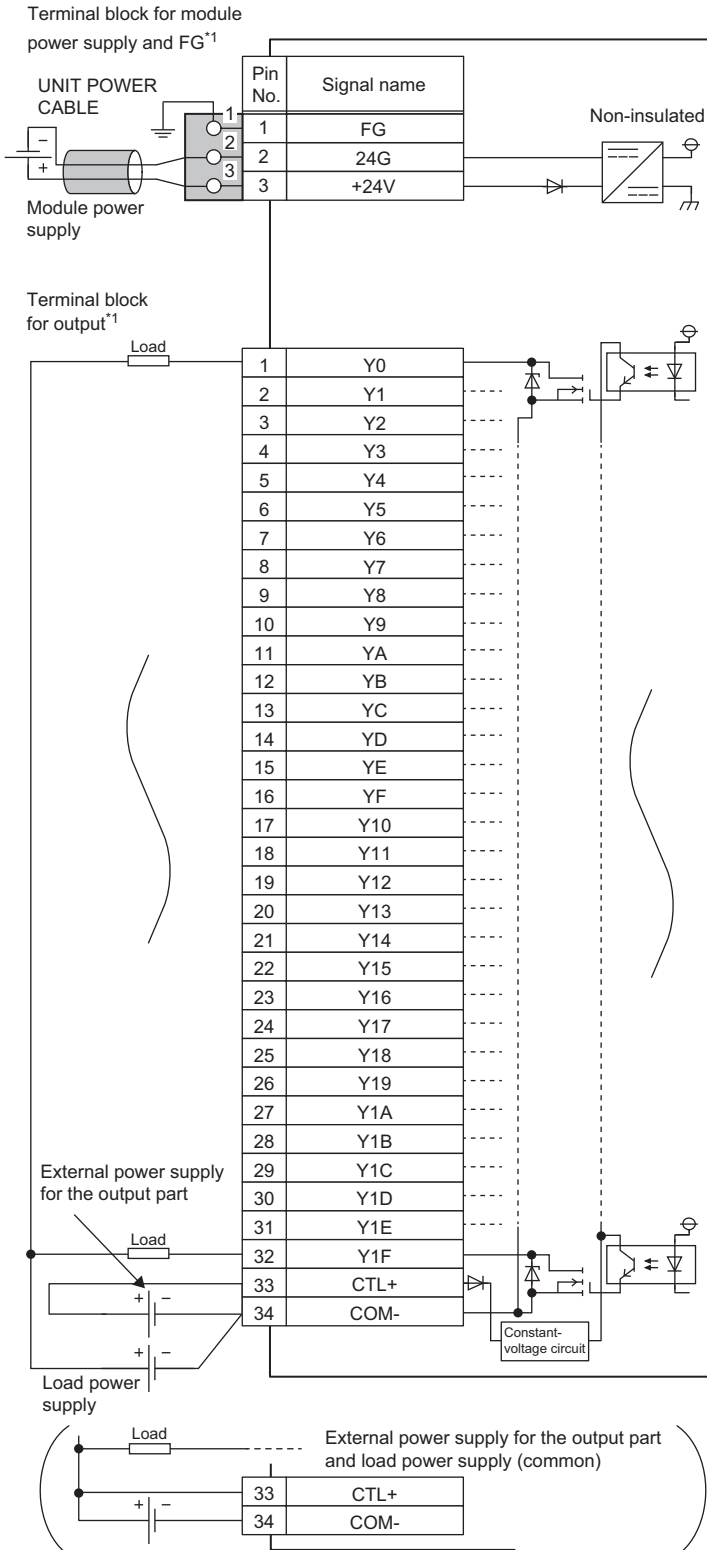*5   This can be used for the module with the firmware version "08" or later.
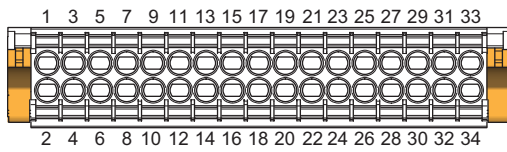
■External wiring

*1　Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for output

Terminal number	Signal name	Terminal number	Signal name
1	Y0	17	Y10
2	Y1	18	Y11
3	Y2	19	Y12
4	Y3	20	Y13
5	Y4	21	Y14
6	Y5	22	Y15
7	Y6	23	Y16
8	Y7	24	Y17
9	Y8	25	Y18
10	Y9	26	Y19
11	YA	27	Y1A
12	YB	28	Y1B
13	YC	29	Y1C
14	YD	30	Y1D
15	YE	31	Y1E
16	YF	32	Y1F
—		33	CTL+
		34	COM-

NZ2GN2B1-16T transistor output module

Item		NZ2GN2B1-16T
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*4]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*4]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*4]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*6]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*5]
Number of output points		16 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		0.5A/point, 4A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.3VDC (TYP.) 0.5A, 0.6VDC (MAX.) 0.5A
Output response time	OFF → ON	0.1ms or less
	ON → OFF	0.8ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	40mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		16 points/common (Common terminal: terminal number 18) (1-wire, screw terminal block type) Sink type
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5 to 3.5A/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	18-point two-piece terminal block Tightening torque range for terminal screw (M3 × 5.2 screw): 0.43 to 0.57N·m Tightening torque range for terminal block mounting screw (M3.5 screw): 0.68 to 0.92N·m
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*1]
	For I/O	Stranded wire: 0.3 to 2.0mm² (22 to 14 AWG)
Applicable solderless terminal	Terminal block for module power supply and FG[*2]	☞ Page 129 Applicable solderless terminal
	Terminal block for output	☞ Page 141 Applicable solderless terminal
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*3]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.21kg

*1 Use bar solderless terminals for wiring.

*2 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*3 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 252 Output module (16-point module))
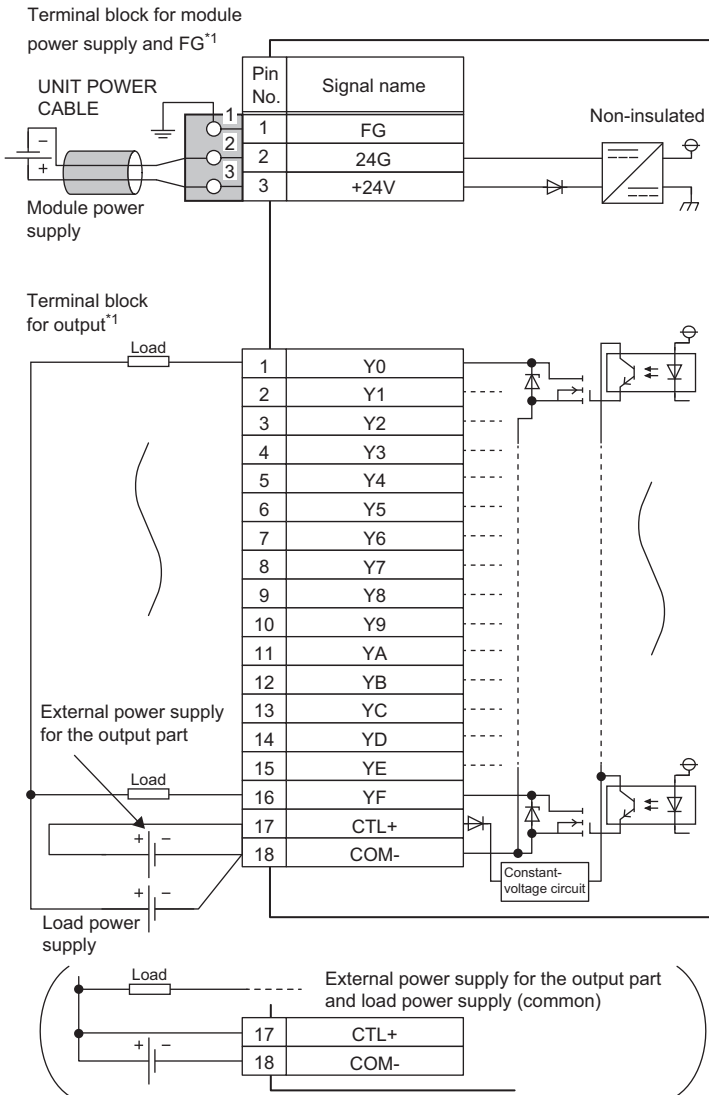
*4 This can be used for the module with the firmware version "08" or later.

*5 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

■External wiring

Terminal block for module
power supply and FG[*1]

*1   Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot
     be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for output

Terminal number	Signal name
1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	YA
12	YB
13	YC
14	YD
15	YE
16	YF
17	CTL+
18	COM-

NZ2GN2B1-32T transistor output module

Item		NZ2GN2B1-32T
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*7]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1*6]
Number of output points		32 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		0.5A/point, 5A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.3VDC (TYP.) 0.5A, 0.6VDC (MAX.) 0.5A
Output response time	OFF → ON	0.1ms or less
	ON → OFF	0.8ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	40mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		32 points/common (Common terminal: terminal number 34) (1-wire, screw terminal block type) Sink type
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5 to 3.5A/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	34-point two-piece terminal block Tightening torque range for terminal screw (M3 × 5.2 screw): 0.43 to 0.57N·m Tightening torque range for terminal block mounting screw (M3.5 screw): 0.68 to 0.92N·m
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*2]
	For I/O	Stranded wire: 0.3 to 2.0mm² (22 to 14 AWG)
Applicable solderless terminal	Terminal block for module power supply and FG[*3]	☞ Page 129 Applicable solderless terminal
	Terminal block for output	☞ Page 141 Applicable solderless terminal
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*4]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	120mA or less (24VDC, all points ON)
Weight		0.29kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 Use bar solderless terminals for wiring.

*3 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*4 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 253 Output module (32-point module))

*5 This can be used for the module with the firmware version "08" or later.

*6 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

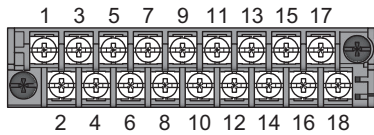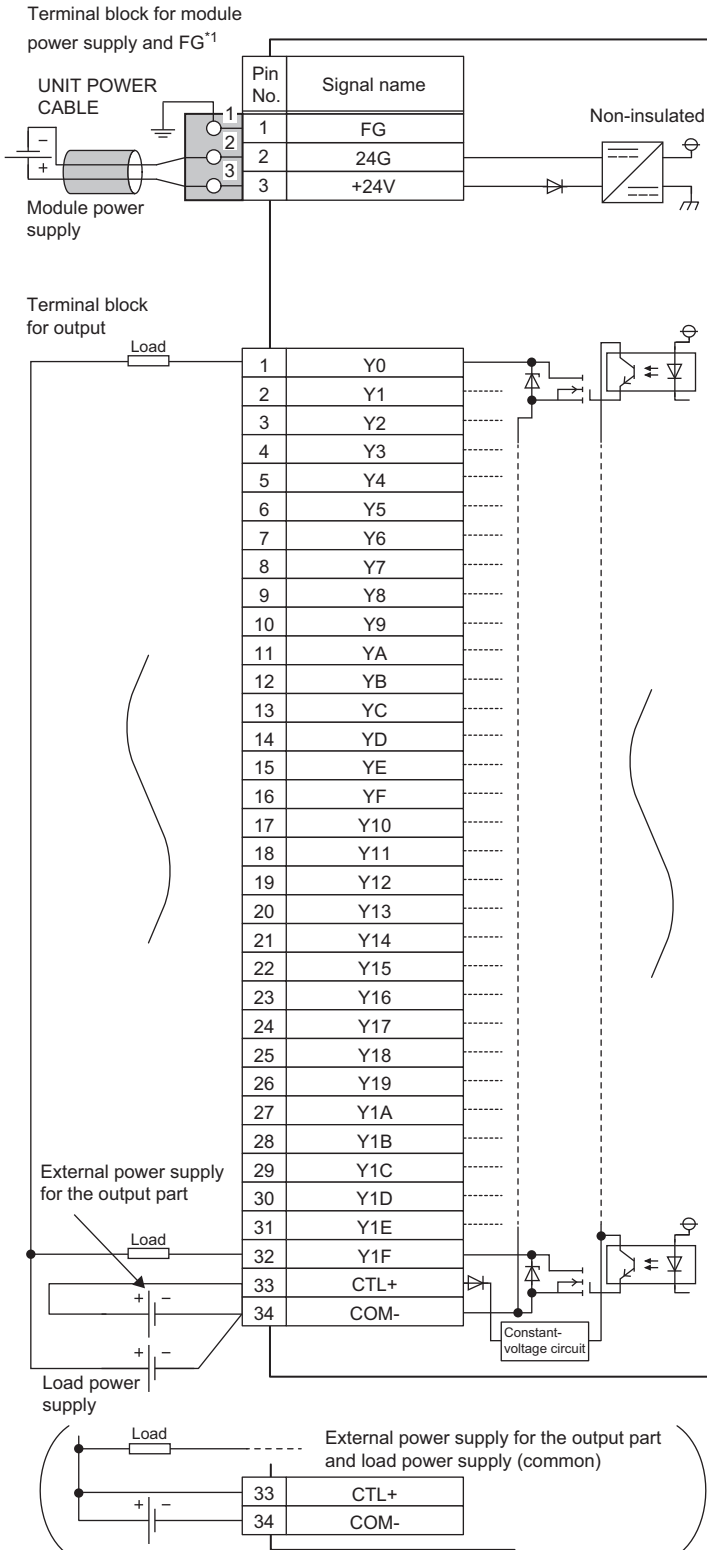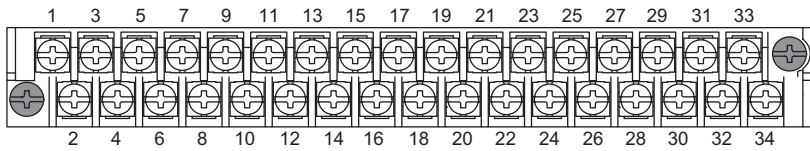*7 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■External wiring

Terminal block for module power supply and FG*1

UNIT POWER CABLE

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

Module power supply

Terminal block for output

1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	YA
12	YB
13	YC
14	YD
15	YE
16	YF
17	Y10
18	Y11
19	Y12
20	Y13
21	Y14
22	Y15
23	Y16
24	Y17
25	Y18
26	Y19
27	Y1A
28	Y1B
29	Y1C
30	Y1D
31	Y1E
32	Y1F
33	CTL+
34	COM-

External power supply for the output part

Load

Load power supply

Constant-voltage circuit

External power supply for the output part and load power supply (common)

33	CTL+
34	COM-

*1 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for output

Terminal number	Signal name	Terminal number	Signal name
1	Y0	17	Y10
2	Y1	18	Y11
3	Y2	19	Y12
4	Y3	20	Y13
5	Y4	21	Y14
6	Y5	22	Y15
7	Y6	23	Y16
8	Y7	24	Y17
9	Y8	25	Y18
10	Y9	26	Y19
11	YA	27	Y1A
12	YB	28	Y1B
13	YC	29	Y1C
14	YD	30	Y1D
15	YE	31	Y1E
16	YF	32	Y1F
—		33	CTL+
		34	COM-

NZ2GNCF1-32T transistor output module

Item		NZ2GNCF1-32T
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*7]		512µs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1*6]
Number of output points		32 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		0.1A/point, 3.2A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A
Output response time	OFF → ON	0.1ms or less
	ON → OFF	0.8ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	40mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1µs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		32 points/common (Common terminal: pin number A1, A2) (1-wire, 40-pin connector type) Sink type
Protection function	Overload protection function	Limited current when detecting overcurrent: 1 to 3A/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	40-pin connector
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*2]
	For I/O	40-pin connector The size depends on the connector plug used (sold separately). (☞ Page 143 Wiring of 40-pin connector)
Applicable solderless terminal[*3]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*4]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	120mA or less (24VDC, all points ON)
Weight		0.16kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 Use bar solderless terminals for wiring.

*3 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*4 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 253 Output module (32-point module))

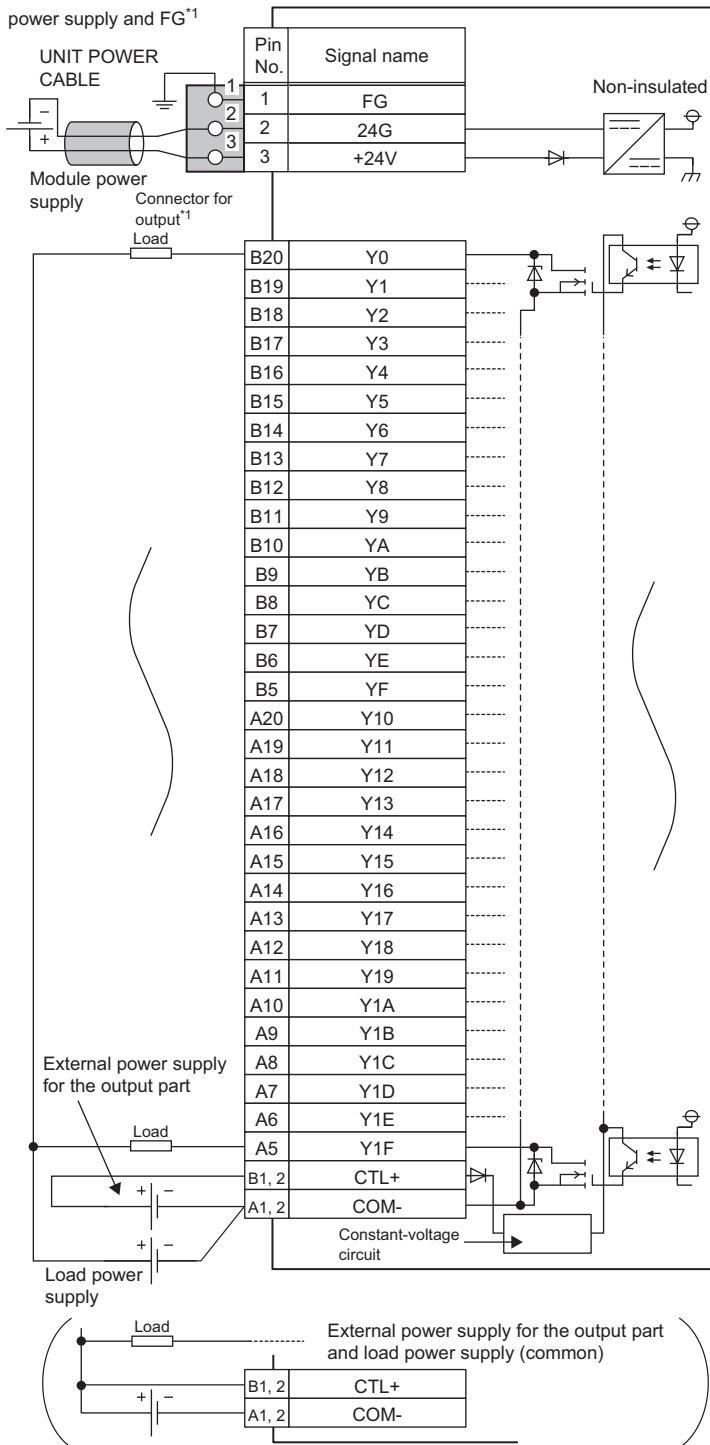*5 This can be used for the module with the firmware version "08" or later.

*6 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*7   For details on time-managed polling, refer to the following.
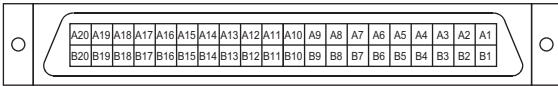   📖 User's manual for the master station used

■External wiring

*1   Only one wire can be inserted into a wire insertion opening for the following: terminal block for module power supply and FG, connector for output. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Connector for output

Terminal number	Signal name	Terminal number	Signal name
B20	Y0	A20	Y10
B19	Y1	A19	Y11
B18	Y2	A18	Y12
B17	Y3	A17	Y13
B16	Y4	A16	Y14
B15	Y5	A15	Y15
B14	Y6	A14	Y16
B13	Y7	A13	Y17
B12	Y8	A12	Y18
B11	Y9	A11	Y19
B10	YA	A10	Y1A
B9	YB	A9	Y1B
B8	YC	A8	Y1C
B7	YD	A7	Y1D
B6	YE	A6	Y1E
B5	YF	A5	Y1F
B4	Empty	A4	Empty
B3	Empty	A3	Empty
B2	CTL+	A2	COM-
B1	CTL+	A1	COM-

NZ2GN12A2-16T transistor output module

Item		NZ2GN12A2-16T
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*4]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*4]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*4]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*6]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*5]
Number of output points		16 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		4A/point (Y0 to Y3)[*1], 2A/point (Y4 to YF), 12A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.25VDC (TYP.) 2A, 0.5VDC (MAX.) 2A, 0.5VDC (TYP.) 4A, 1.0VDC (MAX.) 4A
Output response time	OFF → ON	0.5ms or less
	ON → OFF	0.8ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part[*3]	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	25mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		720VDC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP67
Wiring method for common		16 points/common (2-wire, waterproof connector type) Sink type
Protection function	Overload protection function	Limited current when detecting overcurrent: 9A or more/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	M12 waterproof connector, 8 pins, female, X-code
	Module power supply part	M12 waterproof connector, 5 pins, male, female, L-code
	I/O part	M12 waterproof connector, 5 pins, female, A-code
Applicable waterproof connector	For communications	☞ Page 150 List of Recommended Cables/Connectors for I/O Module (Waterproof Module)
	For power supply	
	For I/O	
	Y-branch connector for I/O	
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*2]
Module power supply[*3]	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.42kg

*1 Make sure that the total amount of output current that flows through one connector is 4A or less.

*2 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 252 Output module (16-point module))
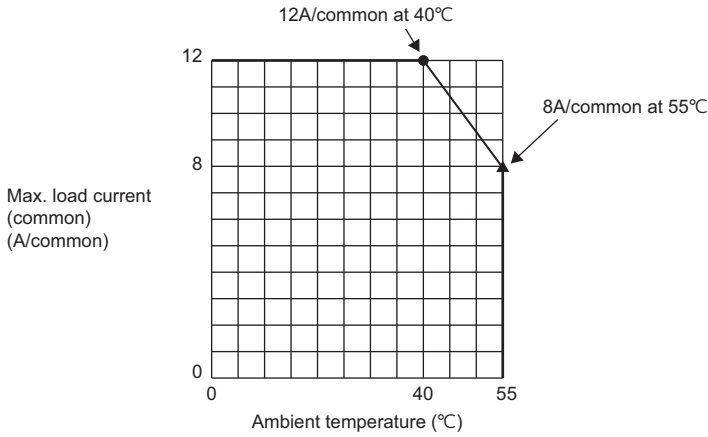
*3 For a power supply to be connected to the waterproof I/O module (such as the module-and-sensor power supply or the load power supply and external power supply for output part), use the power supply that meets the following condition.
SELV (Safety Extra Low Voltage): Product with reinforced insulation from the hazardous potential part (60V or higher)

*4 This can be used for the module with the firmware version "08" or later.

*5 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*6 For details on time-managed polling, refer to the following.

■**Derating chart**

12A/common at 40℃

8A/common at 55℃

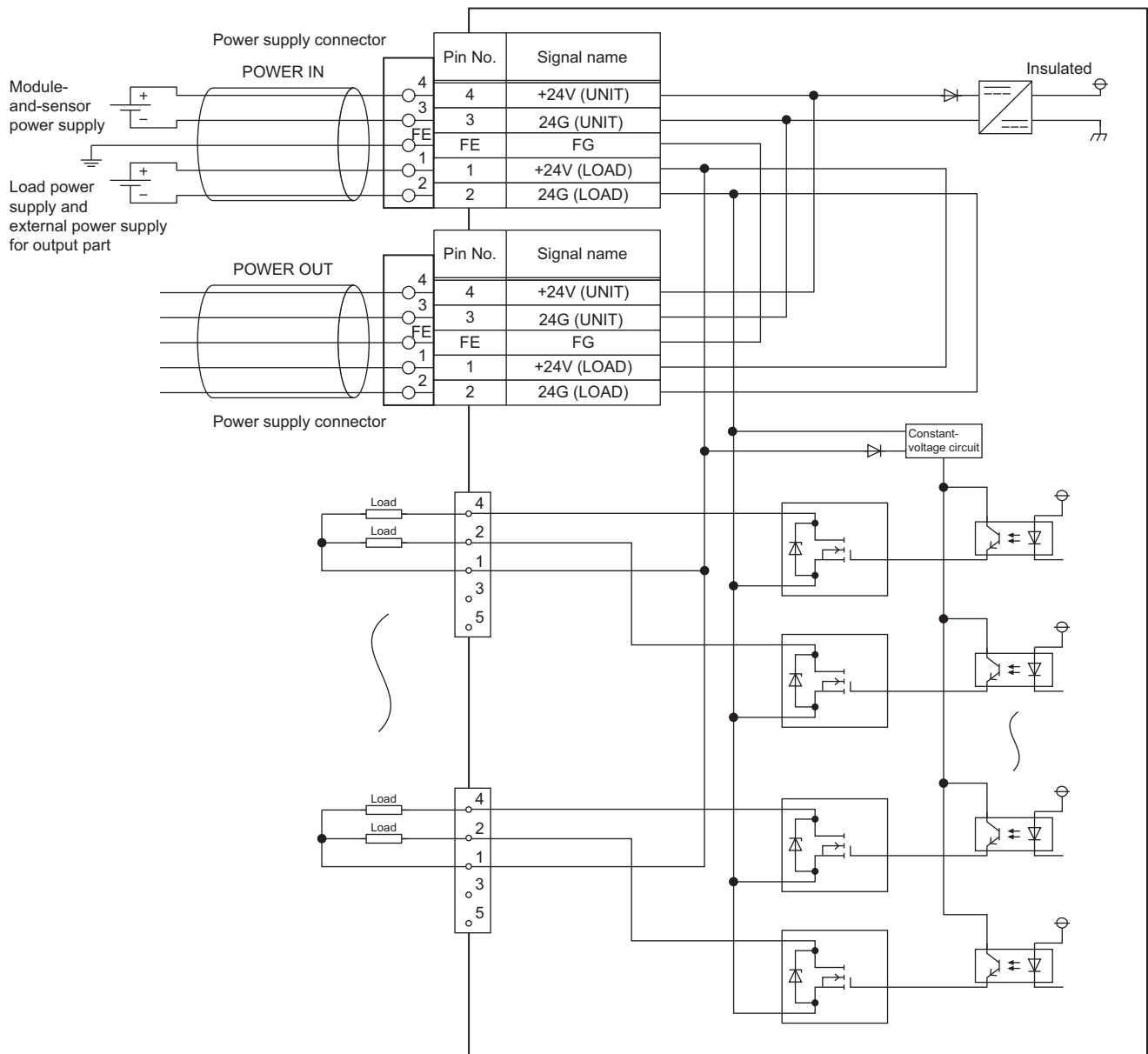Max. load current (common) (A/common)

Ambient temperature (℃)

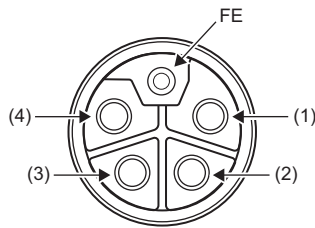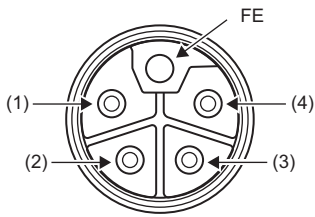●: Module-and-sensor power supply current, 8A

▲: Module-and-sensor power supply current, 6A

The module-and-sensor power supply current is 6A when the ambient temperature is 40℃ or higher.
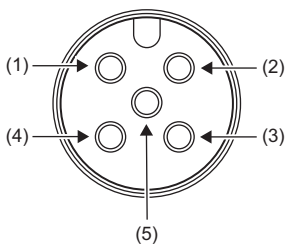
■**External wiring**

Pin No.	Signal name
4	+24V (UNIT)
3	24G (UNIT)
FE	FG
1	+24V (LOAD)
2	24G (LOAD)

Pin No.	Signal name
4	+24V (UNIT)
3	24G (UNIT)
FE	FG
1	+24V (LOAD)
2	24G (LOAD)

Power supply connector
POWER IN

Module-and-sensor power supply

Load power supply and external power supply for output part

POWER OUT

Power supply connector

Insulated

Constant-voltage circuit

Load

■Power supply connectors

Pin number		Signal name	Pin number		Signal name
M12 connector, male (IN)	(1)	+24V (LOAD)	M12 connector, female (OUT)	(1)	+24V (LOAD)
	(2)	24G (LOAD)		(2)	24G (LOAD)
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	+24V (UNIT)		(4)	+24V (UNIT)
	FE	FG		FE	FG

■Connector for output

Pin number		Signal name	Pin number		Signal name
Y0 Y1	(1)	+24V (LOAD)	Y8 Y9	(1)	+24V (LOAD)
	(2)	Y1		(2)	Y9
	(3)	Empty		(3)	Empty
	(4)	Y0		(4)	Y8
	(5)	Empty		(5)	Empty
Y2 Y3	(1)	+24V (LOAD)	YA YB	(1)	+24V (LOAD)
	(2)	Y3		(2)	YB
	(3)	Empty		(3)	Empty
	(4)	Y2		(4)	YA
	(5)	Empty		(5)	Empty
Y4 Y5	(1)	+24V (LOAD)	YC YD	(1)	+24V (LOAD)
	(2)	Y5		(2)	YD
	(3)	Empty		(3)	Empty
	(4)	Y4		(4)	YC
	(5)	Empty		(5)	Empty
Y6 Y7	(1)	+24V (LOAD)	YE YF	(1)	+24V (LOAD)
	(2)	Y7		(2)	YF
	(3)	Empty		(3)	Empty
	(4)	Y6		(4)	YE
	(5)	Empty		(5)	Empty

NZ2GN2S1-16TE transistor output module

Item		NZ2GN2S1-16TE
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*4]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*4]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*4]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*6]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*5]
Number of output points		16 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		0.5A/point, 4A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.5VDC (TYP.) 0.5A, 0.8VDC (MAX.) 0.5A
Output response time	OFF → ON	0.5ms or less
	ON → OFF	1.0ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	80mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		16 points/common (Common terminal: terminal number 17) (1-wire, spring clamp terminal block type) Source type
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5A or more/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	18-point two-piece spring clamp terminal block
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*1]
	For I/O	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*1]
Applicable solderless terminal[*2]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
	Terminal block for output	☞ Page 138 Applicable solderless terminal
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*3]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.15kg

*1 Use bar solderless terminals for wiring.
*2 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.
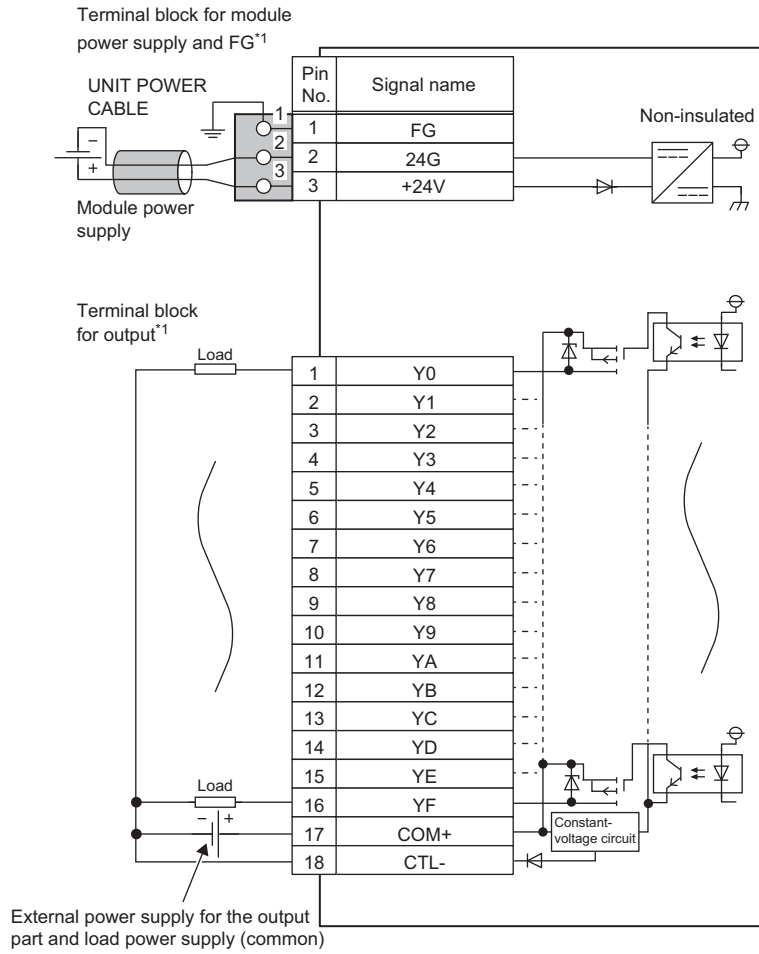*3 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 252 Output module (16-point module))
*4 This can be used for the module with the firmware version "08" or later.
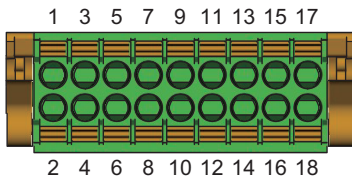*5 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.
*6 For details on time-managed polling, refer to the following.

📖 User's manual for the master station used

■External wiring

Terminal block for module
power supply and FG[*1]

UNIT POWER CABLE

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

Module power supply

Terminal block for output[*1]

Load

1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	YA
12	YB
13	YC
14	YD
15	YE
16	YF
17	COM+
18	CTL-

Load

Constant-voltage circuit

External power supply for the output part and load power supply (common)

*1   Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for output

Terminal number	Signal name
1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	YA
12	YB
13	YC
14	YD
15	YE
16	YF
17	COM+
18	CTL-

NZ2GN2S1-32TE transistor output module

Item		NZ2GN2S1-32TE
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*7]		512µs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*6]
Number of output points		32 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		0.5A/point, 5A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.5VDC (TYP.) 0.5A, 0.8VDC (MAX.) 0.5A
Output response time	OFF → ON	0.5ms or less
	ON → OFF	1.0ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	80mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1µs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		32 points/common (Common terminal: terminal number 33) (1-wire, spring clamp terminal block type) Source type
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5A or more/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	2-piece spring clamp terminal block
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*2]
	For I/O	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*2]
Applicable solderless terminal[*3]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
	Terminal block for output	☞ Page 138 Applicable solderless terminal
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*4]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	120mA or less (24VDC, all points ON)
Weight		0.18kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 Use bar solderless terminals for wiring.

*3 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*4 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 253 Output module (32-point module))
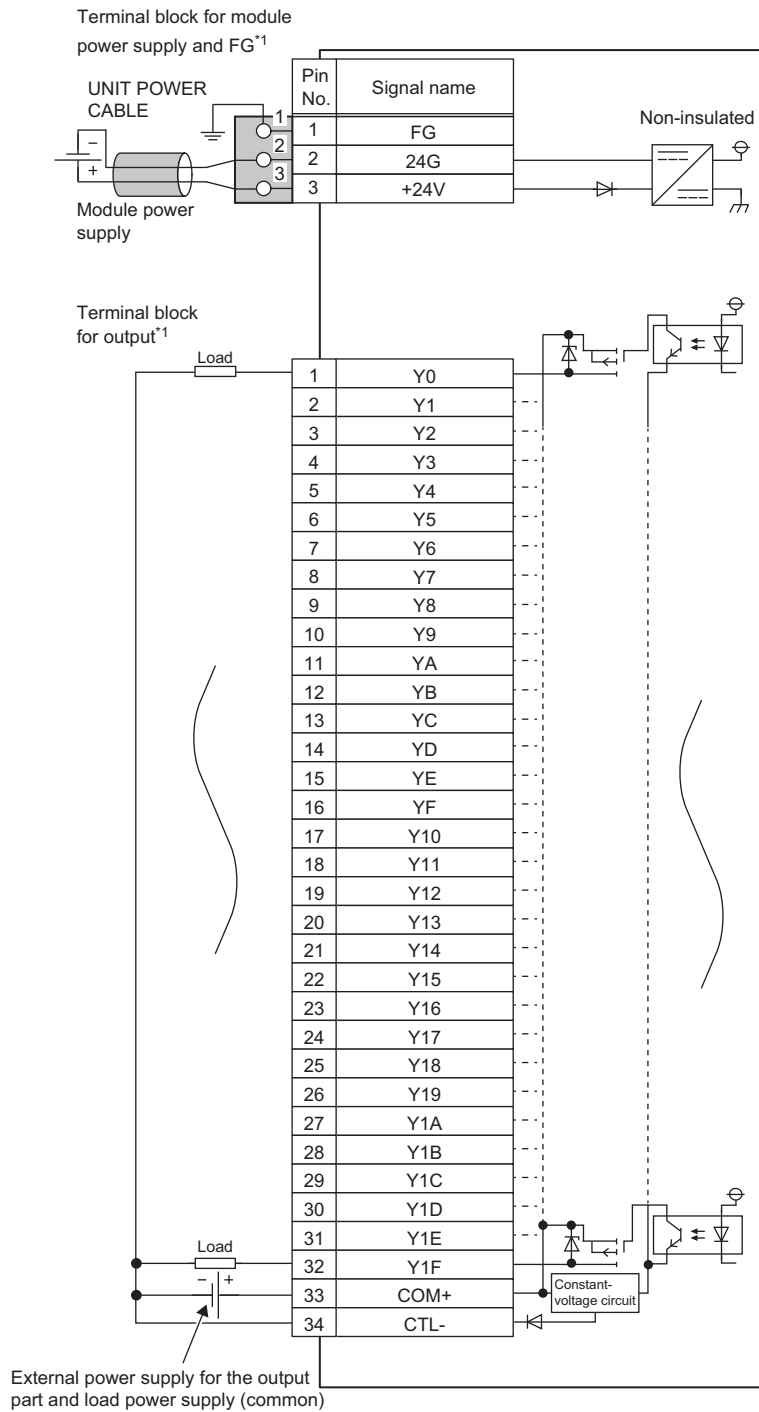
*5 This can be used for the module with the firmware version "08" or later.

*6 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

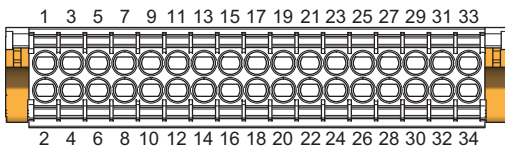*7 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■External wiring

Terminal block for module
power supply and FG[*1]

Pin No.	Signal name
1	FG
2	24G
3	+24V

UNIT POWER CABLE

Module power supply

Non-insulated

Terminal block for output[*1]

Load

1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	YA
12	YB
13	YC
14	YD
15	YE
16	YF
17	Y10
18	Y11
19	Y12
20	Y13
21	Y14
22	Y15
23	Y16
24	Y17
25	Y18
26	Y19
27	Y1A
28	Y1B
29	Y1C
30	Y1D
31	Y1E
32	Y1F
33	COM+
34	CTL-

Load

Constant-voltage circuit

External power supply for the output part and load power supply (common)

*1 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for output

Terminal number	Signal name	Terminal number	Signal name
1	Y0	17	Y10
2	Y1	18	Y11
3	Y2	19	Y12
4	Y3	20	Y13
5	Y4	21	Y14
6	Y5	22	Y15
7	Y6	23	Y16
8	Y7	24	Y17
9	Y8	25	Y18
10	Y9	26	Y19
11	YA	27	Y1A
12	YB	28	Y1B
13	YC	29	Y1C
14	YD	30	Y1D
15	YE	31	Y1E
16	YF	32	Y1F
—		33	COM+
		34	CTL-

NZ2GN2B1-16TE transistor output module

Item		NZ2GN2B1-16TE
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*4]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*4]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*4]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*6]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*5]
Number of output points		16 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		0.5A/point, 4A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.5VDC (TYP.) 0.5A, 0.8VDC (MAX.) 0.5A
Output response time	OFF → ON	0.5ms or less
	ON → OFF	1.0ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	80mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		16 points/common (Common terminal: terminal number 17) (1-wire, screw terminal block type) Source type
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5A or more/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	18-point two-piece terminal block Tightening torque range for terminal screw (M3 × 5.2 screw): 0.43 to 0.57N·m Tightening torque range for terminal block mounting screw (M3.5 screw): 0.68 to 0.92N·m
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*1]
	For I/O	Stranded wire: 0.3 to 2.0mm² (22 to 14 AWG)
Applicable solderless terminal	Terminal block for module power supply and FG[*2]	☞ Page 129 Applicable solderless terminal
	Terminal block for output	☞ Page 141 Applicable solderless terminal
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*3]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.21kg

*1 Use bar solderless terminals for wiring.

*2 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*3 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 252 Output module (16-point module))
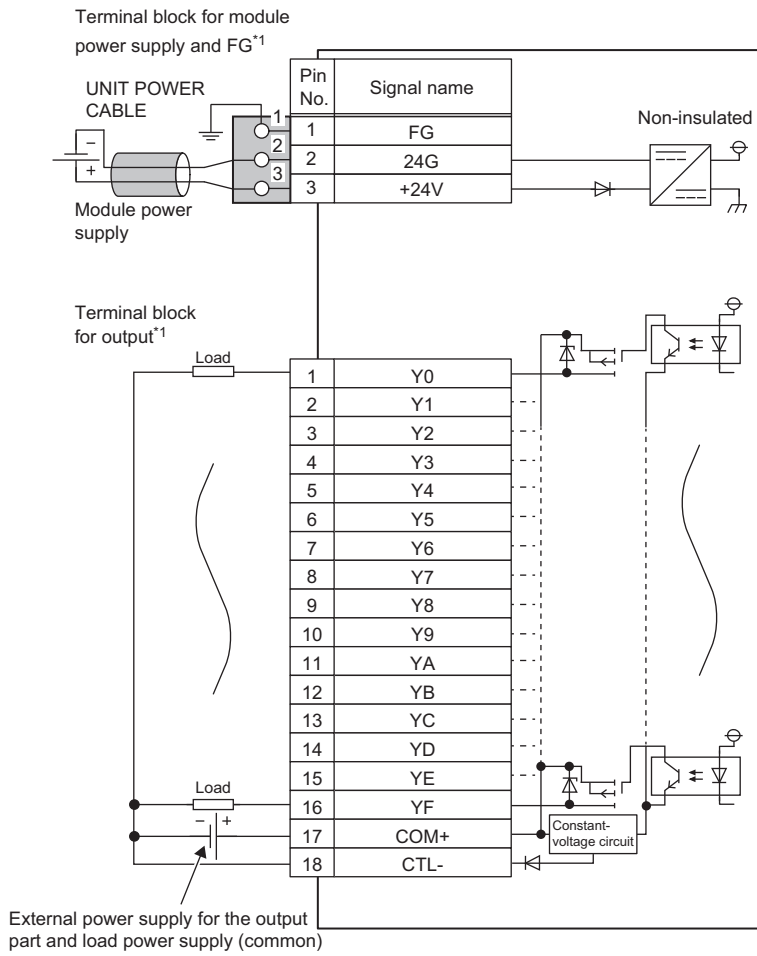
*4 This can be used for the module with the firmware version "08" or later.

*5 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

■External wiring

Terminal block for module
power supply and FG*1

UNIT POWER
CABLE

Module power
supply

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

Terminal block
for output*1

Load

1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	YA
12	YB
13	YC
14	YD
15	YE
16	YF
17	COM+
18	CTL-

Load

Constant-voltage circuit

External power supply for the output
part and load power supply (common)

*1   Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot
      be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for output

Terminal number	Signal name
1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	YA
12	YB
13	YC
14	YD
15	YE
16	YF
17	COM+
18	CTL-

3

NZ2GN2B1-32TE transistor output module

Item		NZ2GN2B1-32TE
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*7]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1*6]
Number of output points		32 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		0.5A/point, 5A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.5VDC (TYP.) 0.5A, 0.8VDC (MAX.) 0.5A
Output response time	OFF → ON	0.5ms or less
	ON → OFF	1.0ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	80mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
Wiring method for common		32 points/common (Common terminal: terminal number 33) (1-wire, screw terminal block type) Source type
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5A or more/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	34-point two-piece terminal block Tightening torque range for terminal screw (M3 × 5.2 screw): 0.43 to 0.57N·m Tightening torque range for terminal block mounting screw (M3.5 screw): 0.68 to 0.92N·m
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*2]
	For I/O	Stranded wire: 0.3 to 2.0mm² (22 to 14 AWG)
Applicable solderless terminal	Terminal block for module power supply and FG[*3]	☞ Page 129 Applicable solderless terminal
	Terminal block for output	☞ Page 141 Applicable solderless terminal
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*4]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	120mA or less (24VDC, all points ON)
Weight		0.29kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 Use bar solderless terminals for wiring.

*3 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*4 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 253 Output module (32-point module))
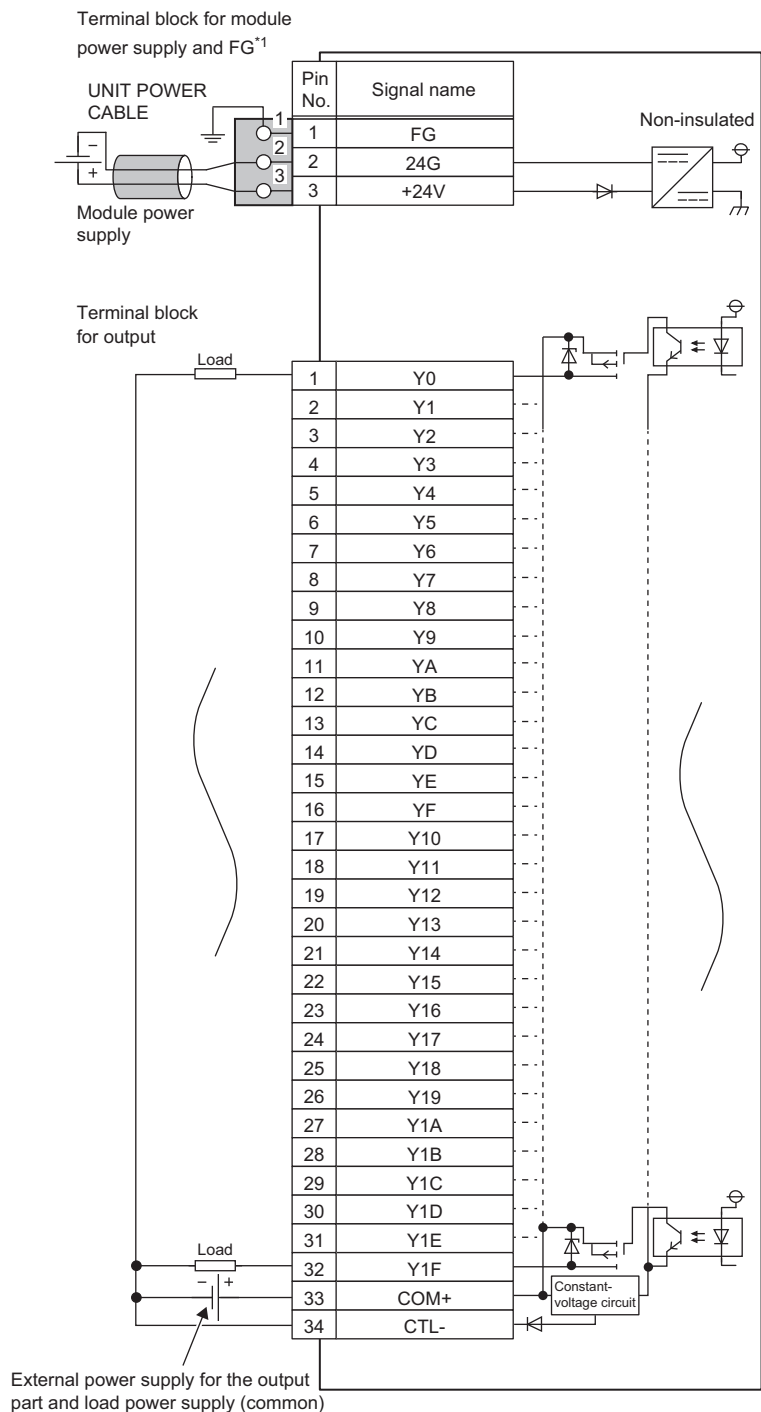
*5 This can be used for the module with the firmware version "08" or later.

*6 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

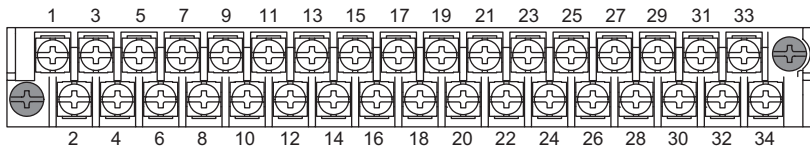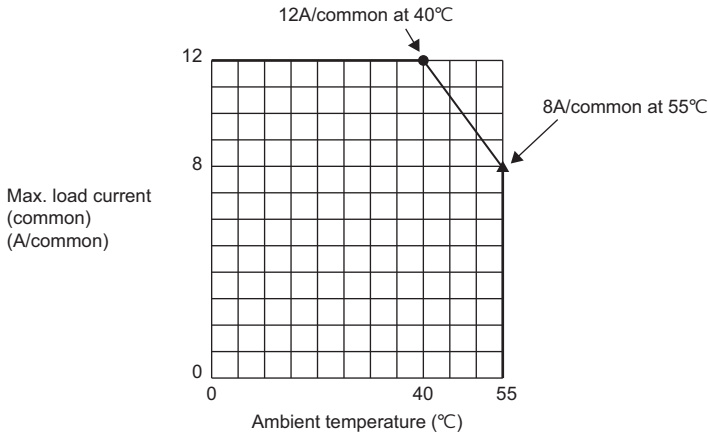*7 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■External wiring

Terminal block for module
power supply and FG*1

UNIT POWER
CABLE

Module power
supply

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

Terminal block
for output

Load

1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	YA
12	YB
13	YC
14	YD
15	YE
16	YF
17	Y10
18	Y11
19	Y12
20	Y13
21	Y14
22	Y15
23	Y16
24	Y17
25	Y18
26	Y19
27	Y1A
28	Y1B
29	Y1C
30	Y1D
31	Y1E
32	Y1F
33	COM+
34	CTL-

Load

Constant-
voltage circuit

External power supply for the output
part and load power supply (common)

*1 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■Terminal block for output

Terminal number	Signal name	Terminal number	Signal name
1	Y0	17	Y10
2	Y1	18	Y11
3	Y2	19	Y12
4	Y3	20	Y13
5	Y4	21	Y14
6	Y5	22	Y15
7	Y6	23	Y16
8	Y7	24	Y17
9	Y8	25	Y18
10	Y9	26	Y19
11	YA	27	Y1A
12	YB	28	Y1B
13	YC	29	Y1C
14	YD	30	Y1D
15	YE	31	Y1E
16	YF	32	Y1F
—		33	COM+
		34	CTL-

NZ2GN12A2-16TE transistor output module

Item		NZ2GN12A2-16TE
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*4]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*4]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*4]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*6]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*5]
Number of output points		16 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		4A/point (Y0 to Y3)[*1], 2A/point (Y4 to YF), 12A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.3VDC (TYP.) 2A, 0.6VDC (MAX.) 2A, 0.6VDC (TYP.) 4A, 1.2VDC (MAX.) 4A
Output response time	OFF → ON	0.5ms or less
	ON → OFF	1.0ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part[*3]	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	45mA or less (TYP. 24VDC per common) External load current is not included.
Withstand voltage		720VDC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP67
Wiring method for common		16 points/common (2-wire, waterproof connector type) Source type
Protection function	Overload protection function	Limited current when detecting overcurrent: 5.2A or more/point Activated to each point.
	Overheat protection function	Activated to each point.
External interface	Communication part	M12 waterproof connector, 8 pins, female, X-code
	Module power supply part	M12 waterproof connector, 5 pins, male, female, L-code
	I/O part	M12 waterproof connector, 5 pins, female, A-code
Applicable waterproof connector	For communications	☞ Page 150 List of Recommended Cables/Connectors for I/O Module (Waterproof Module)
	For power supply	
	For I/O	
	Y-branch connector for I/O	
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*2]
Module power supply[*3]	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.42kg

*1 Make sure that the total amount of output current that flows through one connector is 4A or less.
*2 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 252 Output module (16-point module))
*3 For a power supply to be connected to the waterproof I/O module (such as the module-and-sensor power supply or the load power supply and external power supply for output part), use the power supply that meets the following condition.
    SELV (Safety Extra Low Voltage): Product with reinforced insulation from the hazardous potential part (60V or higher)
*4 This can be used for the module with the firmware version "08" or later.
*5 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.
*6 For details on time-managed polling, refer to the following.

■Derating chart

12A/common at 40℃

8A/common at 55℃

Max. load current
(common)
(A/common)
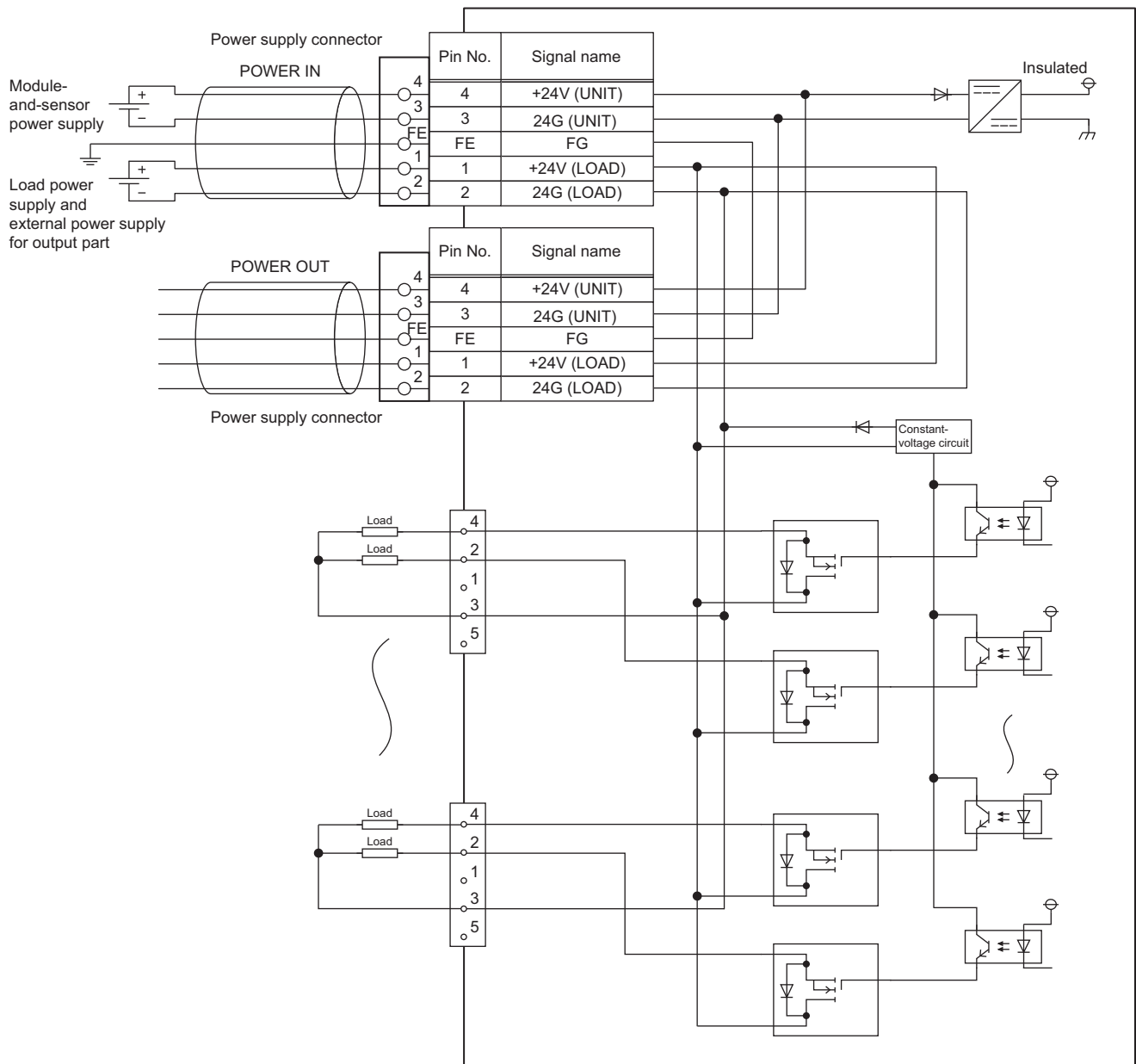
Ambient temperature (℃)

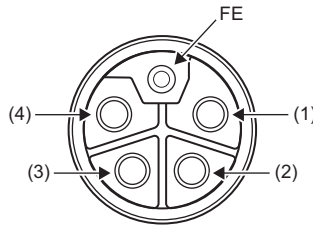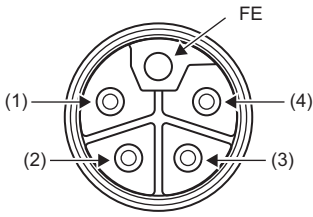● : Module-and-sensor power supply current, 8A

▲ : Module-and-sensor power supply current, 6A

The module-and-sensor power supply current is 6A when the ambient temperature is 40℃ or higher.
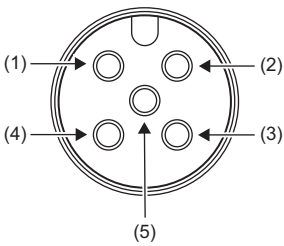
■External wiring

Power supply connector

POWER IN

Module-
and-sensor
power supply

Load power
supply and
external power supply
for output part

Pin No.	Signal name
4	+24V (UNIT)
3	24G (UNIT)
FE	FG
1	+24V (LOAD)
2	24G (LOAD)

Insulated

POWER OUT

Pin No.	Signal name
4	+24V (UNIT)
3	24G (UNIT)
FE	FG
1	+24V (LOAD)
2	24G (LOAD)

Power supply connector

Constant-
voltage circuit

Load

Load

■Power supply connectors

Pin number		Signal name	Pin number		Signal name
M12 connector, male (IN)	(1)	+24V (LOAD)	M12 connector, female (OUT)	(1)	+24V (LOAD)
	(2)	24G (LOAD)		(2)	24G (LOAD)
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	+24V (UNIT)		(4)	+24V (UNIT)
	FE	FG		FE	FG

■Connector for output

Pin number		Signal name	Pin number		Signal name
Y0 Y1	(1)	Empty	Y8 Y9	(1)	Empty
	(2)	Y1		(2)	Y9
	(3)	24V (LOAD)		(3)	24V (LOAD)
	(4)	Y0		(4)	Y8
	(5)	Empty		(5)	Empty
Y2 Y3	(1)	Empty	YA YB	(1)	Empty
	(2)	Y3		(2)	YB
	(3)	24V (LOAD)		(3)	24V (LOAD)
	(4)	Y2		(4)	YA
	(5)	Empty		(5)	Empty
Y4 Y5	(1)	Empty	YC YD	(1)	Empty
	(2)	Y5		(2)	YD
	(3)	24V (LOAD)		(3)	24V (LOAD)
	(4)	Y4		(4)	YC
	(5)	Empty		(5)	Empty
Y6 Y7	(1)	Empty	YE YF	(1)	Empty
	(2)	Y7		(2)	YF
	(3)	24V (LOAD)		(3)	24V (LOAD)
	(4)	Y6		(4)	YE
	(5)	Empty		(5)	Empty

I/O combined module

NZ2GN2S1-32DT DC input/transistor output module

Item		NZ2GN2S1-32DT
■Input specifications		
Number of input points		16 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.0mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF → ON	0ms[*2]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON → OFF	
Wiring method for common		16 points/common (Common terminal: terminal number 33) (1-wire, spring clamp terminal block type) Positive common type
■Output specifications		
Number of output points		16 points
Rated load voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Max. load current		0.5A/point, 4A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.3VDC (TYP.) 0.5A, 0.6VDC (MAX.) 0.5A
Output response time	OFF → ON	0.1ms or less
	ON → OFF	0.8ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	25mA or less (TYP. 24VDC per common) External load current is not included.
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5 to 3.5A/point Activated to each point.
	Overheat protection function	Activated to each point.
Wiring method for common		16 points/common (Common terminal: terminal number 34) (1-wire, spring clamp terminal block type) Sink type
■Common specifications		
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*7]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*7]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*7]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*9]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1*8]
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*3]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	2-piece spring clamp terminal block
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*4]
	For I/O	Stranded wire: 0.3 to 1.5㎟ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*4]

Item		NZ2GN2S1-32DT
Applicable solderless terminal[5]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
	I/O terminal block	☞ Page 138 Applicable solderless terminal
Multicast filter		Available[1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[6]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.20kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.

*3 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*4 Use bar solderless terminals for wiring.

*5 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*6 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 257 I/O combined module (32-point module))
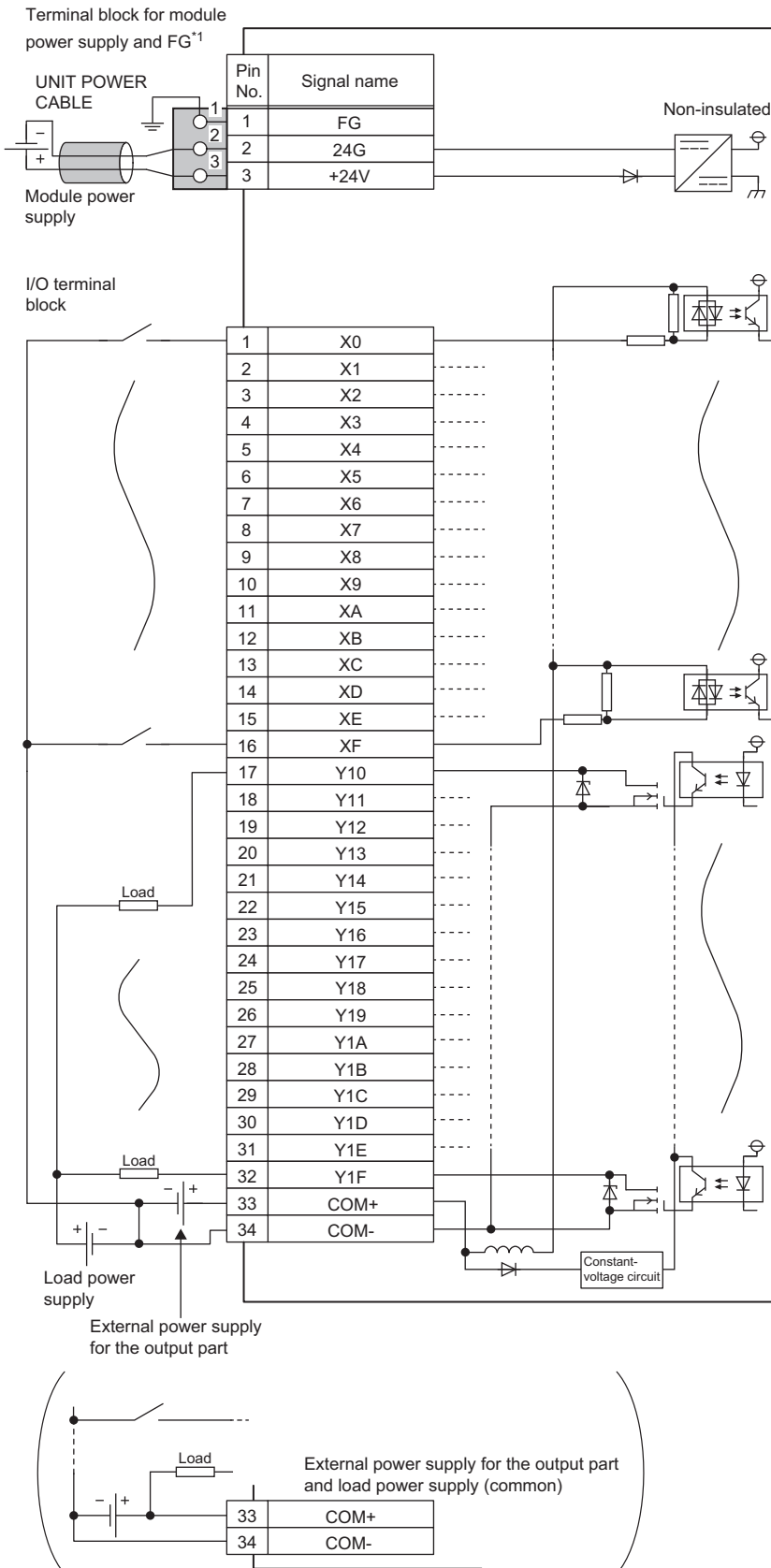
*7 This can be used for the module with the firmware version "08" or later.

*8 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*9 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■External wiling

Terminal block for module power supply and FG[*1]

UNIT POWER CABLE

Module power supply

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

I/O terminal block[*1]

1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	Y10
18	Y11
19	Y12
20	Y13
21	Y14
22	Y15
23	Y16
24	Y17
25	Y18
26	Y19
27	Y1A
28	Y1B
29	Y1C
30	Y1D
31	Y1E
32	Y1F
33	COM+
34	COM-

Load

Load

Load

Load power supply

External power supply for the output part

Constant-voltage circuit

External power supply for the output part and load power supply (common)

33	COM+
34	COM-

*1 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■I/O terminal block

Terminal number	Signal name	Terminal number	Signal name
1	X0	17	Y10
2	X1	18	Y11
3	X2	19	Y12
4	X3	20	Y13
5	X4	21	Y14
6	X5	22	Y15
7	X6	23	Y16
8	X7	24	Y17
9	X8	25	Y18
10	X9	26	Y19
11	XA	27	Y1A
12	XB	28	Y1B
13	XC	29	Y1C
14	XD	30	Y1D
15	XE	31	Y1E
16	XF	32	Y1F
—		33	COM+
		34	COM-

NZ2GN2B1-32DT DC input/transistor output module

Item	NZ2GN2B1-32DT
■Input specifications	
Number of input points	16 points
Rated input voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current	6.0mA TYP. (for 24VDC)
Maximum number of simultaneous input points	100%
ON voltage/ON current	11VDC or more/4mA or more
OFF voltage/OFF current	5VDC or less/1.5mA or less
Input resistance	3.3kΩ

Input response time	OFF → ON	0ms[*2]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON → OFF	

Wiring method for common	16 points/common (Common terminal: terminal number 33) (1-wire, screw terminal block type) Positive common type

■Output specifications

Item	NZ2GN2B1-32DT
Number of output points	16 points
Rated load voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Max. load current	0.5A/point, 4A/common
Maximum inrush current	Current is limited by the overload protection function.
Leakage current at OFF	0.1mA or less
Max. voltage drop at ON	0.3VDC (TYP.) 0.5A, 0.6VDC (MAX.) 0.5A

Output response time	OFF → ON	0.1ms or less
	ON → OFF	0.8ms or less (resistive load)

Surge suppressor		Zener diode
External power supply for output part	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	25mA or less (TYP. 24VDC per common) External load current is not included.
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5 to 3.5A/point Activated to each point.
	Overheat protection function	Activated to each point.

Wiring method for common	16 points/common (Common terminal: terminal number 34) (1-wire, screw terminal block type) Sink type

■Common specifications

Item		NZ2GN2B1-32DT
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*7]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*7]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*7]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*9]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1*8]
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*3]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	34-point two-piece terminal block Tightening torque range for terminal screw (M3 × 5.2 screw): 0.43 to 0.57N·m Tightening torque range for terminal block mounting screw (M3.5 screw): 0.68 to 0.92N·m
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*4]
	For I/O	Stranded wire: 0.3 to 2.0mm² (22 to 14 AWG)

Item		NZ2GN2B1-32DT
Applicable solderless terminal	Terminal block for module power supply and FG[*5]	☞ Page 129 Applicable solderless terminal
	I/O terminal block	☞ Page 141 Applicable solderless terminal
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*6]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.31kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.

*3 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*4 Use bar solderless terminals for wiring.

*5 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*6 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 257 I/O combined module (32-point module))
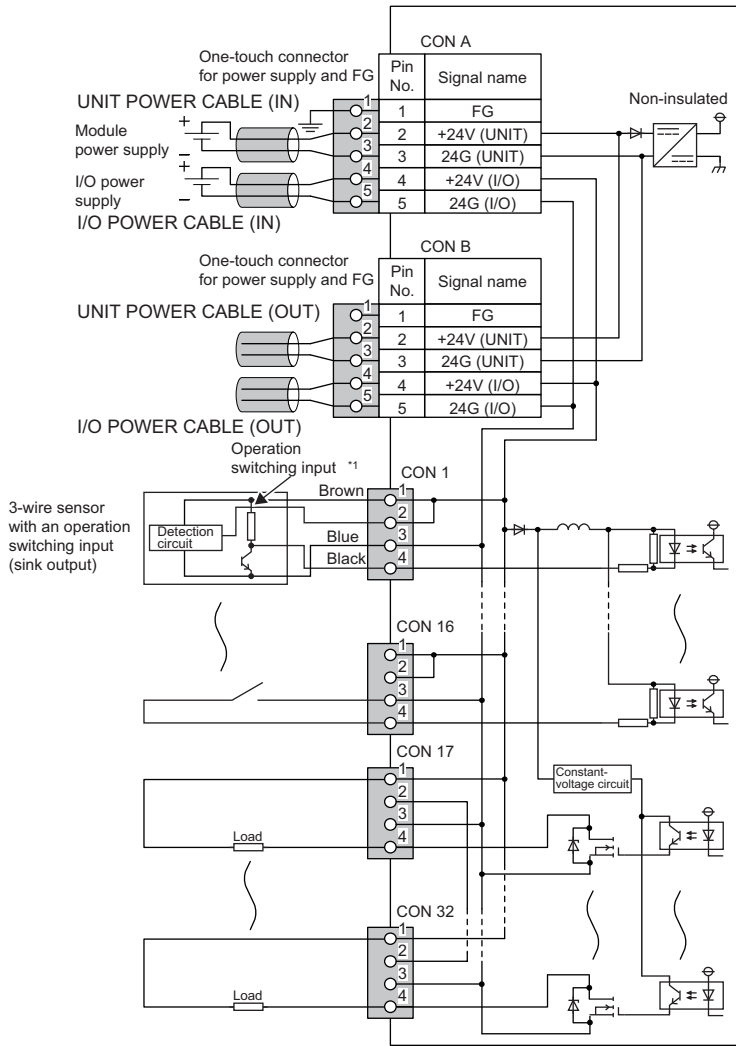
*7 This can be used for the module with the firmware version "08" or later.

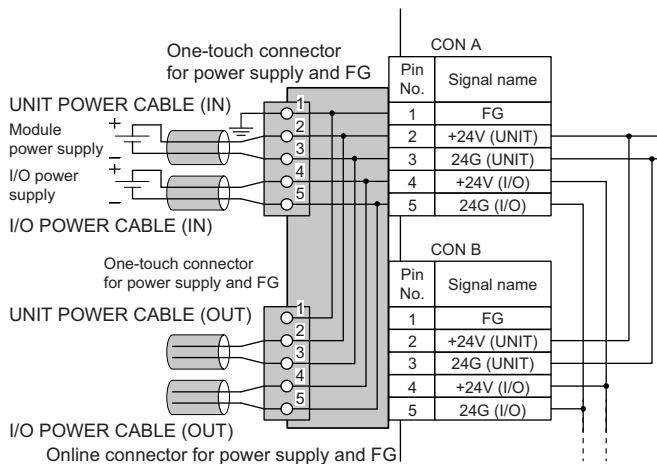*8 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*9 For details on time-managed polling, refer to the following.
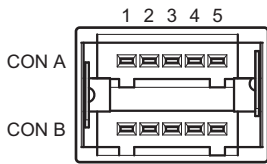📖 User's manual for the master station used

3

■External wiring

Terminal block for module power supply and FG[*1]

UNIT POWER CABLE

Module power supply

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

I/O terminal block

1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	Y10
18	Y11
19	Y12
20	Y13
21	Y14
22	Y15
23	Y16
24	Y17
25	Y18
26	Y19
27	Y1A
28	Y1B
29	Y1C
30	Y1D
31	Y1E
32	Y1F
33	COM+
34	COM-

Load

Load power supply

External power supply for the output part

Constant-voltage circuit

External power supply for the output part and load power supply (common)

33	COM+
34	COM-

Load

*1 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■I/O terminal block

Terminal number	Signal name	Terminal number	Signal name
1	X0	17	Y10
2	X1	18	Y11
3	X2	19	Y12
4	X3	20	Y13
5	X4	21	Y14
6	X5	22	Y15
7	X6	23	Y16
8	X7	24	Y17
9	X8	25	Y18
10	X9	26	Y19
11	XA	27	Y1A
12	XB	28	Y1B
13	XC	29	Y1C
14	XD	30	Y1D
15	XE	31	Y1E
16	XF	32	Y1F
—		33	COM+
		34	COM-

3

NZ2GNCE3-32DT DC input/transistor output module

Item		NZ2GNCE3-32DT
■Input specifications		
Number of input points		16 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.6mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF → ON	0ms[*2]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON → OFF	
Wiring method for common		16 points/common (3-wire, sensor connector (e-CON) type) Positive common type
■Output specifications		
Number of output points		16 points
Rated load voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Max. load current		0.5A/point, 4A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.3VDC (TYP.) 0.5A, 0.6VDC (MAX.) 0.5A
Output response time	OFF → ON	0.1ms or less
	ON → OFF	0.8ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	25mA or less (TYP. 24VDC per common) External load current is not included.
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5 to 3.5A/point Activated to each point.
	Overheat protection function	Activated to each point.
Wiring method for common		16 points/common (3-wire, sensor connector (e-CON) type) Sink type
■Common specifications		
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1][*6]
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*3]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
External interface	Communication part	RJ45 connector
	Module power supply part	One-touch connector for power supply and FG (5 pins, crimping type)
	I/O part	Sensor connector (e-CON) (4 pins, crimping type)

Item		NZ2GNCE3-32DT
Applicable wire size	For power supply	0.66 to 0.98㎟ (18 AWG) [Finishing outer diameter: φ2.2 to 3.0mm (A6CON-PW5P), φ2.0 to 2.3mm (A6CON-PW5P-SOD)] Strand diameter: 0.16mm or longer Insulating coating material: PVC (heat resistant vinyl)
	For I/O	Sensor connector (e-CON) The size depends on the connector plug used (sold separately). (☞ Page 148 Wiring of sensor connector (e-CON))
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*4]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.25kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.

*3 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*4 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 257 I/O combined module (32-point module))
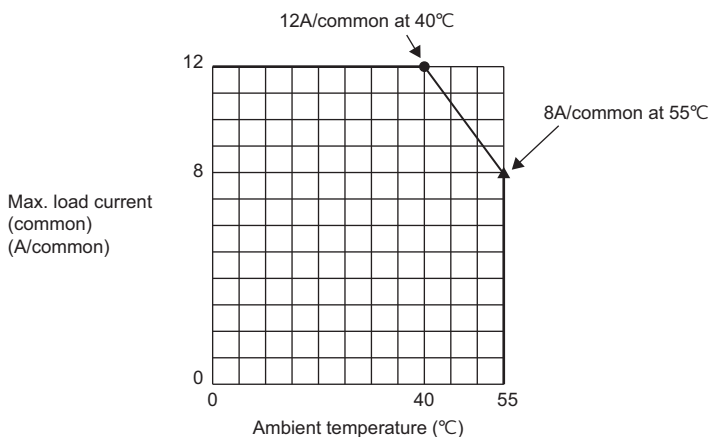
*5 This can be used for the module with the firmware version "08" or later.

*6 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*7 For details on time-managed polling, refer to the following.
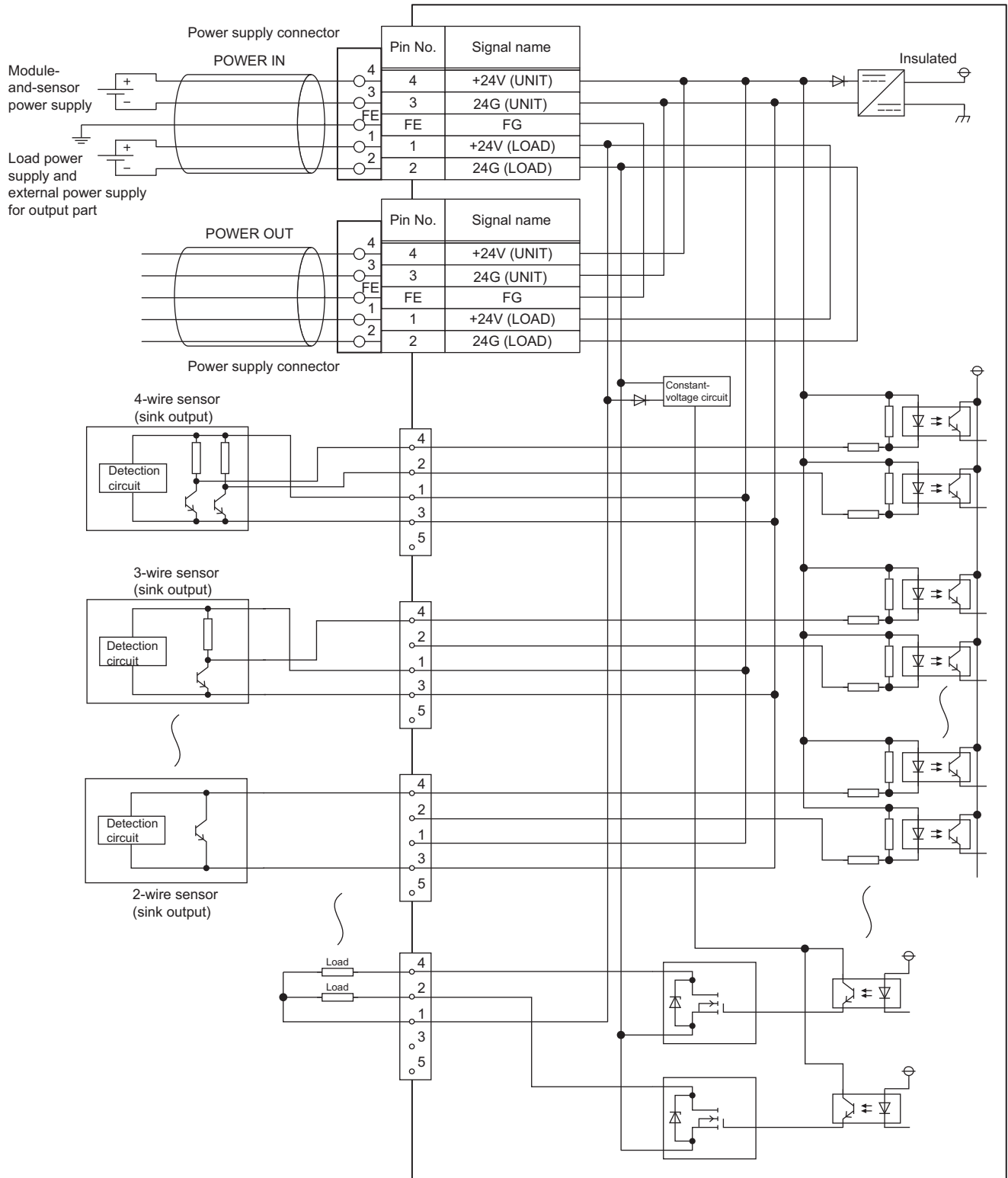   📖 User's manual for the master station used

■External wiring

CON A

Pin No.	Signal name
1	FG
2	+24V (UNIT)
3	24G (UNIT)
4	+24V (I/O)
5	24G (I/O)

One-touch connector for power supply and FG

UNIT POWER CABLE (IN)

Module power supply

I/O power supply

I/O POWER CABLE (IN)

Non-insulated

CON B

Pin No.	Signal name
1	FG
2	+24V (UNIT)
3	24G (UNIT)
4	+24V (I/O)
5	24G (I/O)

One-touch connector for power supply and FG

UNIT POWER CABLE (OUT)

I/O POWER CABLE (OUT)

Operation switching input *1

CON 1

Brown
Blue
Black

3-wire sensor with an operation switching input (sink output)

Detection circuit

CON 16

CON 17

Constant-voltage circuit

Load

CON 32

Load

• When an online connector is connected

CON A

Pin No.	Signal name
1	FG
2	+24V (UNIT)
3	24G (UNIT)
4	+24V (I/O)
5	24G (I/O)

One-touch connector for power supply and FG

UNIT POWER CABLE (IN)

Module power supply

I/O power supply

I/O POWER CABLE (IN)

One-touch connector for power supply and FG

UNIT POWER CABLE (OUT)

CON B

Pin No.	Signal name
1	FG
2	+24V (UNIT)
3	24G (UNIT)
4	+24V (I/O)
5	24G (I/O)

I/O POWER CABLE (OUT)

Online connector for power supply and FG

*1   The colors of leads correspond to IEC 60947-5-2.

■Connector for module power supply and FG

Terminal number[1]		Signal name
CON A CON B	1	FG
	2	+24V (UNIT)
	3	24G (UNIT)
	4	+24V (I/O)
	5	24G (I/O)

[1]   A non-wired connector must be connected to the empty slot of the connector for module power supply and FG.

■Connector for input

Terminal number		Signal name	Terminal number		Signal name	Terminal number		Signal name	Terminal number		Signal name
CON1 (X0)	1	+24V	CON9 (X8)	1	+24V	CON17 (Y10)	1	+24V	CON25 (Y18)	1	+24V
	2	+V		2	+V		2	NC[*1]		2	NC[*1]
	3	24G		3	24G		3	24G		3	24G
	4	X0		4	X8		4	Y10		4	Y18
CON2 (X1)	1	+24V	CON10 (X9)	1	+24V	CON18 (Y11)	1	+24V	CON26 (Y19)	1	+24V
	2	+V		2	+V		2	NC[*1]		2	NC[*1]
	3	24G		3	24G		3	24G		3	24G
	4	X1		4	X9		4	Y11		4	Y19
CON3 (X2)	1	+24V	CON11 (XA)	1	+24V	CON19 (Y12)	1	+24V	CON27 (Y1A)	1	+24V
	2	+V		2	+V		2	NC[*1]		2	NC[*1]
	3	24G		3	24G		3	24G		3	24G
	4	X2		4	XA		4	Y12		4	Y1A
CON4 (X3)	1	+24V	CON12 (XB)	1	+24V	CON20 (Y13)	1	+24V	CON28 (Y1B)	1	+24V
	2	+V		2	+V		2	NC[*1]		2	NC[*1]
	3	24G		3	24G		3	24G		3	24G
	4	X3		4	XB		4	Y13		4	Y1B
CON5 (X4)	1	+24V	CON13 (XC)	1	+24V	CON21 (Y14)	1	+24V	CON29 (Y1C)	1	+24V
	2	+V		2	+V		2	NC[*1]		2	NC[*1]
	3	24G		3	24G		3	24G		3	24G
	4	X4		4	XC		4	Y14		4	Y1C
CON6 (X5)	1	+24V	CON14 (XD)	1	+24V	CON22 (Y15)	1	+24V	CON30 (Y1D)	1	+24V
	2	+V		2	+V		2	NC[*1]		2	NC[*1]
	3	24G		3	24G		3	24G		3	24G
	4	X5		4	XD		4	Y15		4	Y1D
CON7 (X6)	1	+24V	CON15 (XE)	1	+24V	CON23 (Y16)	1	+24V	CON31 (Y1E)	1	+24V
	2	+V		2	+V		2	NC[*1]		2	NC[*1]
	3	24G		3	24G		3	24G		3	24G
	4	X6		4	XE		4	Y16		4	Y1E
CON8 (X7)	1	+24V	CON16 (XF)	1	+24V	CON24 (Y17)	1	+24V	CON32 (Y1F)	1	+24V
	2	+V		2	+V		2	NC[*1]		2	NC[*1]
	3	24G		3	24G		3	24G		3	24G
	4	X7		4	XF		4	Y17		4	Y1F

*1 All the pin 2 of CON17 to CON32 cannot be used because they are internally connected.

NZ2GN12A42-16DT DC input/transistor output module

Item	NZ2GN12A42-16DT
■Input specifications	
Number of input points	8 points
Rated input voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current	7.3mA TYP. (for 24VDC)
Maximum number of simultaneous input points	100%
ON voltage/ON current	11VDC or more/4mA or more
OFF voltage/OFF current	5VDC or less/1.5mA or less
Input resistance	3.0kΩ

Input response time	OFF → ON	0ms[*1]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 10ms)
	ON → OFF	

Wiring method for common	8 points/common (2- to 4-wire, waterproof connector type) Positive common type
Current supplied to external devices	0.4A/terminal
■Output specifications	
Number of output points	8 points
Rated load voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current	4A/point (Y8 to YB)[*2], 2A/point (YC to YF), 12A/common
Maximum inrush current	Current is limited by the overload protection function.
Leakage current at OFF	0.1mA or less
Max. voltage drop at ON	0.25VDC (TYP.) 2A, 0.5VDC (MAX.) 2A, 0.5VDC (TYP.) 4A, 1.0VDC (MAX.) 4A

Output response time	OFF → ON	0.5ms or less
	ON → OFF	0.8ms or less (resistive load)

Surge suppressor		Zener diode

External power supply for output part[*4]	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	20mA or less (TYP. 24VDC per common) External load current is not included.

Protection function	Overload protection function	Limited current when detecting overcurrent: 9A or more/point Activated to each point.
	Overheat protection function	Activated to each point.

Wiring method for common	8 points/common (2-wire, waterproof connector type) Sink type
■Common specifications	
Station type	Remote station
CC-Link IE TSN Class	CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]

CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]

Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*7]	512μs
Network topology	Line topology, star topology, mixture of star topology and line topology, ring topology[*6]
Withstand voltage	720VDC for 1 minute between all DC external terminals and ground
Insulation resistance	10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity	Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree	IP67

External interface	Communication part	M12 waterproof connector, 8 pins, female, X-code
	Module power supply part	M12 waterproof connector, 5 pins, male, female, L-code
	I/O part	M12 waterproof connector, 5 pins, female, A-code

Applicable waterproof connector	For communications	☞ Page 150 List of Recommended Cables/Connectors for I/O Module (Waterproof Module)
	For power supply	
	For I/O	
	Y-branch connector for I/O	

Item		NZ2GN12A42-16DT
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[*3]
Module power supply[*4]	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	160mA or less (24VDC, all points ON)
Weight		0.42kg

*1 If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.

*2 Make sure that the total amount of output current that flows through one connector is 4A or less.

*3 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 255 I/O combined module (16-point module))

*4 For a power supply to be connected to the waterproof I/O module (such as the module-and-sensor power supply or the load power supply and external power supply for output part), use the power supply that meets the following condition.
SELV (Safety Extra Low Voltage): Product with reinforced insulation from the hazardous potential part (60V or higher)

*5 This can be used for the module with the firmware version "08" or later.

*6 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*7 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■Derating chart

● : Module-and-sensor power supply current, 8A

▲ : Module-and-sensor power supply current, 6A

The module-and-sensor power supply current is 6A when the ambient temperature is 40℃ or higher.

■External wiring

Pin No.	Signal name
4	+24V (UNIT)
3	24G (UNIT)
FE	FG
1	+24V (LOAD)
2	24G (LOAD)

Pin No.	Signal name
4	+24V (UNIT)
3	24G (UNIT)
FE	FG
1	+24V (LOAD)
2	24G (LOAD)

■Power supply connectors

Pin number		Signal name	Pin number		Signal name
M12 connector, male (IN)	(1)	+24V (LOAD)	M12 connector, female (OUT)	(1)	+24V (LOAD)
	(2)	24G (LOAD)		(2)	24G (LOAD)
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	+24V (UNIT)		(4)	+24V (UNIT)
	FE	FG		FE	FG

■Connector for I/O

Connector for input			Connector for output		
Pin number		**Signal name**	**Pin number**		**Signal name**
X0 X1	(1)	+24V (UNIT)	Y8 Y9	(1)	+24V (LOAD)
	(2)	X1		(2)	Y9
	(3)	24G (UNIT)		(3)	Empty
	(4)	X0		(4)	Y8
	(5)	Empty		(5)	Empty
X2 X3	(1)	+24V (UNIT)	YA YB	(1)	+24V (LOAD)
	(2)	X3		(2)	YB
	(3)	24G (UNIT)		(3)	Empty
	(4)	X2		(4)	YA
	(5)	Empty		(5)	Empty
X4 X5	(1)	+24V (UNIT)	YC YD	(1)	+24V (LOAD)
	(2)	X5		(2)	YD
	(3)	24G (UNIT)		(3)	Empty
	(4)	X4		(4)	YC
	(5)	Empty		(5)	Empty
X6 X7	(1)	+24V (UNIT)	YE YF	(1)	+24V (LOAD)
	(2)	X7		(2)	YF
	(3)	24G (UNIT)		(3)	Empty
	(4)	X6		(4)	YE
	(5)	Empty		(5)	Empty

NZ2GN2S1-32DTE DC input/transistor output module

Item		NZ2GN2S1-32DTE
■Input specifications		
Number of input points		16 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.0mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF → ON	0ms[*2]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON → OFF	
Wiring method for common		16 points/common (Common terminal: terminal number 34) (1-wire, spring clamp terminal block type) Negative common type
■Output specifications		
Number of output points		16 points
Rated load voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Max. load current		0.5A/point, 4A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.5VDC (TYP.) 0.5A, 0.8VDC (MAX.) 0.5A
Output response time	OFF → ON	0.5ms or less
	ON → OFF	1.0ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	45mA or less (TYP. 24VDC per common) External load current is not included.
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5A or more/point Activated to each point.
	Overheat protection function	Activated to each point.
Wiring method for common		16 points/common (Common terminal: terminal number 33) (1-wire, spring clamp terminal block type) Source type
■Common specifications		
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*7]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*7]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*7]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*9]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1*8]
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*3]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	2-piece spring clamp terminal block
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5m㎡ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*4]
	For I/O	Stranded wire: 0.3 to 1.5m㎡ (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*4]
Applicable solderless terminal[*5]	Terminal block for module power supply and FG	☞ Page 129 Applicable solderless terminal
	I/O terminal block	☞ Page 138 Applicable solderless terminal

Item		NZ2GN2S1-32DTE
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*6]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.20kg

*1   The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2   If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.

*3   It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*4   Use bar solderless terminals for wiring.

*5   Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*6   This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 257 I/O combined module (32-point module))

*7   This can be used for the module with the firmware version "08" or later.

*8   Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*9   For details on time-managed polling, refer to the following.
      📖 User's manual for the master station used

■External wiring

Terminal block for module power supply and FG[*1]

UNIT POWER CABLE

Module power supply

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

I/O terminal block[*1]

	Signal name
1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	Y10
18	Y11
19	Y12
20	Y13
21	Y14
22	Y15
23	Y16
24	Y17
25	Y18
26	Y19
27	Y1A
28	Y1B
29	Y1C
30	Y1D
31	Y1E
32	Y1F
33	COM+
34	COM-

Load

Load

Constant-voltage circuit

External power supply for the output part and load power supply (common)

*1 Only one wire can be inserted into a wire insertion opening. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

3

■I/O terminal block

Terminal number	Signal name	Terminal number	Signal name
1	X0	17	Y10
2	X1	18	Y11
3	X2	19	Y12
4	X3	20	Y13
5	X4	21	Y14
6	X5	22	Y15
7	X6	23	Y16
8	X7	24	Y17
9	X8	25	Y18
10	X9	26	Y19
11	XA	27	Y1A
12	XB	28	Y1B
13	XC	29	Y1C
14	XD	30	Y1D
15	XE	31	Y1E
16	XF	32	Y1F
—		33	COM+
		34	COM-

NZ2GN2B1-32DTE DC input/transistor output module

Item		NZ2GN2B1-32DTE
■Input specifications		
Number of input points		16 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		6.0mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.3kΩ
Input response time	OFF → ON	0ms[*2]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 1ms)
	ON → OFF	
Wiring method for common		16 points/common (Common terminal: terminal number 34) (1-wire, screw terminal block type) Negative common type
■Output specifications		
Number of output points		16 points
Rated load voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Max. load current		0.5A/point, 4A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.5VDC (TYP.) 0.5A, 0.8VDC (MAX.) 0.5A
Output response time	OFF → ON	0.5ms or less
	ON → OFF	1.0ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	45mA or less (TYP. 24VDC per common) External load current is not included.
Protection function	Overload protection function	Limited current when detecting overcurrent: 1.5A or more/point Activated to each point.
	Overheat protection function	Activated to each point.
Wiring method for common		16 points/common (Common terminal: terminal number 33) (1-wire, screw terminal block type) Source type
■Common specifications		
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*7]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*7]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*7]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*9]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*1*8]
Withstand voltage		510VAC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity[*3]		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP2X
External interface	Communication part	RJ45 connector
	Module power supply part	Terminal block for module power supply and FG (2-piece spring clamp terminal block)
	I/O part	34-point two-piece terminal block Tightening torque range for terminal screw (M3 × 5.2 screw): 0.43 to 0.57N·m Tightening torque range for terminal block mounting screw (M3.5 screw): 0.68 to 0.92N·m
Applicable wire size	For power supply	Stranded wire: 0.3 to 1.5mm² (22 to 16 AWG), terminal slot size: 2.4mm × 1.5mm[*4]
	For I/O	Stranded wire: 0.3 to 2.0mm² (22 to 14 AWG)

Item		NZ2GN2B1-32DTE
Applicable solderless terminal	Terminal block for module power supply and FG[*5]	☞ Page 129 Applicable solderless terminal
	I/O terminal block	☞ Page 141 Applicable solderless terminal
Multicast filter		Available[*1]
Cyclic transmission	RX/RY points	32 points
	RWr/RWw points	4 points[*6]
Module power supply	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	110mA or less (24VDC, all points ON)
Weight		0.31kg

*1 The performance specifications vary depending on firmware versions of modules used. (☞ Page 295 Added and Changed Functions)

*2 If the input response time is set to "0ms", the actual input response time is 80µs at OFF → ON, and 160µs at ON → OFF.

*3 It is the noise immunity of when the input response time setting value is other than "0ms". Note that the module is easily affected by noise if "0ms" is set.

*4 Use bar solderless terminals for wiring.

*5 Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

*6 This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 257 I/O combined module (32-point module))

*7 This can be used for the module with the firmware version "08" or later.

*8 Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*9 For details on time-managed polling, refer to the following.
📖 User's manual for the master station used

■External wiring

Terminal block for module power supply and FG[*1]

UNIT POWER CABLE

Module power supply

Pin No.	Signal name
1	FG
2	24G
3	+24V

Non-insulated

I/O terminal block

Pin	Signal name
1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7
9	X8
10	X9
11	XA
12	XB
13	XC
14	XD
15	XE
16	XF
17	Y10
18	Y11
19	Y12
20	Y13
21	Y14
22	Y15
23	Y16
24	Y17
25	Y18
26	Y19
27	Y1A
28	Y1B
29	Y1C
30	Y1D
31	Y1E
32	Y1F
33	COM+
34	COM-

Load

Load

Constant-voltage circuit

External power supply for the output part and load power supply (common)

*1   Only one wire can be inserted into a wire insertion opening for the terminal block for module power supply and FG. Multiple wires cannot be connected to a terminal. Connecting two or more wires may cause a poor contact.

■I/O terminal block

Terminal number	Signal name	Terminal number	Signal name
1	X0	17	Y10
2	X1	18	Y11
3	X2	19	Y12
4	X3	20	Y13
5	X4	21	Y14
6	X5	22	Y15
7	X6	23	Y16
8	X7	24	Y17
9	X8	25	Y18
10	X9	26	Y19
11	XA	27	Y1A
12	XB	28	Y1B
13	XC	29	Y1C
14	XD	30	Y1D
15	XE	31	Y1E
16	XF	32	Y1F
—		33	COM+
		34	COM-

NZ2GN12A42-16DTE DC input/transistor output module

Item		NZ2GN12A42-16DTE
■Input specifications		
Number of input points		8 points
Rated input voltage		24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
Rated input current		7.3mA TYP. (for 24VDC)
Maximum number of simultaneous input points		100%
ON voltage/ON current		11VDC or more/4mA or more
OFF voltage/OFF current		5VDC or less/1.5mA or less
Input resistance		3.0kΩ
Input response time	OFF → ON	0ms[*1]/0.2ms/1ms/1.5ms/5ms/10ms/20ms/70ms (Factory default: 10ms)
	ON → OFF	
Wiring method for common		8 points/common (2- to 4-wire, waterproof connector type) Negative common type
Current supplied to external devices		0.4A/terminal
■Output specifications		
Number of output points		8 points
Rated load voltage		12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
Max. load current		4A/point (Y8 to YB)[*2], 2A/point (YC to YF), 12A/common
Maximum inrush current		Current is limited by the overload protection function.
Leakage current at OFF		0.1mA or less
Max. voltage drop at ON		0.3VDC (TYP.) 2A, 0.6VDC (MAX.) 2A, 0.6VDC (TYP.) 4A, 1.2VDC (MAX.) 4A
Output response time	OFF → ON	0.5ms or less
	ON → OFF	1.0ms or less (resistive load)
Surge suppressor		Zener diode
External power supply for output part[*4]	Voltage	12/24VDC (ripple rate: 5% or less) (Allowable voltage range: 10.2 to 28.8VDC)
	Current	30mA or less (TYP. 24VDC per common) External load current is not included.
Protection function	Overload protection function	Limited current when detecting overcurrent: 5.2A or more/point Activated to each point.
	Overheat protection function	Activated to each point.
Wiring method for common		8 points/common (2-wire, waterproof connector type) Source type
■Common specifications		
Station type		Remote station
CC-Link IE TSN Class		CC-Link IE TSN Class B (factory default) CC-Link IE TSN Class A[*5]
CC-Link IE TSN protocol version	CC-Link IE TSN Class B	CC-Link IE TSN protocol version 1.0 CC-Link IE TSN protocol version 2.0[*5]
	CC-Link IE TSN Class A	CC-Link IE TSN protocol version 2.0[*5]
Maximum response time for time-managed polling (for CC-Link IE TSN Class A)[*7]		512μs
Network topology		Line topology, star topology, mixture of star topology and line topology, ring topology[*6]
Withstand voltage		720VDC for 1 minute between all DC external terminals and ground
Insulation resistance		10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester)
Noise immunity		Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition)
Protection degree		IP67
External interface	Communication part	M12 waterproof connector, 8 pins, female, X-code
	Module power supply part	M12 waterproof connector, 5 pins, male, female, L-code
	I/O part	M12 waterproof connector, 5 pins, female, A-code
Applicable waterproof connector	For communications	☞ Page 150 List of Recommended Cables/Connectors for I/O Module (Waterproof Module)
	For power supply	
	For I/O	
	Y-branch connector for I/O	

Item		NZ2GN12A42-16DTE
Multicast filter		Available
Cyclic transmission	RX/RY points	16 points
	RWr/RWw points	4 points[3]
Module power supply[4]	Voltage	24VDC (ripple rate: 5% or less) (Allowable voltage range: 20.4 to 28.8VDC)
	Current	160mA or less (24VDC, all points ON)
Weight		0.42kg

*1   If the input response time is set to "0ms", the actual input response time is 80μs at OFF → ON, and 160μs at ON → OFF.

*2   Make sure that the total amount of output current that flows through one connector is 4A or less.

*3   This value indicates the number of points set by default when the module is dragged and dropped to the network map in the CC-Link IE TSN Configuration window. According to the function used, set an appropriate number of points. (☞ Page 255 I/O combined module (16-point module))

*4   For a power supply to be connected to the waterproof I/O module (such as the module-and-sensor power supply or the load power supply and external power supply for output part), use the power supply that meets the following condition.
     SELV (Safety Extra Low Voltage): Product with reinforced insulation from the hazardous potential part (60V or higher)

*5   This can be used for the module with the firmware version "08" or later.

*6   Ring topology cannot be used when the CC-Link IE TSN Class is CC-Link IE TSN Class A.

*7   For details on time-managed polling, refer to the following.
     📖 User's manual for the master station used

■Derating chart

●: Module-and-sensor power supply current, 8A

▲: Module-and-sensor power supply current, 6A

The module-and-sensor power supply current is 6A when the ambient temperature is 40℃ or higher.

■External wiring

■Power supply connectors

Pin number		Signal name	Pin number		Signal name
M12 connector, male (IN)	(1)	+24V (LOAD)	M12 connector, female (OUT)	(1)	+24V (LOAD)
	(2)	24G (LOAD)		(2)	24G (LOAD)
	(3)	24G (UNIT)		(3)	24G (UNIT)
	(4)	+24V (UNIT)		(4)	+24V (UNIT)
	FE	FG		FE	FG

■Connector for I/O

Connector for input			Connector for output		
Pin number		**Signal name**	**Pin number**		**Signal name**
X0 X1	(1)	+24V (UNIT)	Y8 Y9	(1)	Empty
	(2)	X1		(2)	Y9
	(3)	24G (UNIT)		(3)	24G (LOAD)
	(4)	X0		(4)	Y8
	(5)	Empty		(5)	Empty
X2 X3	(1)	+24V (UNIT)	YA YB	(1)	Empty
	(2)	X3		(2)	YB
	(3)	24G (UNIT)		(3)	24G (LOAD)
	(4)	X2		(4)	YA
	(5)	Empty		(5)	Empty
X4 X5	(1)	+24V (UNIT)	YC YD	(1)	Empty
	(2)	X5		(2)	YD
	(3)	24G (UNIT)		(3)	24G (LOAD)
	(4)	X4		(4)	YC
	(5)	Empty		(5)	Empty
X6 X7	(1)	+24V (UNIT)	YE YF	(1)	Empty
	(2)	X7		(2)	YF
	(3)	24G (UNIT)		(3)	24G (LOAD)
	(4)	X6		(4)	YE
	(5)	Empty		(5)	Empty

3.4 Function List

This section lists the functions of I/O modules.

○: Available, ━: Not available

Item	Description	Function availability			Reference
		Input module	Output module	I/O combined module	
Input response time setting function	Prevents an incorrect input due to noise by setting the response time required for the module to recognize an actual input as the X signal.	○	━	○	☞ Page 166 Input Response Time Setting Function
Output HOLD/CLEAR setting function	Sets whether to hold or clear the last output value when the I/O module is disconnected from data link, when the CPU module operating status is STOP, or when the CPU module operation is suspended by an error.	━	○	○	☞ Page 168 Output HOLD/CLEAR Setting Function
CC-Link IE TSN Network synchronous communication function	Performs I/O with a synchronization cycle of the master station that supports the CC-Link IE TSN Network synchronous communication function.	○	○	○	☞ Page 169 CC-Link IE TSN Network Synchronous Communication Function
CC-Link IE TSN Class setting function	Sets the I/O module to CC-Link IE TSN Class B or CC-Link IE TSN Class A. For differences between system configurations where the I/O module with CC-Link IE TSN Class B or CC-Link IE TSN Class A can be incorporated, refer to the following. 📖 User's manual for the master station used	○	○	○	☞ Page 194 CC-Link IE TSN Class Setting Function
Communication speed setting function	Sets the communication speed.	○	○	○	☞ Page 196 Communication Speed Setting Function
Output ON/OFF information hold function	Checks whether the output has been turned on or off.	━	○	○	☞ Page 197 Output ON/OFF Information Hold Function
Protection function	The transistor output module and the I/O combined module (transistor output part) have the overload protection function and the overheat protection function.	━	○	○	☞ Page 198 Protection Function
Module power supply voltage drop detection function	Detects a voltage drop of the module power supply.	○	○	○	☞ Page 199 Module Power Supply Voltage Drop Detection Function
External power supply monitoring function	Monitors the ON/OFF status of the external power supply.	━	○	○	☞ Page 199 External Power Supply Monitoring Function
Firmware update function	Updates the firmware of the I/O module via CC-Link IE TSN.	○	○	○	☞ Page 200 Firmware Update Function
CPU module in STOP external output test function	Turns on or off the output of a remote device at any desired time while the CPU module is in STOP. For details, refer to descriptions of the remote device test in the following manual. 📖 User's manual for the master station used	━	○	○	━
SLMP communication function	Allows communications with the I/O modules using SLMP.	○	○	○	☞ Page 205 SLMP Communication Function

4 PROCEDURES BEFORE OPERATION

This chapter describes the procedures before operation.

1. Setting the IP address/station number setting switches

Set the fourth octet of IP address of I/O module.

☞ Page 119 Setting the IP address/station number setting switches

2. Function setting switch setting

Set functions of the I/O module.

In the factory default switch status, the I/O module operates in the following settings. Change the switch status as necessary.

• Input response time setting: 1ms (I/O module (except for waterproof module)), 10ms (I/O module (waterproof module))

• Output HOLD/CLEAR setting: CLEAR

• Communication speed setting: 1Gbps

• CC-Link IE TSN Network synchronous communication setting: Synchronous X/Y control mode

• CC-Link IE TSN Class setting: CC-Link IE TSN Class B

☞ Page 121 Function setting switch setting

3. Connection

Mount the I/O modules (except for waterproof modules) on a DIN rail. Or fix the I/O modules (waterproof modules).

☞ Page 127 Mounting the I/O modules (except for waterproof module) on a DIN rail

☞ Page 128 Fixing the I/O module (waterproof module)

4. Wiring

Wire the power supply, Ethernet cables, and external devices to the I/O modules.

☞ Page 129 Wiring of Terminal Block for Module Power Supply and FG

☞ Page 134 Wiring the I/O Module (Waterproof Module) to the Power Supply

☞ Page 135 Wiring of Ethernet Cable

☞ Page 138 Wiring of I/O Module and External Device

5. Network parameter setting

Set the network parameters.

☞ Page 153 Network Configuration Setting

6. Module parameter setting

For the following case, set the module parameters.

• Setting parameters with the engineering tool

☞ Page 157 Module Parameter Setting

7. Programming

Create a program.

> **Point** 🔎
>
> To replace the I/O module, follow the procedure described below:
> • When the parameters are set by the engineering tool, export the parameters.
> • Power off the I/O module and remove it.
> • Prepare a new I/O module and perform the procedure from step 1 to step 4. At this time, the settings of the IP address/station number setting switches and function setting switch must be the same as the settings for I/O module before replacement.
> • When the parameters are set by the engineering tool, import the parameters.
> • Check that the RUN LED and DATA LINK LED of I/O module are on and the ERR. LED is off before restarting control operation.

MEMO

4

5 SYSTEM CONFIGURATION

This chapter describes system configuration using an I/O module.

For details on the CC-Link IE TSN configuration, refer to the following.

📖 User's manual for the master station used

5.1 Applicable Systems

Applicable master station

When using an I/O module, use the following products as a master station.

Model	Firmware version
RJ71GN11-T2	No restriction
RD78G64, RD78G32, RD78G16, RD78G8, RD78G4	
RD78GHV, RD78GHW	"05" or later

The above information of "applicable master station" is information at the time of this manual's issuance.

For the latest information, refer to the CC-Link Partner Association's homepage.

www.cc-link.org

Compatible software version

For the compatible software version, always keep the engineering tool of the master station up to date.

Only GX Works3 is a compatible engineering tool.

When the latest software is necessary, please consult your local Mitsubishi representative.

Compatible software package

GX Works3 is required to diagnose the I/O module.

Install GX Works3 with the following version according to the I/O module used.

Model	Software version
NZ2GN2S1-32D, NZ2GN2B1-32D, NZ2GN2S1-32T, NZ2GN2B1-32T, NZ2GN2S1-32TE, NZ2GN2B1-32TE, NZ2GN2S1-32DT, NZ2GN2B1-32DT, NZ2GN2S1-32DTE, NZ2GN2B1-32DTE	Version 1.055H or later
NZ2GNCF1-32D, NZ2GNCE3-32D, NZ2GNCF1-32T, NZ2GNCE3-32DT	Version 1.065T or later
NZ2GN2S1-16D, NZ2GN2B1-16D, NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN2S1-16T, NZ2GN2B1-16T, NZ2GN12A2-16T, NZ2GN2S1-16TE, NZ2GN2B1-16TE, NZ2GN12A2-16TE, NZ2GN12A42-16DT, NZ2GN12A42-16DTE	Version 1.075D or later

Applicable profile

A profile is required to use the I/O module in the CC-Link IE TSN configuration setting.

The following table shows the applicable profile versions.

Model	Firmware version	Profile version
NZ2GN2S1-32D, NZ2GN2B1-32D, NZ2GN2S1-32T, NZ2GN2B1-32T, NZ2GN2S1-32TE, NZ2GN2B1-32TE, NZ2GN2S1-32DT, NZ2GN2B1-32DT, NZ2GN2S1-32DTE, NZ2GN2B1-32DTE	"01" or later	"00" or later
	"02" or later	"01" or later
	"03" or later	"02" or later
	"05" or later	"03" or later
	"06" or later	"04" or later
	"08" or later	"05" or later
	"09" or later	"06" or later
NZ2GN2S1-16D, NZ2GN2B1-16D, NZ2GN2S1-16T, NZ2GN2B1-16T, NZ2GN2S1-16TE, NZ2GN2B1-16TE	"05" or later	"00" or later
	"06" or later	"01" or later
	"08" or later	"02" or later
	"09" or later	"03" or later
NZ2GNCF1-32D, NZ2GNCE3-32D, NZ2GNCF1-32T, NZ2GNCE3-32DT	"01" or later	"00" or later
	"05" or later	"01" or later
	"06" or later	"02" or later
	"08" or later	"03" or later
	"09" or later	"04" or later
NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN12A2-16T, NZ2GN12A2-16TE, NZ2GN12A42-16DT, NZ2GN12A42-16DTE	"05" or later	"00" or later
	"06" or later	"01" or later
	"08" or later	"02" or later
	"09" or later	"03" or later

When the latest profile of the I/O module is necessary, please consult your local Mitsubishi representative.

The profile is a setting file that stores information required for the start-up, operation, and maintenance of devices supporting the CC-Link family.

A module is added to the "Module List" of the "CC-Link IE TSN Configuration" window by profile registration to the engineering tool of the master station.

For the profile registration, refer to the following.

📖 GX Works3 Operating Manual

Ethernet cable

For the specifications of the Ethernet cable, refer to the following.
- When using the I/O modules (except for waterproof modules): 📖 User's manual for the master station used
- When using the I/O modules (waterproof modules): ☞ Page 150 List of Recommended Cables/Connectors for I/O Module (Waterproof Module)

Switching hub

For compatible switching hubs, refer to the following.
📖 User's manual for the master station used

6 INSTALLATION AND WIRING

This chapter describes the installation and wiring of the I/O module.

6.1 Before Using the I/O Modules

Input modules

Precautions common to all input modules

■Number of simultaneous ON points

The number of input points that can be turned on at the same time varies depending on the input voltage and ambient temperature. Refer to the maximum number of simultaneous input points of the specifications of each input module. (☞ Page 22 Input module, ☞ Page 80 I/O combined module)

Precautions when using the DC input module

■Measures against back EMF

When connecting an inductive load, connect a diode in parallel with the load. Use the diode that satisfies the following conditions:

• A reverse breakdown voltage is ten times as high as the circuit voltage or more.
• A forward current is twice as high as the load current or more.

Positive common type	Negative common type

■Input response time

For the input module and I/O combined module, the input response time can be set. (☞ Page 166 Input Response Time Setting Function)

In a circumstance where noise tends to occur, the noise in an input can be reduced by making the input response time longer, which makes the input status more stable.

The factory default input response time is as follows.

• I/O module (except for waterproof module): 1ms
• I/O module (waterproof module): 10ms

Output modules

Precautions common to all output modules

■Maximum switching frequency when L load is driven

The maximum switching frequency imposes a limit on the use; an ON state or an OFF state must not be changed without an interval of at least one second.

■Load to be connected

When connecting a counter or timer utilizing a DC-DC converter as a load of the output module, select an output module whose maximum load current is higher than the inrush current of a load to be connected. If the selection is based on the average current of a load to be connected, an inrush current flows cyclically from the load while the output module is in an ON state or in operation, which can cause failure of the output module. If it is necessary to select an output module on the basis of the average current of a load to be connected, to alleviate the effect of the inrush current, take any of the following corrective actions:

- Connecting a resistor in series with the load
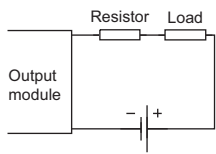
- Connecting an inductor in series with the load
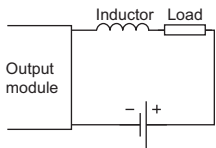
Precautions when using the transistor output module

■Measures against reverse current

In the following connections, a reverse current flows to the output element, which can cause failure.

When wiring, set up diodes as the following figures show:

• When connecting transistor output modules in parallel

Sink type	Source type
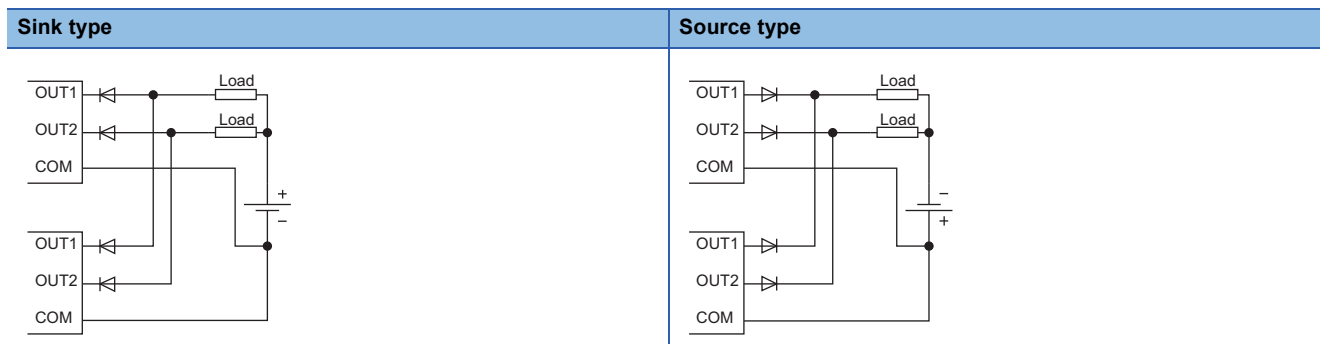
• When providing another circuit in parallel with a transistor output module
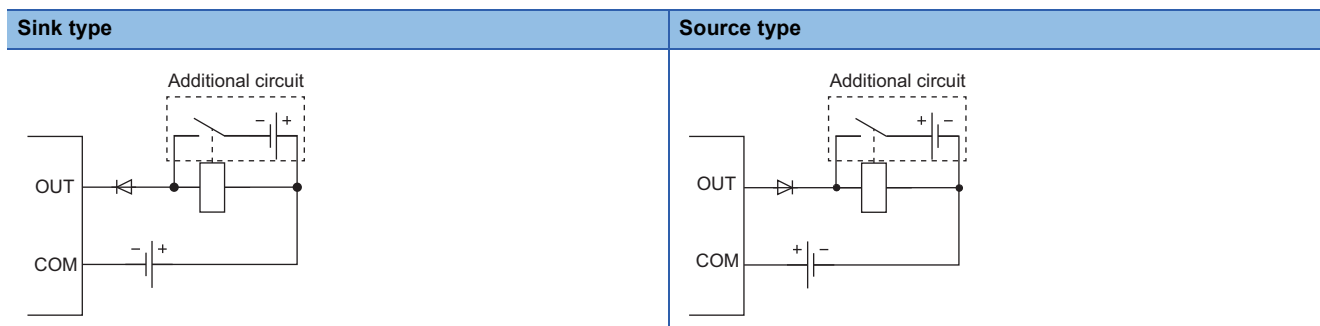
Sink type	Source type

■Measures against back EMF

When connecting an inductive load, connect a diode in parallel with the load.

Use the diode that satisfies the following conditions:

• A reverse breakdown voltage is ten times as high as the circuit voltage or more.
• A forward current is twice as high as the load current or more.

Sink type	Source type
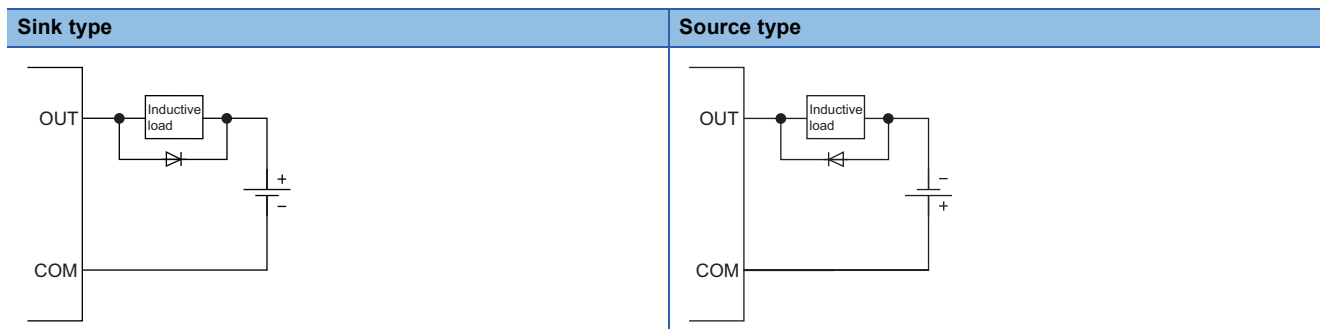
■About element protection of the output module

If excessive noise affects the terminals of the output module, the output may be turned on to help the protection of the output element. Adjust the voltage between terminals of the output module to fall within the operating load voltage range by taking measures such as the following:

• To use an inductive load such as a relay, a surge suppressor is required on the load side as well. Take appropriate measures with the measures against back EMF as a guide.
• To prevent excessive noise, avoid installing power cables together with I/O cables.

I/O combined module

There are no precautions specific to I/O combined modules. Refer to the following precautions.

6

6.2 Setting Switch

Indicator cover of the I/O module (waterproof module)

To operate the setting switches of the I/O module (waterproof module), loosen the screws for the indicator cover with the screwdriver and open the cover. After finishing the operation, be sure to close the indicator cover and tighten the screws. When the cover is open or the screws have not been tightened properly, waterproof performance is lost.

Tightening torque

Tighten the screws for the indicator cover within the following tightening torque range.

Screw type	Tightening torque range
Indicator cover screw (M3 screw)	0.43 to 0.57N·m

> **Point**
>
> - Do not put oil on the screws. Doing so may damage the screws.
> - Tighten the screws with an applicable screwdriver. Tightening with an inapplicable screwdriver may damage the screws.

Setting the IP address/station number setting switches

Set the fourth octet of the IP address using the IP address/station number setting switches on the front of the I/O module. The setting of the IP address/station number setting switches is enabled when the I/O module is powered on. Therefore, set this function when the module is powered off.

> **Point**
>
> When operating the IP address/station number setting switches, use a flathead screwdriver with a tip width of 2.5mm or less.

Setting procedure

Set the fourth octet (decimal) of the IP address using the IP address/station number setting switches x1 and x16 (hexadecimal).

Combinations of x1 and x16 are as follows.

<div align="center">x1</div>

x16\x1	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
B	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

(Leftmost column header is x16)

Ex.
To set to 30:
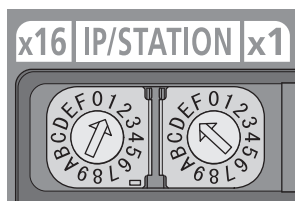
Setting range

The setting value must be in the range between 1 and 254.

When a value in the range between 1 and 254 is set, the following occurs.
- The first three octets of the IP address: Octets one, two, and three from the IP address of the master station are used for operation.
- Subnet mask: The subnet mask of the master station is used for operation.

When a value outside the range between 1 and 254 is set, the following occurs.
- When 0 is set, the IP address saved in the non-volatile memory and the subnet mask of the master station are used for operation.
- When 255 is set, an IP address/station number setting switch out of range error (error code: 0106H) occurs.

To set an IP address for the I/O module using the engineering tool, set the IP address/station number setting switches to 0. For details, refer to the following.

Point

- Do not change the IP address/station number setting switches while the I/O module is powered on. If the IP address/station number setting switches are changed while the I/O module is powered on, an IP address/station number setting switch changed error (error code: 0200H) occurs, and the ERR. LED flashes. After setting the IP address/station number setting switches back to the previous setting, turn on Error clear request flag (RWw0.b10) to clear the error state and turn off the ERR. LED.
- When the power is turned on with the IP address/station number setting switches set to a value in the range 1 to 254, the IP address is saved in the non-volatile memory at the time a data link with the master station is established. The address 192.168.3.250 is set to the non-volatile memory by factory default.
- Do not set an IP address with duplicated fourth octet in the access range of CC-Link IE TSN. Duplicated fourth octet causes the duplicated IP address due to the automatic setting of the first to third octet, resulting in failure of data link establishment.

Restriction

The following IP addresses cannot be used for input/output modules.
- IP addresses whose host addresses are all 0 or 255.
- IP addresses whose third and fourth octets are all 255.
- IP addresses outside the range 0.0.0.1 to 223.255.255.254

Precautions

When operating switches, use products for static elimination or an antistatic screwdriver, or touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

Function setting switch setting

Set the following functions using the function setting switch on the front of I/O module.
 • Network setting function
 • Input response time setting function
 • Output HOLD/CLEAR setting function
 • CC-Link IE TSN Network synchronous communication function
 • CC-Link IE TSN Class setting function
 • Communication speed setting function

The setting of function setting switch is enabled when the I/O module is powered on. Thus, set each function when the module is powered off.

Point

When operating the function setting switch, use a flathead screwdriver having a blade of 1.2mm or less in width.

The following settings can also be configured by the parameter automatic setting or the device station parameter processing. Note that when the setting is configured by these methods, the parameters set by the following function setting switches are ignored.
 • Input response time setting (function setting switches 2 to 4)
 • Output HOLD/CLEAR setting (function setting switch 5)
 • CC-Link IE TSN Network synchronous communication setting (function setting switches 6, 7)

For details on the parameter automatic setting or the device station parameter processing, refer to the following.

☞ Page 157 Module Parameter Setting

6

Setting procedure

Set each function with function setting switch 1 to function setting switch 10.
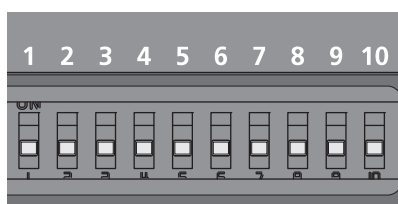
Switch name	Function name		Setting details
Function setting switch 1	NETWORK	Network setting function	Set this switch to OFF in normal operation. Set it to ON to perform a unit test. (☞ Page 221 Unit Test)
Function setting switch 2 to function setting switch 4	RESPONSE	Input response time setting function	Set the input response time. (☞ Page 166 Setting procedure)
Function setting switch 5	HOLD/CLEAR	Output HOLD/CLEAR setting function	Set output HOLD/CLEAR. (☞ Page 168 Setting procedure)
Function setting switch 6, function setting switch 7	MODE	CC-Link IE TSN Network synchronous communication function, CC-Link IE TSN Class setting function	■For the I/O module with the firmware version of "08" or later Set the CC-Link IE TSN Network synchronous communication (☞ Page 193 Operation mode setting of CC-Link IE TSN Network synchronous communication) and CC-Link IE TSN Class (☞ Page 194 Setting procedure). ■For the I/O module with the firmware version of "05" to "07" Set the CC-Link IE TSN Network synchronous communication. (☞ Page 193 Operation mode setting of CC-Link IE TSN Network synchronous communication) ■For the I/O module with the firmware version of "04" or earlier Fix these switches to OFF.
Function setting switch 8, function setting switch 9	F LINK P1/P2	Use prohibited	Fix these switches to OFF.
Function setting switch 10	LINK SPEED	Communication speed setting function	■For the I/O module with the firmware version of "02" or later Set the communication speed. (☞ Page 196 Setting procedure) ■For the I/O module with the firmware version of "01" Fix this switch to OFF.

Point

Do not change any function setting switch while the I/O module is powered on. If the setting of a function setting switch is changed while the I/O module is powered on, one of the errors from Function setting switch 1 changed error (error code: 0201H) to Function setting switch 10 changed error (error code: 020AH) occurs, and the changed setting of that function setting switch is not applied. Returning the function setting switch to its previous position and turning on Error clear request flag (RWw0.b10) eliminate the error.

Precautions

Slide one function setting switch at a time horizontally. Do not hold the screwdriver at an angle or pivot it off the edge of the case while working a function setting switch, since damage or deformation may result.

(1) Flathead screwdriver
(2) Function setting switch
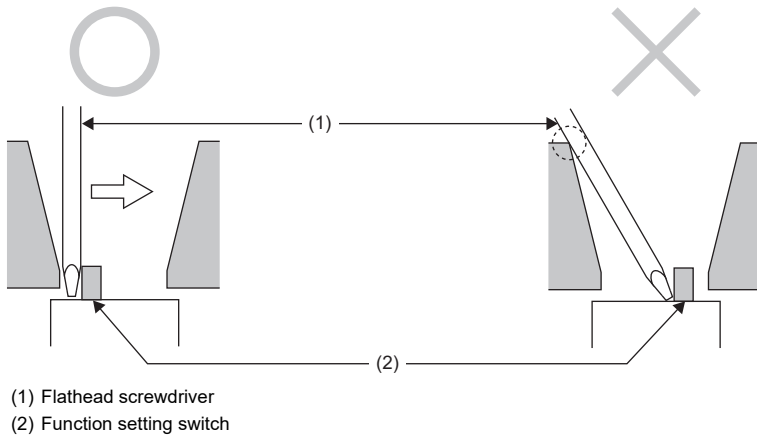
6.3 Installation Environment and Installation Position

Installation environment

Installation location

Do not install the I/O module to the following environment:

■I/O module (except for waterproof module)
- Ambient temperature is outside the range from 0 to 55℃;
- Ambient humidity is outside the range from 5 to 95% RH;
- Condensation occurs due to rapid temperature change;
- Corrosive gas or combustible gas is present;
- Conductive powder such as dust and iron powder, oil mist, salinity, or organic solvent is filled;
- The I/O module is exposed to direct sunlight;
- A strong electric field or strong magnetic field is generated; and
- The I/O module is subject to vibration and shock.

■I/O module (waterproof module)
- Ambient temperature is outside the range from 0 to 55℃;
- IP67 is not satisfied;
- Condensation occurs due to rapid temperature change;
- Corrosive gas or combustible gas is present;
- Conductive powder such as dust and iron powder, oil mist, salinity, or organic solvent is filled;
- The I/O module is exposed to direct sunlight;
- A strong electric field or strong magnetic field is generated; and
- The I/O module is subject to vibration and shock.

Installation surface

Install the I/O module on the flat surface. When the installation surface is uneven, excessive force is applied to the printed-circuit board and may cause a defect.

Installation position

I/O module (except for waterproof module)

When installing the I/O module (except for waterproof module) in a control panel, provide a clearance of 60mm or more (1) between the module and the sides of the control panel or other parts to ensure good ventilation and facilitate module change. When installing two or more CC-Link IE TSN remote modules next to each other, they can be installed in contact with each other.
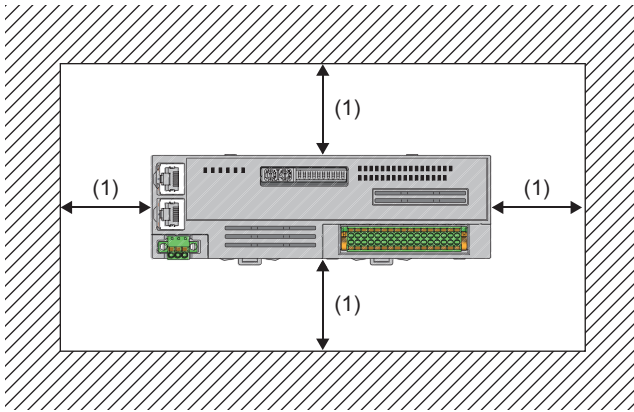
I/O module (waterproof module)

When installing the I/O module (waterproof module) in a control panel, provide a clearance of 50mm or more (1) between the module and the sides of the control panel or other parts to ensure good ventilation and facilitate module change.

When installing two or more CC-Link IE TSN remote modules next to each other, they can be installed in contact with each other.

When using a right-angle, waterproof connector or a Y-branch connector, however, provide a clearance to avoid stress on cables.
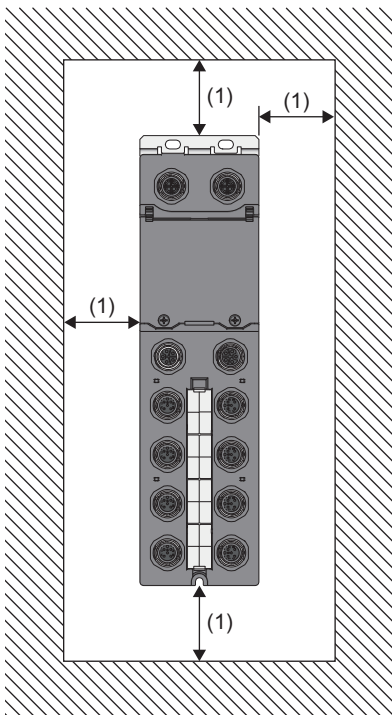
Installation direction

The I/O module can be installed in six directions.

Use the DIN rail to install the I/O module (except for waterproof module). Note that the DIN rail cannot be used to install the I/O module (waterproof module).

Ex.
Installing the I/O module (except for waterproof module)
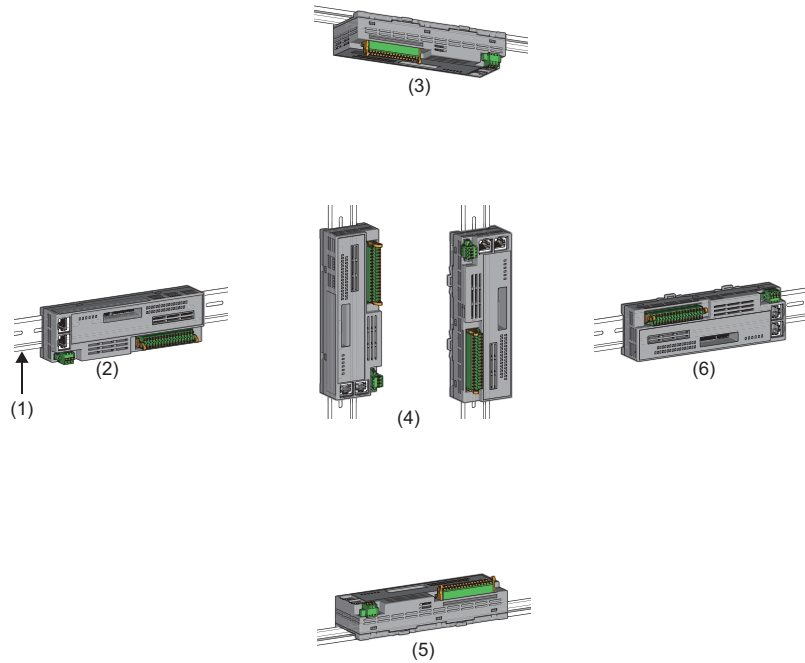
(1) DIN rail
(2) Horizontal installation
(3) Downward installation
(4) Vertical installation
(5) Upward installation
(6) Horizontal installation (upside down)

6.4 Installation

Mounting the I/O modules (except for waterproof module) on a DIN rail

Installation procedure
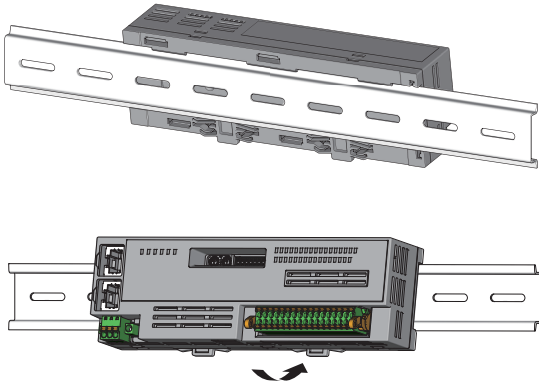
1. Hang the upper tabs of the I/O module (except for waterproof module) on a DIN rail.

2. Push in the DIN rail hooks of the module until they click.

Point

Do not slide modules from the edge of the DIN rail when mounting them. The modules may be damaged.
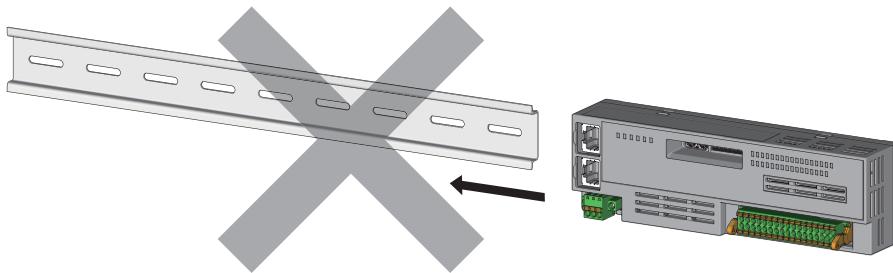
Removal procedure

Remove the modules from the DIN rail by reversing the above procedure.
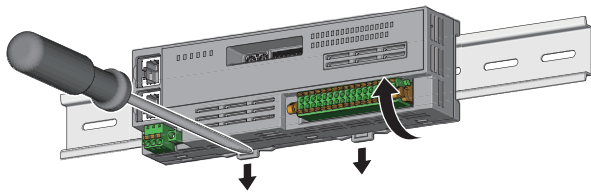
1. While pushing down the DIN rail hook with a flathead screwdriver, remove the module from the DIN rail by pulling its lower part toward you.

Applicable DIN rail models

Use the following DIN rails that are compliant with JIS C 2812 and IEC 60715.
• TH35-7.5Fe
• TH35-7.5Al

Interval between DIN rail mounting screws

Tighten the screws at intervals of 200mm or less.

Fixing the I/O module (waterproof module)

When fixing the I/O module (waterproof module), tighten all of three screws.

If any of the screws is loose, the module will be greatly affected by vibration, causing failure of the module.

When installing the module, tighten screws within the following torque range.

Screw type	Tightening torque range
Module mounting screw/FG metal fitting screw (M4 screw)	0.83 to 1.11N·m

Point

- Do not put oil on the screws. Doing so may damage the screws.
- Tighten the screws with an applicable screwdriver. Tightening with an inapplicable screwdriver may damage the screws.
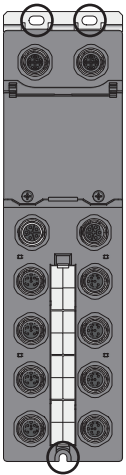
6.5 Wiring of Terminal Block for Module Power Supply and FG

Tightening torque

Tighten the terminal block mounting screws within the following specified torque range.

Tightening the screws too much may damage the case of I/O module (except for waterproof module).

Screw type	Tightening torque range
Terminal block mounting screw (M2.5 screw)	0.2 to 0.3 N·m

Wire to be used

The following table describes the wire to be connected to the terminal block for module power supply and FG.

Diameter	Type	Material	Temperature rating
22 to 16 AWG	Stranded	Copper	75℃ or more

Applicable solderless terminal

The following table lists the applicable solderless terminal.

Product name	Terminal shape	Model	Applicable wire size	Bar solderless terminal tool	Contact
Bar solderless terminal	Ferrule (with insulation sleeve)	NF0.5-8, NF0.5-10	0.3 to 0.5mm²	NH-79A	NICHIFU Co., Ltd.
		NF0.75-8, NF0.75-10	0.75mm²		
		AI0.34-10TQ	0.34mm²	CRIMPFOX6	PHOENIX CONTACT GmbH & Co. KG
		AI0.5-10WH	0.5mm²		
		AI0.75-10GY	0.75mm²		
	Ferrule (without insulation sleeve)	A0.5-10	0.5mm²		
		A0.75-10	0.75mm²		
		A1.0-10	1.0mm²		
		A1.5-10	1.5mm²		

Installing and removing the terminal block

To remove the terminal block, loosen the terminal block mounting screws with a flathead screwdriver.

To install the terminal block, tighten the terminal block mounting screw with a flathead screwdriver.

Failure to secure the terminal block may cause drop, short circuit, or malfunction.
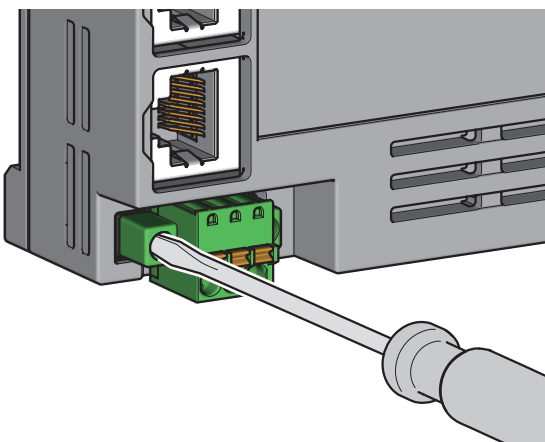
Connecting and disconnecting the cable

To connect the cable, fully insert a wire with a bar solderless terminal into a wire insertion opening.

After inserting the wire, pull it lightly to check that it is securely clamped.

(1)
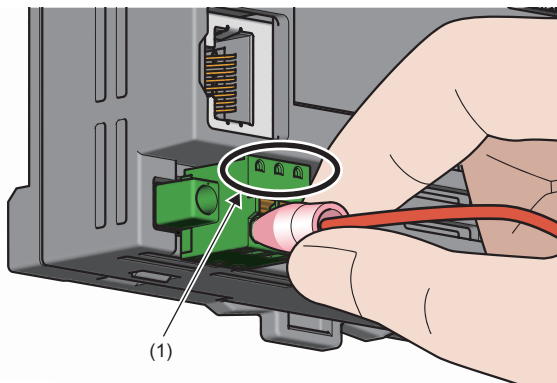
> **Point**
>
> Continuity can be checked with test terminal (1).
>
> Use the following test plug to check continuity.
> - PHOENIX CONTACT GmbH & Co. KG test plug (φ1.0mm): MPS-MT 1-S4-B RD, MPS-MT 1-S

To disconnect the cable, push in the open/close button with a flathead screwdriver.

With the button pushed in, pull out the wire having a bar solderless terminal.
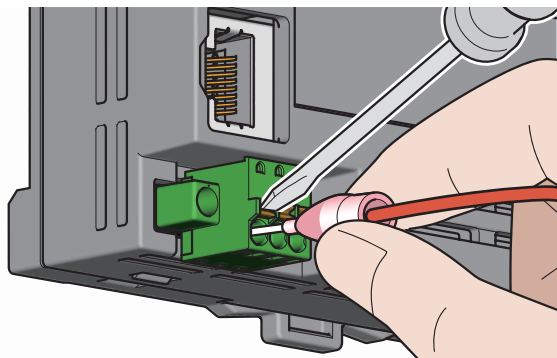
Precautions

- Use a bar solderless terminal for the wiring to the push-in type spring clamp terminal block. If a stripped wire is inserted into a wire insertion opening, the wire cannot be securely clamped.
- For how long the wire should be stripped, follow the specifications of the bar solderless terminal used. To attach a bar solderless terminal to a wire, use a crimping tool.
- Before inserting a bar solderless terminal into a wire insertion opening (1), check the shape of the opening and the shape of the terminal. Insert the terminal paying attention to the orientation. If a bar solderless terminal larger than wire insertion opening (1) is inserted, the terminal block may be damaged.

(1)
2.4mm
1.5mm
24G +24V
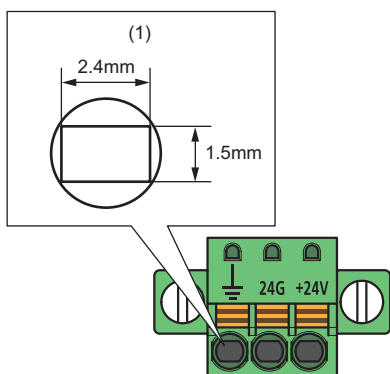
6.6 Wiring of Connector for Module Power Supply and FG

Applicable plugs

The following table lists plugs applicable to the connector for power supply and FG.

Product name	Model name of Mitsubishi Electric product	Model name of part[6]	Specifications			Color of the cover
			Applicable cable (core wire size)	Applicable cable (outer diameter)	Maximum rated current	
One-touch connector plug for power supply and FG[1][3][4]	A6CON-PW5P	35505-6080-A00 GF	0.75mm² (0.66 to 0.98mm²) (18 AWG) 0.16mm or larger for wire diameter Insulating coating material PVC (heat resistant vinyl)	φ2.2 to 3.0mm	7A[5]	Gray
	A6CON-PW5P-SOD	35505-6180-A00 GF		φ2.0 to 2.3mm		Blue
Online connector for power supply and FG[2]	A6CON-PWJ5P	35720-L200-A00 AK	—	—	—	—

*1 One order of Mitsubishi Electric A6CON-□□5P includes 10 plugs.
*2 One order of Mitsubishi Electric A6CON-□□J5P includes 5 plugs.
*3 One-touch connector plugs cannot be reused once crimped.
*4 Check the outer diameter of the applicable cable before selecting a connector.
*5 The allowable current values of the cables connected must be observed.
*6 Contact (manufacturer of the plugs): 3M Japan Limited

Wiring procedure

Plug body
Plug cover
Metal contact

Metal contacts

Metal contacts
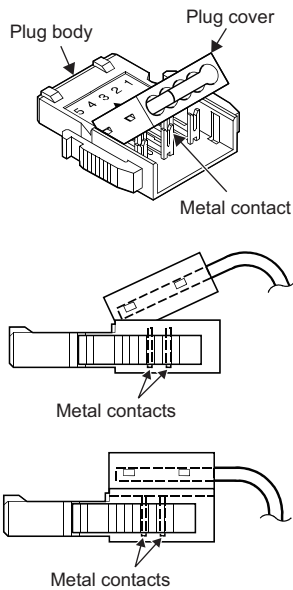
1. Checking parts of the connector
Check that the plug cover is attached to the plug body.
Do not push the plug cover into the plug body before inserting cables. Once clamped, the plug cannot be reused.

2. Inserting cables
Lift the rear part of the plug cover, and insert a cable fully to the end of the plug cover.
If a cable is not inserted fully, it may cause a poor crimping.
The cables to be inserted must be applicable cables.

3. Setting the plug cover
After inserting cables, push down the rear part of the plug cover so that the plug cover is engaged with metal contacts.

4. Crimping

Hold the center of plug cover with pliers and squeeze the cover in.

Fully push in the both edges (parts holding latches) of the plug cover. Check that the latches are engaged with the plug body.
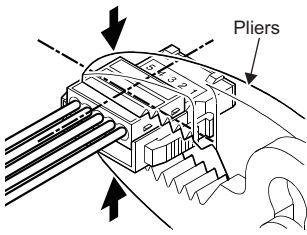
■Side view

[Correct crimping]

0.2mm or less

[Incorrect crimping]

5. Checking the crimped state (from the wire side)

Check that the plug body and plug cover are aligned horizontally seen from the wire side.

The lifted part of the plug cover must be 0.2mm or less.

As shown in the incorrect crimping, if the plug cover is lifted aslant or protruded from the plug body by more than 0.2mm, it may result in improper crimping.

Push in the plug cover correctly and fully with pliers as shown in the correct crimping.

[Correct crimping]

[Incorrect crimping]

Latches

Latch

Clearance

6. Checking the crimped state (from the above)

Check that there is no clearance between the plug body and plug cover seen from the above.

As shown in the incorrect crimping, latches engaged improperly cause clearance between the plug body and plug cover.

Push in the plug cover correctly and fully with pliers as shown in the correct crimping.

Point

When using a cabtyre cable, strip the jacket of the cable by 2cm or more. If the wires are uneven in length, cut the ends of the wires to an even length with a tool, such as a nipper, before inserting them to the connector.

2cm or more

Trim the wire ends to the same length
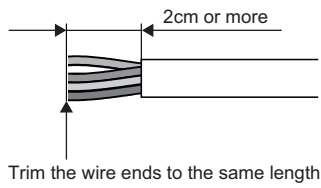
Precautions

When modules are transition wired through connectors for module power supply and FG, a current flows in the modules. When applying transition wiring, design the system so that the current that flows in the modules is equal to or lower than the allowable current value of each module.

6

6.7 Wiring the I/O Module (Waterproof Module) to the Power Supply

For the wiring, connect the power supply to the POWER IN terminal of the power supply connector of the I/O module (waterproof module).

Transition wiring of the power supply

When installing multiple I/O modules (waterproof module), the power can be supplied to the modules through transition wiring. For transition wiring, connect cables between the POWER OUT terminal of the module (power supplier) and the POWER IN terminal of another module (power supply destination).
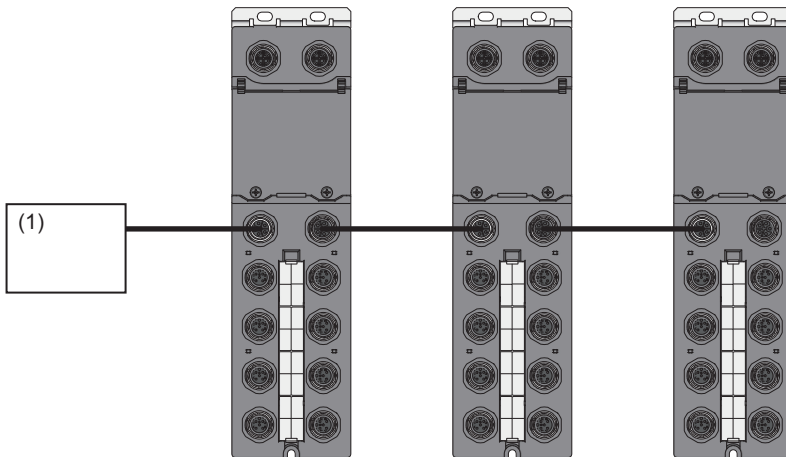
(1) Power supply

> **Point**
>
> For transition wiring, check the current consumption of each wired I/O module (waterproof module). For the current consumption of an I/O module (waterproof module), refer to the following performance specifications.
> ☞ Page 22 Input module, Page 47 Output module, Page 80 I/O combined module

Precautions

The largest current flows from the power supply to the power supply connector of the first I/O module (waterproof module). Make sure that the current does not exceed the following current capacity of the power supply connector.
- Module-and-sensor power supply: 8A per pin
- Load power supply and external power supply for output part: 12A per pin

For a power supply to supply 24VDC, use a power supply (SELV power supply) that does not exceed 30VAC (effective value), 42.4V (peak value), or 60VDC. Also, use a power supply which is applied to "limited-energy circuit" defined in IEC 61010-1.

6.8 Wiring of Ethernet Cable

Connecting the Ethernet cable to the I/O module (except for waterproof module)

■Connecting

1. Power off the module power supply of the I/O module (except for waterproof module) and the power of the external device.

2. Push the Ethernet cable connector into the I/O module (except for waterproof module) until it clicks. Pay attention to the connector's orientation.

3. Power on the module power supply of the I/O module (except for waterproof module).

4. Power on the external device.

5. Check that P1 LINK LED/P2 LINK LED on the port into which the Ethernet cable is connected is on.[1][2]

If P1 LINK LED/P2 LINK LED does not turn on, refer to the following and take a corrective action.

[1] The time taken for P1 LINK LED/P2 LINK LED to turn on after connection of the Ethernet cable may vary. The LINK LED normally turns on in a few second. However, if link-up processing is repeated due to a condition of a device on the line, the longer time may be required.

[2] When the communication speed of the I/O module is 100Mbps, and when connecting a 100Mbps device to P1 and P2 of the I/O module, enable auto-negotiation of that device.

> **Point**
>
> Both P1 and P2 connectors can be used.
> - To use only one of them for star topology, either P1 or P2 can be connected.
> - To use both of them for line topology and ring topology, P1-P1, P2-P2, and P1-P2 connections are possible.
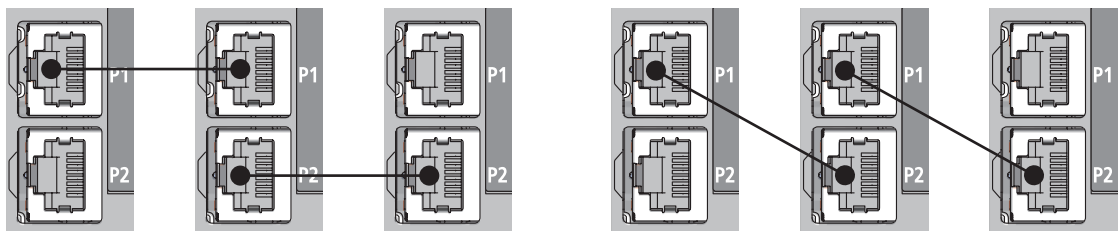
■Disconnecting

1. Power off the module power supply of the I/O module (except for waterproof module).

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

Connecting the Ethernet cable to the I/O module (waterproof module)

■Connecting

1. Power off the module power supply of the I/O module (waterproof module) and the power of the external device.

2. Insert the Ethernet cable connector into the I/O module (waterproof module). Pay attention to the connector's orientation.

3. Tighten the Ethernet cable connector.

4. Power on the module power supply of the I/O module (waterproof module).

5. Power on the external device.

6. Check that P1 LINK LED/P2 LINK LED on the port into which the Ethernet cable is connected is on.[*1][*2]

If P1 LINK LED/P2 LINK LED does not turn on, refer to the following and take a corrective action.

☞ Page 217 When the P1 LINK LED or P2 LINK LED turns off

*1 The time taken for P1 LINK LED/P2 LINK LED to turn on after connection of the Ethernet cable may vary. The LINK LED normally turns on in a few second. However, if link-up processing is repeated due to a condition of a device on the line, the longer time may be required.
*2 When connecting a 100Mbps device to P1 and P2 of the I/O module (waterproof module) while the communication speed of the module is 100Mbps, enable auto-negotiation of the device.

> **Point** 🔍
>
> Both P1 and P2 connectors can be used.
> - To use only one of them for star topology, either P1 or P2 can be connected.
> - To use both of them for line topology and ring topology, P1-P1, P2-P2, and P1-P2 connections are possible.
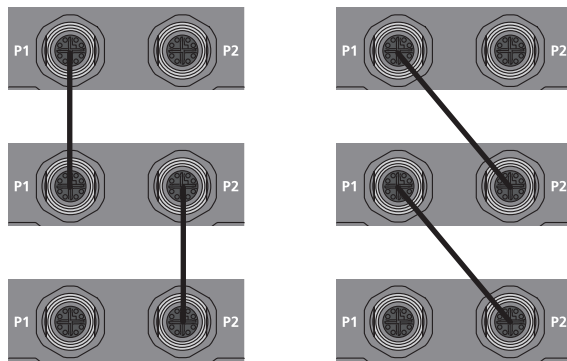
■Disconnecting

1. Power off the module power supply of the I/O module (waterproof module).

2. Loosen the Ethernet cable connector and remove the cable.

Precautions

■Laying Ethernet cables
- Place the Ethernet cable in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the I/O module or cables or malfunction due to poor contact.
- Do not touch the core of the connector of the cable or the module, and protect it from dirt and dust. If any oil from your hand, or any dirt or dust sticks to the core, it can increase transmission loss, causing data link to fail.
- For the Ethernet cables to be used, check that they are not disconnected or short-circuited and that there is no problem with connector connection.

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

■Connecting and disconnecting the Ethernet cable
Hold the connector part when connecting and disconnecting the Ethernet cable. Pulling the cable connected to the I/O module may result in damage to the I/O module or cable or malfunction due to poor contact.

■Connectors without Ethernet cable
Attach connector covers or waterproof caps to prevent dirt and dust from entering the I/O module and prevent I/O module failure and malfunction caused by static electricity.

■Maximum segment length for the Ethernet cable (Maximum cable length)
The maximum segment length for the Ethernet cable is 100m. However, the distance may be shorter depending on the operating environment of the cable. For details, contact the manufacturer of the cables used.

■Bending radius of the Ethernet cable
There are restrictions on the bending radius of the Ethernet cable. Check the bending radius in the specifications of the Ethernet cables used.

6

6.9 Wiring of I/O Module and External Device

Wiring of spring clamp terminal block

Wire to be used

The following table describes the wire to be connected to the spring clamp terminal block.

Diameter	Type	Material	Temperature rating
22 to 16 AWG	Stranded	Copper	75℃ or more

Applicable solderless terminal

The following table lists the applicable solderless terminal.

Product name	Terminal shape	Model	Applicable wire size[*1]	Bar solderless terminal tool	Contact
Bar solderless terminal	Ferrule (with insulation sleeve)	AI0.34-10TQ	0.34mm²	CRIMPFOX6	PHOENIX CONTACT GmbH & Co. KG
		AI0.5-10WH	0.5mm²		
		AI0.75-10GY	0.75mm²		
	Ferrule (without insulation sleeve)	A0.5-10	0.5mm²		
		A0.75-10	0.75mm²		
		A1.0-10	1.0mm²		
		A1.5-10	1.5mm²		

*1 When using a solderless terminal with an insulation sleeve, select the terminal whose applicable wire size is 0.75mm² or smaller.

Installing or removing the terminal block

The following procedures show how to install and remove the terminal block.

■Lock and release lever positions

To make it easy to install and remove the terminal block, a three-stage positioning stopper is attached so that the lever does not freely turn around.

When installing or removing the terminal block, turn the lever to the lock or release lever position.

View of right side of I/O module: When pulling out the terminal block
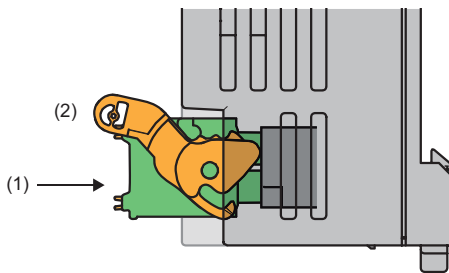
1. Release lever position

This lever position shows the state in which the terminal block (1) has been completely pulled out from the I/O module. Turn from the locking lever position to the release lever position (2) and lift the terminal block from the I/O module.

View of right side of I/O module: When insertion of the terminal block is complete
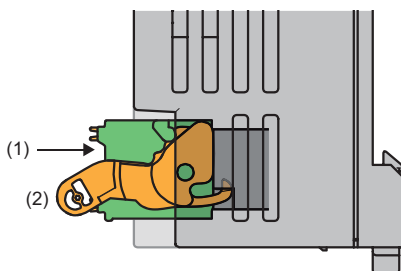
2. Lock lever position

This position shows the state in which the terminal block (1) completely fits the I/O module. Check the lock lever position (2) and pull the terminal block lightly to check that the I/O module completely fits the terminal block.

■Removal procedure

Turn the lever to the release lever position and remove the terminal block from the I/O module.

■Installation procedure

Move the lever to the locking lever position and push the terminal block. If the terminal block is fully pushed in, the hook of the lever hangs on the I/O module and fits the terminal block.

> **Point**
>
> The terminal block can be inserted with the lever locations other than the lock lever position.
> After insertion, check that the lever is in the lock lever position.

Signal name and wiring

For the signal names of the terminal block and wiring of the external device, refer to the specifications of each module. (☞ Page 22 Performance Specifications)

Incorrect wiring can cause malfunction of or damage on the I/O module.

Connecting and disconnecting the cable

■Connecting the cable

Strip the cable as follows.

- The strip length of wire: 10mm

Insert a wire whose tip was processed into a wire insertion opening (2) and push it all the way in to the back.

If the wire cannot be inserted by this method, insert the wire all the way in to the back while pressing the release button (1) using a flathead screwdriver with a tip width of 2.0 to 2.5mm. Once the wire is inserted all the way in to the back, remove the flathead screwdriver.
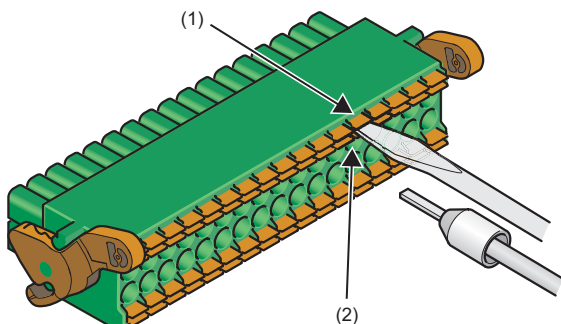
> **Point**
>
> Pull the wire or bar solderless terminal lightly to check that it is securely clamped.

■Disconnecting the cable

Pull the wire while pressing the release button using a flathead screwdriver with a tip width of 2.0 to 2.5mm.

Precautions

- Use bar solderless terminals for wiring to the terminal block. If a stripped wire is inserted into a wire insertion opening as-is, the wire cannot be securely clamped.
- Use a crimping tool to connect a bar solderless terminal to a wire. (☞ Page 138 Applicable solderless terminal)
- When inserting a bar solderless terminal, check that the size of the terminal and its insertion direction are correct to prevent the terminal from getting stuck in or the terminal block damage. When using a bar solderless terminal other than the applicable solderless terminals, check that for its size, the cross-sectional shape of the terminal after processing (1) is smaller than the size mentioned below, even including an error in processing. For the correct terminal insertion direction, refer to the figure below.
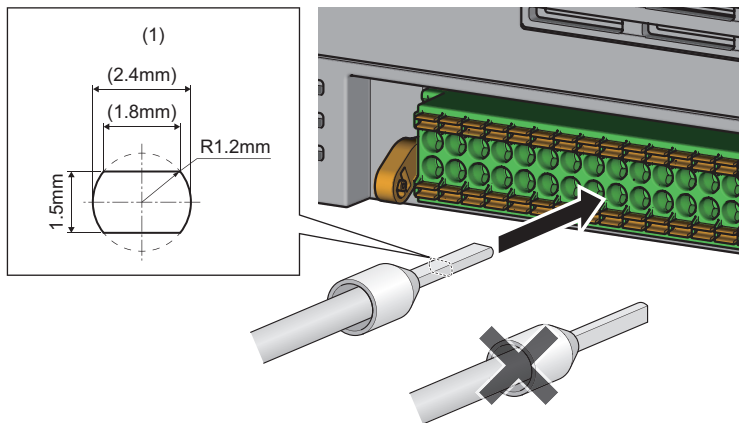
> **Point**
>
> For details on the finish shape of a bar solderless terminal including an error in processing, contact the manufacturers of the bar solderless terminal and the bar solderless terminal tool.

Wiring of screw terminal block

Tightening torque

Tighten the terminal screw within the following tightening torque range.

Tightening the screws too much may damage the I/O module case.

Screw type	Tightening torque range
Terminal screw (M3 × 5.2 screw)	0.43 to 0.57N·m
Terminal block mounting screw (M3.5 screw)	0.68 to 0.92N·m

Wire to be used

The following table describes the wire to be connected to the screw terminal block.

Diameter	Type	Material	Temperature rating
22 to 14 AWG	Stranded	Copper	75℃ or more

Applicable solderless terminal

The following table lists the applicable solderless terminal.

Model	Applicable wire size	Contact
RAA1.25-3	0.3 to 1.25㎟	—
V2-MS3	1.25 to 2.0㎟	J.S.T.MFG.CO.,LTD.
TGV2-3N	1.25 to 2.0㎟	NICHIFU Co., Ltd.

Installing or removing the terminal block

■Removal procedure

When the terminal block mounting screws (two points) are loosened, the two-piece terminal block can be removed.

■Installation procedure

1. Install the two-piece terminal block.

2. Tighten the terminal block mounting screws.

Signal name and wiring

For the signal names of the terminal block and wiring of the external device, refer to the specifications of each module. (☞ Page 22 Performance Specifications)

Incorrect wiring can cause malfunction of or damage on the module.

Wiring method

(1)
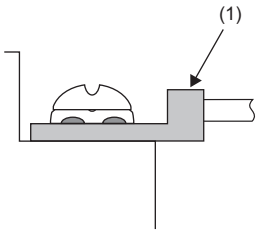
1. Loosen the terminal screw. Connect the round solderless terminal (1) as it is.

Point

• Do not put oil on the terminal and screw. Failure to do so may damage the screw.

• The number of the applicable solderless terminals must be two or less. When inserting two applicable solderless terminals, insert them back-to-back. Otherwise the screw cannot be tightened and it may damage the screw.

• Tighten the terminal screw with an applicable driver. Tightening with an inapplicable driver may damage the screw.

• When operating terminal screws in the lower row, prevent the screwdriver from contacting the upper row. If the screwdriver contacts the upper row, it may damage the terminal block.

• Install the terminal block so it is level. If the terminal block skews when installed, it may damage the contacts of the terminal block.

Wiring of 40-pin connector

Tightening torque

Tighten the connector screws within the following tightening torque range.

Undertightening can cause short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.

Screw type	Tightening torque range
Connector screw (M2.6 screw)	0.20 to 0.29N·m

Applicable connector

Prepare 40-pin connectors separately.

The following tables list the types of connectors and reference products of crimping tools and pressure-displacement tools.

■40-pin connector

Type	Model	Applicable wire size
Soldering type connector (straight type)	A6CON1[*1]	0.08 to 0.3mm² (28 to 22 AWG), (stranded wire)
Crimping type connector (straight type)	A6CON2	0.08 to 0.24mm² (28 to 24 AWG), (stranded wire)
IDC type connector (straight type)	A6CON3	0.08mm² (28 AWG) (stranded wire) φ0.25mm (30 AWG) (solid wire) Flat cable (intervals of 1.27mm)
Soldering type connector (dual purpose (straight/oblique) type)	A6CON4[*1]	0.08 to 0.3mm² (28 to 22 AWG), (stranded wire)

*1 When using 40 pins, use cables whose sheath outside diameters are 1.3mm or shorter. Select cables according to the amount of current to flow.

■40-pin connector crimping tool and pressure-displacement tool

Type	Model	Contact
Crimping tool	N363TT005H	OTAX Corporation
Pressure-displacement tool	N367TT012H (locator plate)	
	N707TT001H (cable cutter)	
	N707TT101H (hand press)	

For how to wire the connectors and how to use the crimping tool and pressure-displacement tools, contact the manufacturer.

Signal name and wiring

For the signal names of the terminal block and wiring of the external device, refer to the specifications of each module. (☞ Page 22 Performance Specifications)

Incorrect wiring can cause malfunction of or damage on the module.

Wiring method

■For A6CON1 and A6CON4
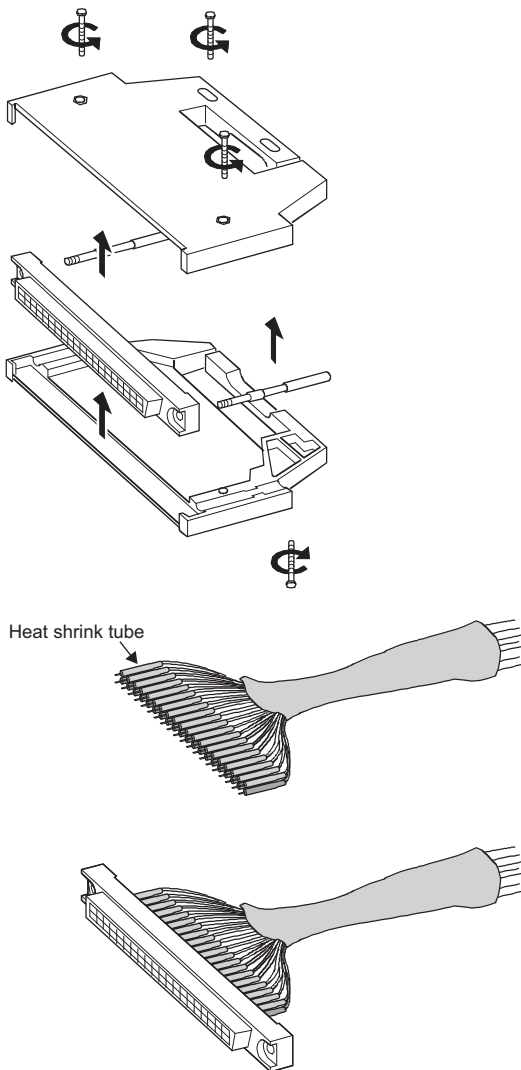
Heat shrink tube

1. Loosen four screws of the connector and remove the screws.

2. Remove the covers from the body.

3. Solder the wires and cover the wires with heat shrinkable tubes.

4. Check the terminal layout and connect the wires to the connector body.
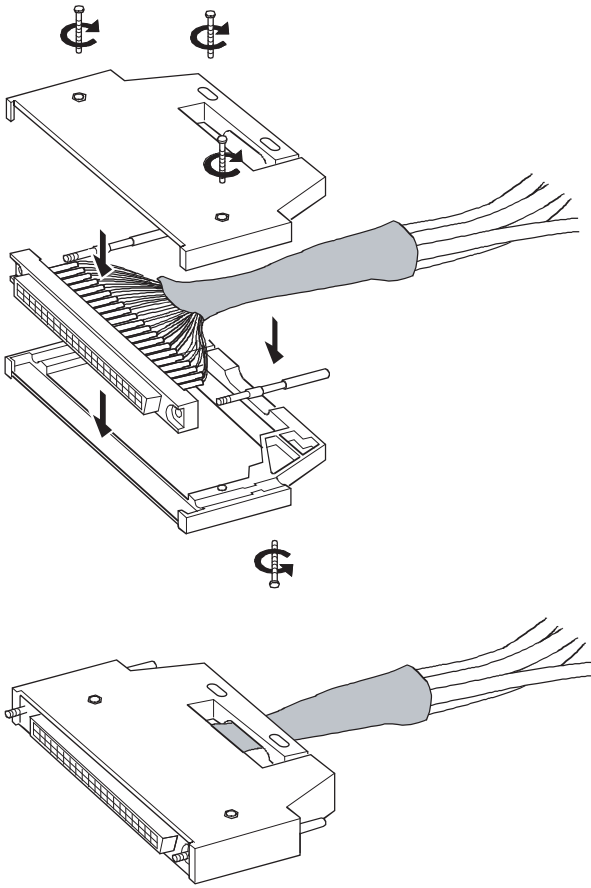
5. Place the body in one of the cover and insert the fixing screws into the screw holes. After that, fit the other cover on the body.

6. Tighten the four screws.

■For A6CON2

The following table shows the specifications of the N363TT005H to be used for the A6CON2.

Applicable wire size	Cross-section area of the wire	Crimp height	Sheath outside diameter	Stripping length
24 AWG	0.20 to 0.24mm²	1.25 to 1.30	φ1.2 or less	3.0 to 4.0
26 AWG	0.13 to 0.16mm²	1.20 to 1.25	φ1.2 or less	3.0 to 4.0
28 AWG	0.08 to 0.096mm²	1.15 to 1.20	φ1.2 or less	3.0 to 4.0

For wiring of the A6CON2, a special tool is required.

For how to use and adjust the tool, contact the manufacturer.

■For A6CON3

For wiring of the A6CON3, special tools are required.

For how to use and adjust the tool, contact the manufacturer.
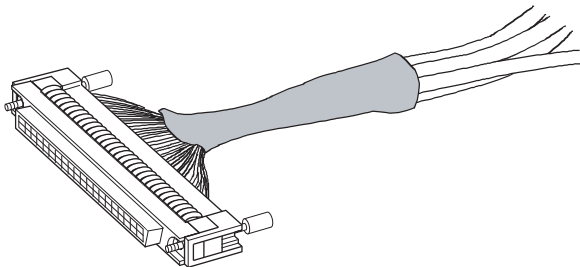
1. Check the terminal layout and crimp the wires to the connector.

Point

The following figure shows the array of terminals for flat cables. (a view from the outlet of a 40-pin connector)

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20
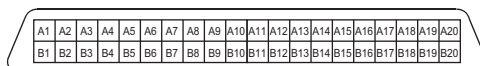
Installation procedure
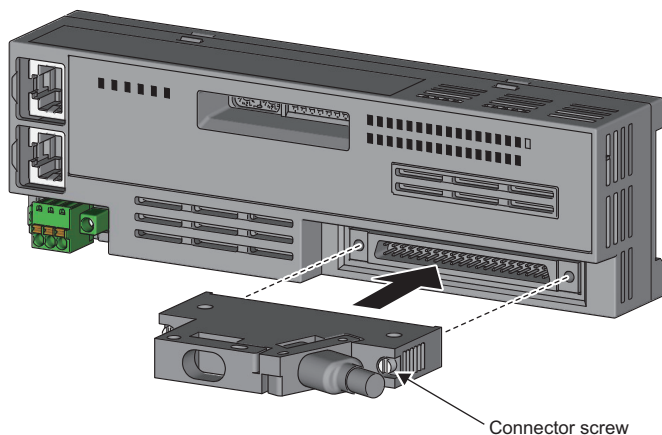
Connector screw

1. Connecting a connector

Connect the wired connector to the I/O module.
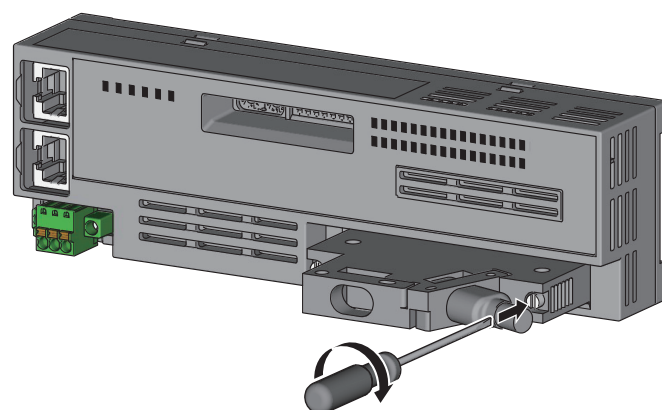
2. Tightening connector screws

Tighten two connector screws (M2.6 screw).

Removal procedure
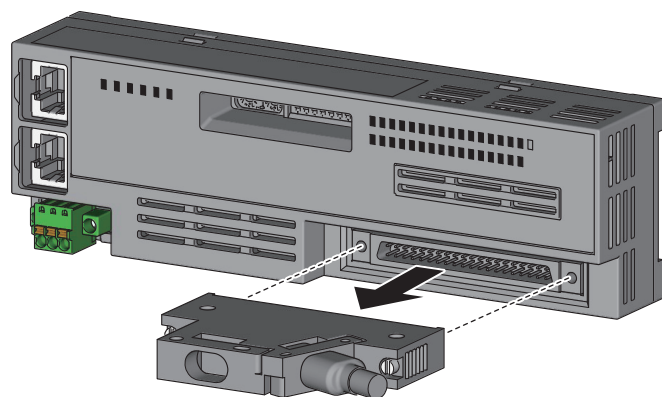
1. Removing a connector

Loosen two connector screws and pull out the connector horizontally from the module.

Precautions

■Laying cables

- To connect the cables to the I/O module, securely connect the connector and fix it with screws at two points.
- Place the cables in a duct or clamp them. If not, a dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.

■40-pin connector

- 40-pin connectors (A6CON□) must be crimped or pressed with tools specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
- For wires to be connected to 40-pin connectors (A6CON□), use copper wires with the temperature rating of 75℃ or more.

> **Point**
>
> To ensure that this product complies with the EMC Directive and the Low Voltage Directive, refer to the following.
> ☞ Page 285 EMC and Low Voltage Directives
> Even though the compliance with the EMC Directive and the Low Voltage Directive is not required, configuring a system that complies with the EMC Directive may reduce effects of the external noise.

Wiring of sensor connector (e-CON)

Applicable connector

Prepare sensor connectors (e-CON) separately.

The following table lists reference products of connectors.

Model	Manufacturer	Specifications			Color of the cover
		Applicable cable (core wire size)	Applicable cable (outer diameter)	Maximum rated current	
ECN-M014R	Mitsubishi Electric System & Service Co., Ltd.	0.14 to 0.30㎟ (26 to 24 AWG)	φ0.8 to 1.0mm	2.0A	Red
ECN-M024Y			φ1.0 to 1.2mm		Yellow
ECN-M034OR			φ1.2 to 1.6mm		Orange
ECN-M044GN		0.30 to 0.50㎟ (22 to 20 AWG)	φ1.0 to 1.2mm		Green
ECN-M054BL			φ1.2 to 1.6mm		Blue
ECN-M064GY			φ1.6 to 2.0mm		Gray

Signal name and wiring

For the signal names of the terminal block and wiring of the external device, refer to the specifications of each module. (☞ Page 22 Performance Specifications)

Incorrect wiring can cause malfunction of or damage on the module.

Wiring method

For how to wire the sensor connectors (e-CON), refer to the catalogs of each manufacturer.

Wiring of waterproof connectors

Applicable connectors and cables

For connectors and cables that can be used for the I/O module (waterproof module), refer to the following.

☞ Page 150 List of Recommended Cables/Connectors for I/O Module (Waterproof Module)

Signal names and wiring

For the signal names of the connectors and wiring of the external device, refer to the specifications of each module. (☞ Page 22 Performance Specifications)

Incorrect wiring can cause malfunction of or damage on the module.

Connecting

1. Insert the I/O cable connector into the I/O module (waterproof module). Pay attention to the connector's orientation.

2. Tighten the I/O cable connector.

Disconnecting

1. Loosen the I/O cable connector and remove the cable.

Point

- If the I/O cable is damp, the connector's resin part of the module may get wet from the moisture on the cable at its removal. Dry or wipe up the water from the resin part for re-connecting the I/O cable.
- At the removal of I/O cable or waterproof cap, an O-ring attached to the connector of the I/O module (waterproof module) may also come off with the cable or cap. In such a case, re-attach that O-ring to the connector of the module.

6.10 List of Recommended Cables/Connectors for I/O Module (Waterproof Module)

The following tables list applicable waterproof cables/connectors.

For details on applicable waterproof connectors, refer to the website of each manufacturer.

For power supply

The waterproof cables are listed below.

□, □ of a model represents the length of the cable.

Connector		Model	Connection cable diameter	Manufacturer
M12 5 pins (4 + FE) Male, female	L code	SC-M12PWL5MF-□,□MU	—	Mitsubishi Electric System & Service Co., Ltd.
M12 5 pins (4 + FE) Female, discrete wire		SC-M12PWL5F-□,□MU		

For I/O

The waterproof connectors/cables are listed below.

□, □ of a model represents the length of the cable.

Connector		Model	Connection cable diameter	Manufacturer
M12 5 pins Male, discrete wire	A code	SC-M12SNA5M-□,□MU	—	Mitsubishi Electric System & Service Co., Ltd.
M12 4 pins Male, discrete wire		SC-M12SNA4M-□,□MU		
M12 5 pins Male, discrete wire (shielded)		SC-M12SNA5SM-□,□MU		
M12 4 pins Male, discrete wire (shielded)		SC-M12SNA4SM-□,□MU		
M12, A code	—	SACC-M12MS-5CON-PG 7-M	φ4.0 to 6.0mm	PHOENIX CONTACT GmbH & Co. KG
		SACC-M12MS-5CON-PG 9-M	φ6.0 to 8.0mm	

Y-branch connector for I/O

The waterproof connector is listed below.

Connector		Model	Connection cable diameter	Manufacturer
M12 5 pins Male	A code	SAC-5P-M12Y/2XM12FS VP	—	PHOENIX CONTACT GmbH & Co. KG

For communications

The waterproof connectors/cables are listed below.

□, □ of a model represents the length of the cable.

Connector		Model	Connection cable diameter	Manufacturer
M12 8 pins Male	X code-X code	SC-E5EW-X□,□M	—	Mitsubishi Electric System & Service Co., Ltd.
		SC-E5EW-X□,□M-MV		
		SC-E5EW-X□,□M-L		
M12 8 pins Male	X code-RJ45	SC-E5EW-SX□,□M		
		SC-E5EW-SX□,□M-MV		
		SC-E5EW-SX□,□M-L		
M12 8 pins Male	X code-X code	NBC-M12MSX/□,□-94F/M12MSX NBC-M12MSX-M12MSX-10G/94F/□,□	—	PHOENIX CONTACT GmbH & Co. KG
M12 8 pins Male	X code-RJ45	NBC-M12MSX/□,□-94F/R4AC NBC-M12MSX-R4AC-10G/94F/□,□		
M12 8 pins Male, X code	—	J80026A0100	φ5.5 to 9.0mm	Telegartner Karl Gartner GmbH
— (cable only)		SC-E5EW-□,□M	—	Mitsubishi Electric System & Service Co., Ltd.

Waterproof caps

The waterproof caps are listed below.

Type	Model	Manufacturer
I/O connector, communication connector	PROT-M12	PHOENIX CONTACT GmbH & Co. KG
Power supply connector (male)	PROT-M12 FS	PHOENIX CONTACT GmbH & Co. KG
Power supply connector (female)	PROT-M12 MS PWR	PHOENIX CONTACT GmbH & Co. KG

6

6.11 Attaching Waterproof Caps

Tighten the waterproof caps within the following torque range.

Screw type	Tightening torque range
Waterproof cap	0.36 to 0.44N·m

7 PARAMETER SETTING

7.1 Network Configuration Setting

Set the parameters of the I/O module with the network parameters written to the CPU module of the master station.

For the setting procedure for the master station, refer to the following.

📖 User's manual for the master station used

Communication cycle interval setting

When using the I/O module in CC-Link IE TSN, check the CC-Link IE TSN Class setting, and set the communication cycle interval setting as follows, depending on the CC-Link IE TSN Class.

Note that when the firmware version of I/O module is "07" or earlier, set the communication cycle interval setting by referring to the section of "When the I/O module is set to CC-Link IE TSN Class B".

■When the I/O module is set to CC-Link IE TSN Class B

Firmware version	Communication speed		Value that can be set
	Master station	I/O module[*1]	
"03" or later	1Gbps	1Gbps	• When the value is set in increments of 1μs: 125.00μs or more and 10000.00μs or less • When the value is not set in increments of 1μs: 31.25μs, 62.50μs, 125.00μs, 250.00μs, 500.00μs, 1000.00μs, 2000.00μs, 4000.00μs, or 8000.00μs
		100Mbps[*2]	• When the value is set in increments of 1μs: 125.00μs or more and 625.00μs or less • When the value is not set in increments of 1μs: 125.00μs, 250.00μs, or 500.00μs
	100Mbps	1Gbps	• When the value is set in increments of 1μs: 125.00μs or more and 10000.00μs or less • When the value is not set in increments of 1μs: 31.25μs, 62.50μs, 125.00μs, 250.00μs, 500.00μs, 1000.00μs, 2000.00μs, 4000.00μs, or 8000.00μs
		100Mbps[*3]	• When the value is set in increments of 1μs: 500.00μs or more, 10000.00μs or less, and divisible by 2μs • When the value is not set in increments of 1μs: 500.00μs, 1000.00μs, 2000.00μs, 4000.00μs, or 8000.00μs
"02"	1Gbps	1Gbps	• When the value is set in increments of 1μs: 125.00μs or more and 8000.00μs or less • When the value is not set in increments of 1μs: 31.25μs, 62.50μs, 125.00μs, 250.00μs, 500.00μs, 1000.00μs, 2000.00μs, 4000.00μs, or 8000.00μs
		100Mbps[*2]	• When the value is set in increments of 1μs: 125.00μs or more and 500.00μs or less • When the value is not set in increments of 1μs: 125.00μs, 250.00μs, or 500.00μs
	100Mbps	1Gbps	• When the value is set in increments of 1μs: 125.00μs or more and 8000.00μs or less • When the value is not set in increments of 1μs: 31.25μs, 62.50μs, 125.00μs, 250.00μs, 500.00μs, 1000.00μs, 2000.00μs, 4000.00μs, or 8000.00μs
		100Mbps[*3]	• When the value is set in increments of 1μs: 500.00μs or more, 8000.00μs or less, and divisible by 2μs • When the value is not set in increments of 1μs: 500.00μs, 1000.00μs, 2000.00μs, 4000.00μs, or 8000.00μs
"01"	1Gbps	1Gbps	• 125.00μs or more and 8000.00μs or less

*1 Set with function setting switch 10. (☞ Page 121 Function setting switch setting)
*2 To use the I/O module in this combination, set the communication cycle setting of the I/O module to "Low-Speed".
*3 To use the I/O module in this combination, do not set the communication cycle setting of the I/O module to "Low-Speed".

■When the I/O module is set to CC-Link IE TSN Class A

Set a value so that "Basic cycle × Magnification" becomes 1ms or longer.
• Basic cycle is determined by a value in "Communication Period Interval Setting", which is set in the parameter of the master station.
• Magnification is determined by both of the following: a value in "Multiple Period Setting", which is set in the parameter of the master station; a value in "Communication Period Setting" of network configuration settings of the I/O module.

When the communication speed of the master station is 1Gbps and the communication speed of the I/O module (set by function setting switch 10) is 100Mbps, set the communication cycle setting of the I/O module to "Low-Speed".

Network topology setting

When using the I/O module in CC-Link IE TSN, set the network topology setting as follows.

Firmware version of I/O module	Setting item
"03" or later	• Line topology, star topology, or mixture of star topology and line topology • Ring topology[*1*2]
"02" or earlier	Line topology, star topology, or mixture of star topology and line topology (fixed)

*1 Check that the firmware versions of all I/O modules on the network are "03" or later before setting the ring topology. When an I/O module with the firmware version of "02" or earlier is on the network, perform a firmware update.
  If an I/O module with the firmware version of "02" or earlier is connected to the network, data link cannot be performed.
*2 Ring topology can be used only when CC-Link IE TSN Class of all I/O modules on the network is CC-Link IE TSN Class B.
  If an I/O module with CC-Link IE TSN Class A is connected to the network in ring topology, data link cannot be performed.

Communication mode

Although the unicast mode and multicast mode are available for communication mode, I/O module operation varies depending on the firmware version if an Ethernet device (or a remote station of CC-Link IE TSN Class A) is connected to the I/O module in multicast mode.

Firmware version of I/O module	Description
"03" or later	Cyclic frames of multicast are not relayed via an Ethernet device (or a remote station of CC-Link IE TSN Class A) connected to an I/O module.
"02" or earlier	Cyclic frames of multicast are relayed via an Ethernet device (or a remote station of CC-Link IE TSN Class A) connected to an I/O module. Because of this, the Ethernet device (or the remote station of CC-Link IE TSN Class A) receives unnecessary cyclic frames, and thus the I/O module may not operate properly.

Setting procedure

A profile is required for each of the model names of the modules to be used.

Operating procedure

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

    👈 [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Model ⇨ [Basic Settings] ⇨ [Network Configuration Settings]

2. Select the module in "Module List" and drag it to the list of stations or the network map.
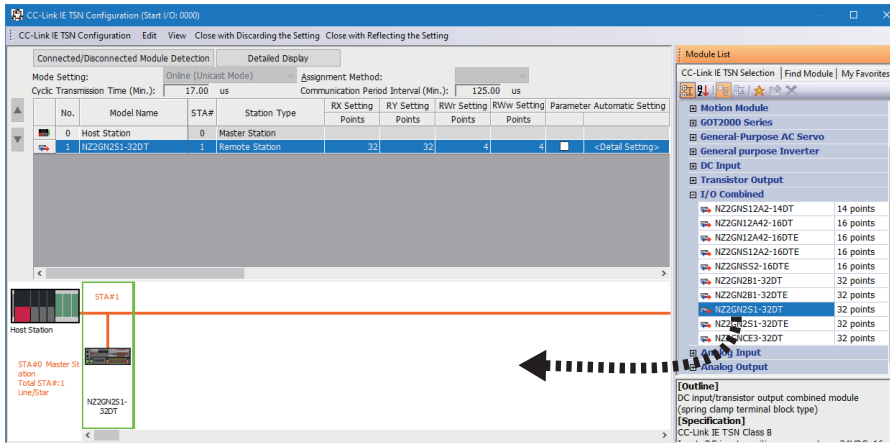
3. An assignment setting row is added to the station list, the total number of stations is increased, and the selected module is added to the network map.

4. Set items in the station list if necessary.

5. Click the [Close with Reflecting the Setting] button to complete the setting process and close the window.

> **Point** 🔍
>
> • The setting operation can be performed with a general-purpose profile. In that case, select "General Remote Station" from the "Module List", and then drag and drop it to the station list or the network map.
> • A module can also be added to the station list by copying and pasting the model name. In addition, multiple modules can be selected by dragging over model names and copied and pasted collectively. However, since the same value is pasted for the station numbers, the station numbers must be changed to avoid duplication.

Setting item list

Item		Description	Setting range
RX Setting, RY Setting	Points	Set the assignment of RX/RY points in units of 16 points.	0 to 32 (Default: 32/16)[*1][*3]
	Start	The RX/RY start number is displayed.	—
	End	The RX/RY end number is displayed.	—
RWr Setting, RWw Setting	Points	Set the assignment of RWw/RWr points in units of 4 points.	0 to 144 (Default: 4)[*1]
	Start	The RWw/RWr start number is displayed.	—
	End	The RWw/RWr end number is displayed.	—
Network Synchronous Communication		Set whether to use the CC-Link IE TSN Network synchronous communication function.[*2][*4]	• Asynchronous (Default) • Synchronous
CC-Link IE TSN Class setting		Set the CC-Link IE TSN Class of the I/O module.[*5] For I/O modules not supporting the CC-Link IE TSN Class setting, set "CC-Link IE TSN Class B".	• CC-Link IE TSN Class B (Default) • CC-Link IE TSN Class A
Communication cycle setting		Set the cycle of the I/O module when setting multiple communication cycles. When the communication speed differs between the master station and the I/O module, the setting range is limited. (☞ Page 153 Communication cycle interval setting)	• Basic cycle • Medium speed • Low speed

*1 For the RX/RY setting and the RWw/RWr setting, set a value in the corresponding setting range. If a value outside the setting range is set, an error occurs on the network configuration setting window.

*2 For an I/O module that does not support the CC-Link IE TSN Network synchronous communication function, set "Asynchronous" for this item. If "Synchronous" is set, an error (error code: D020H) occurs in the I/O module or the event code of 00C71 is registered with event history of the master station.
For the firmware version of an I/O module that supports the CC-Link IE TSN Network synchronous communication function, refer to the following.
☞ Page 295 Added and Changed Functions

*3 The value depends on the input points or the output points of the I/O modules. For the input points or output points, refer to the following.
☞ Page 22 Performance Specifications

*4 When the CC-Link IE TSN Class setting is set to "CC-Link IE TSN Class A", set this item to "Asynchronous". If "Synchronous" is set, the event code of 00C71 is registered with event history of the master station, and the I/O module does not perform data link.

*5 Set the same CC-Link IE TSN Class as the one set by function setting switches 6 and 7 of the I/O module. If a different CC-Link IE TSN Class is set, the event code of 00C81 is registered with event history of the master station, and the I/O module does not perform data link.
For details on the CC-Link IE TSN Class setting function, refer to the following.
☞ Page 194 CC-Link IE TSN Class Setting Function

7.2 Module Parameter Setting

Set the module parameters of the I/O module from the "CC-Link IE TSN Configuration" window of the engineering tool.

Note that the following functions can be set not only with the engineering tool but also with the function setting switches.

 • Input response time setting function

 • Output HOLD/CLEAR setting function

 • CC-Link IE TSN Network synchronous communication function

When setting the parameters using the function setting switches, do not perform the parameter automatic setting or the device station parameter processing.

☞Page 121 Function setting switch setting

The following methods are available for module parameter setting of the I/O module.

 • Parameter automatic setting (☞ Page 157 Parameter automatic setting)

 • Parameter processing of a device station (☞ Page 161 Parameter processing of a device station)

> **Point**
> • When the parameters are saved in the non-volatile memory in the I/O module, the I/O module reads out those parameters and operates with them.
> • When the parameters are not saved in the non-volatile memory in the I/O module, the I/O module operates with the parameters set by the function setting switches.

Applicable version

When performing the module parameter setting with the engineering tool, check the firmware version of the I/O module.

☞Page 295 Added and Changed Functions

Parameter automatic setting

When parameters are set by the parameter automatic setting, the set parameters are saved in the master station. Those parameters are read from the master station and set automatically (automatic setting from the master station) when I/O module performs data link.

The parameters automatically set from the master station are also stored in the non-volatile memory in the I/O module.

At replacement of the I/O module due to module failure or other reasons, the parameters are automatically set in the new module if the parameters in the existing module are set by the parameter automatic setting.

> **Point**
> If the parameters saved in the master station are same as the parameters saved in the non-volatile memory in the I/O module, the parameters in the I/O module are not overwritten at automatic setting from the master station.
> An error in the I/O module is cleared when the I/O module parameter has changed by the parameter automatic setting.

Operating procedure

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

☞ [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Model ⇨ [Basic Settings] ⇨ [Network Configuration Settings]

2. Select the I/O module from "Module List", and drag and drop it to the list of stations or the network map.
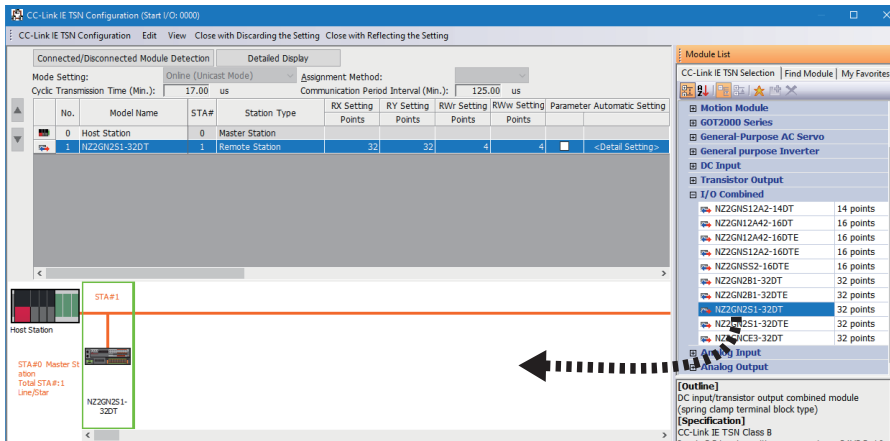

3. Set the network parameters.

For details on the network parameters, refer to the following.

📖 User's manual for the master station used

Select the "Parameter Automatic Setting" checkbox of the network parameters.

	No.	Model Name	STA#	Station Type	RX Setting Points	RY Setting Points	RWr Setting Points	RWw Setting Points	Parameter Automatic Setting	
▦	0	Host Station	0	Master Station						
➡	1	NZ2GN2S1-32DT	1	Remote Station	32	32	4	4	☑	<Detail Setting>

> **Point** 🔍
>
> When the detailed settings of the parameter automatic setting are not configured yet, the letters of [Detail Setting] is blue.

4. Double-click [Detail Setting] beside the "Parameter Automatic Setting" checkbox to display the "Parameter of Device Station" window.

5. Set "Method selection" to "Parameter auto-setting".
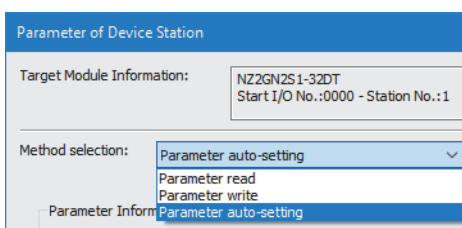
6. Double-click the item to change the setting, and input the setting value.

To save the parameter information in a CSV file, click the [Export] button.

To read the parameter information from a CSV file, click the [Import] button.

 Point

Set all the items for the parameter. If any item is left blank, the "Parameter of Device Station" window cannot be closed.

---

7. Click the [Close with Reflecting the Setting] button to close the "Parameter of Device Station" window.

 Point

The module parameters will not be written to the CPU module and I/O module by clicking the [Close with Reflecting the Setting] button in the "Parameter of Device Station" window.

---

8. Check that the letter of [Detail Setting] has changed to black for the I/O module on which the detailed settings are configured.

	No.	Model Name	STA#	Station Type	RX Setting Points	RY Setting Points	RWr Setting Points	RWw Setting Points	Parameter Automatic Setting	
▦	0	Host Station	0	Master Station						
⇨	1	NZ2GN2S1-32DT	1	Remote Station	32	32	4	4	☑	\<Detail Setting\>

9. Click the [Close with Reflecting the Setting] button to close the "CC-Link IE TSN Configuration" window.

10. When the parameter setting has been completed, click the [Apply] button.

11. Display the "Online Data Operation" window.

✎ [Online] ⇨ [Write to PLC]

12. Select the checkboxes for the parameter and the device station settings write destination.

Module Name/Data Name	◆	🔲	📇	Detail	Title	Last Change	Size (Byte)
🔻 Untitled Project	☐						
🔻 Parameter	☐						
🔻 CC-Link IE TSN Configuration	☑						
📇 Device Station Setting	☑			Detail		-	Not Calculated
🔻 Global Label	☐						
🔻 Program	☐			Detail			
🔻 Device Memory	☐						
🔻 File Register	☐						
🔻 Common Device Comment	☐						

Online Data Operation — Display, Setting, Related Functions — Write, Read, Verify, Delete — Parameter + Program(F), Select All, Open/Close All(T), Deselect All(N) — Legend: ◆ CPU Built-in Memory 🔲 SD Memory Card 📇 Intelligent Function Module

13. Click the [Detail] button for "Device Station Setting" to display the "CC-Link IE TSN Configuration - Device Station Setting" window.

CC-Link IE TSN Configuration - Device Station Setting

Write Target

Target Device — Select All, Deselect All

	Start XY	Station No./ID	IP Address	Last Change	Size (Byte)
☑	0000	1	192.168.3.1	-	Not Calculated

Device stations in which Parameter Auto-setting has been checked are shown in Target Device list.
(Even if Parameter Auto-setting has been checked, device stations in which parameter setting has not been set or in which unsupported parameter setting has been included are not shown)
To allocate parameters for each device station, please set them from master station ([Basic Setting] - [Network Configuration Settings]).

For the device station in which Parameter Auto-setting has not been set, please execute parameter processing through [Parameter of Device Station] from the Shortcut menu of the device station through [Network Configuration Settings].

OK   Cancel

14. Check that the checkbox for the write target I/O module is selected. Select the checkbox if not selected.

15. Click the [OK] button to close the "CC-Link IE TSN Configuration - Device Station Setting" window.

16. Write the set parameters to the CPU module of the master station and reset the CPU module of the master station, or turn off and on the power supply of the programmable controller.

Point

The module parameters will be written to the CPU module by performing [Write to PLC] operation, but they will not be written to the I/O module.

17. Set the CPU module of the master station to RUN, and check that the DATA LINK LED of the I/O module is turned on.

Point

The parameters of the I/O module can be read out by setting "Method selection" to "Parameter read" and clicking the [Execute Parameter Processing] button in the "Parameter Processing of Device Station" window. The parameters read out from the I/O module are displayed in "Read Value".

■Precautions

If the parameter automatic setting is completed with an error, data link cannot be performed.

Device station parameter automatic setting interruption (event code: 00C40) is stored in the event history of the master module.

Take an action corresponding to the code stored in the device station response code (end code).

Device station response code (end code)	Description and cause	Action
1C00H, CF44H	A module parameter set in the CPU module cannot be used for the I/O module.	Set the module parameter so that the model name of the device station set in the network configuration settings matches the model name of the actual module, and write that parameter to the CPU module.
C059H	The I/O module does not support the parameter automatic setting.	When the firmware version of the I/O module is "05" or earlier, perform either of the following: perform a firmware update; deselect the "Parameter Automatic Setting" checkbox of the network parameters and write it to the CPU module.

For the CC-Link IE TSN Network synchronous communication setting of the I/O module, if a parameter different from that at the module start-up is set by the parameter automatic setting, the parameter is changed but Initialization failure (event code: 00C54) is stored in the event history of the master station.

Parameter processing of a device station

Before performing the device station parameter processing, set the network parameters of the master module and write them to the CPU module.

For the setting method, refer to the following.

📖 User's manual for the master station used

Parameters set by the device station parameter processing are not saved in the master station, but are saved in the non-volatile memory in the I/O module.

> **Point**🖉
>
> When the device station parameter processing is executed after data link establishment of the I/O module, the parameter is changed. The parameter change is also stored in the non-volatile memory in the I/O module. An error in the I/O module is cleared when the I/O module parameter has been set by the device station parameter processing.

### Operating procedure

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

🖝 [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Model ⇨ [Basic Settings] ⇨ [Network Configuration Settings]
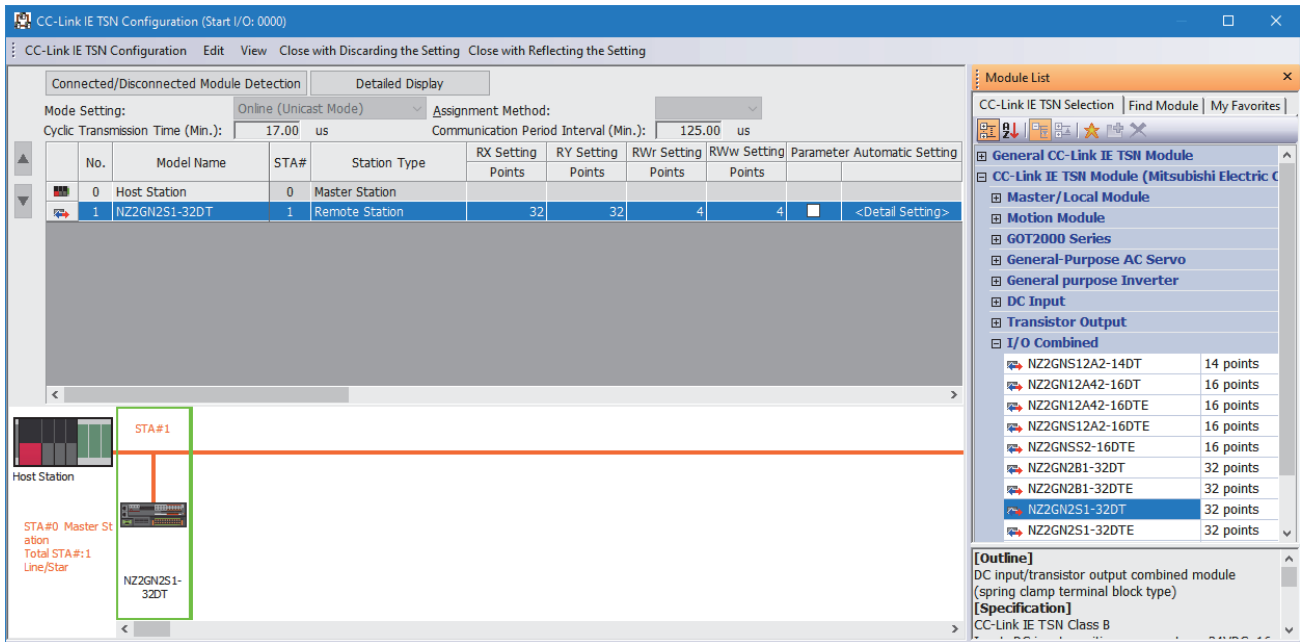
2. Open the "Parameter of Device Station" window.

3. Set "Method selection" to "Parameter write".
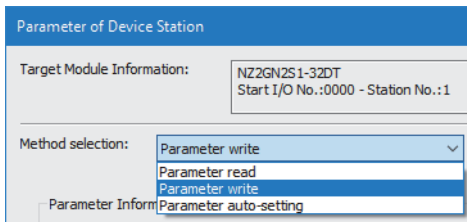
4. Double-click the item to change the setting, and input the setting value.

To save the parameter information in a CSV file, click the [Export] button.

To read the parameter information from a CSV file, click the [Import] button.
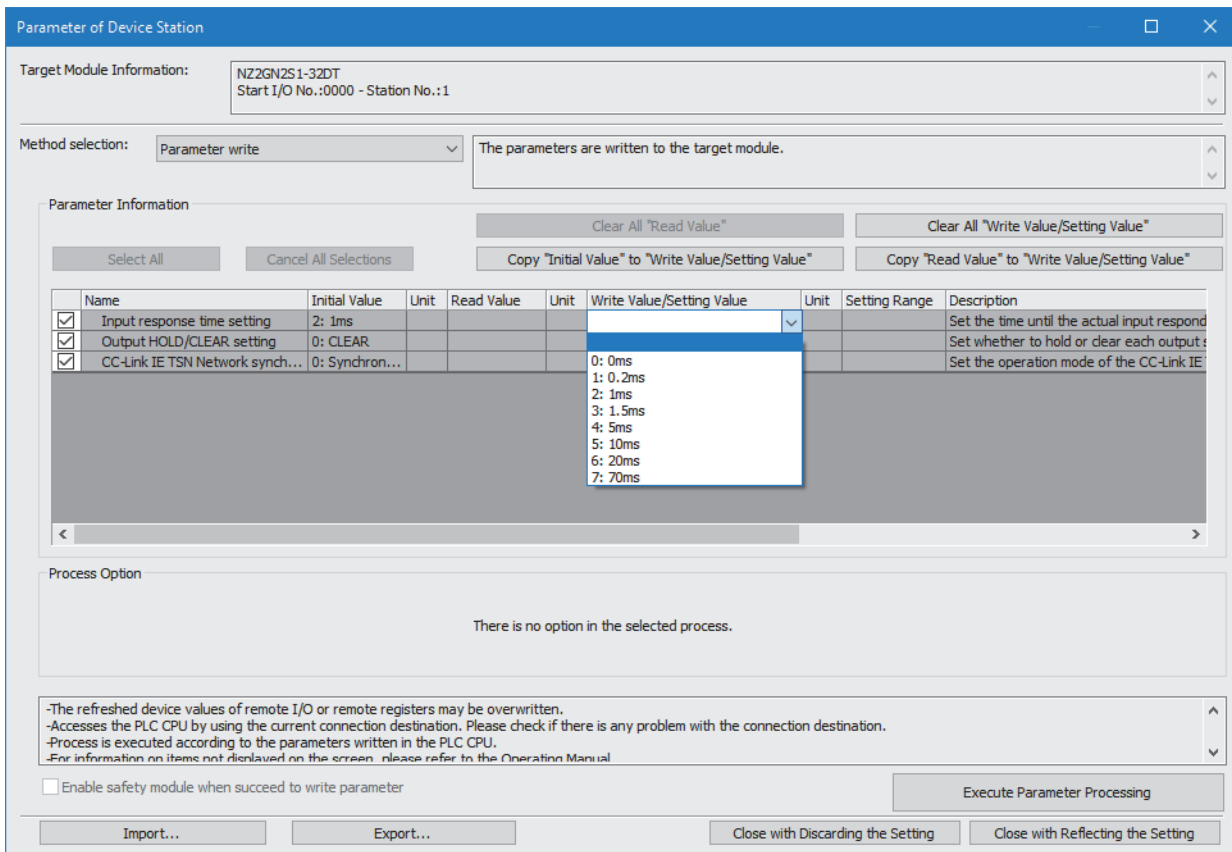
Point

Set all the items for the parameter. If any item is left blank, the parameter cannot be written to the I/O module.

5. When the [Execute Parameter Processing] button is clicked, a window to check the contents appears.

6. Check the contents, and click the [Yes] button.

7. The parameter is written to the I/O module.

Point

The parameters of the I/O module can be read out by setting "Method selection" to "Parameter read" and clicking the [Execute Parameter Processing] button in the "Parameter of Device Station" window.
The parameters read out from the I/O module are displayed in "Read Value".
In addition, parameters for all the items in "Read Value" can be copied to "Write Value/Setting Value" by taking the following steps.
 • Click the title cell of "Read Value" to select all the items and copy them.
 • Click the title cell of "Write Value/Setting Value" to select all the items and paste the copy.

■**Precautions**

When setting the parameters by the device station parameter processing, do not perform the parameter automatic setting.
If the device station parameter processing is performed while the parameters are already set by the parameter automatic setting, the parameters in the I/O module are changed to the ones set by the device station parameter processing. However, after that, if the I/O module is turned off or disconnected, at the timing of re-establishment of I/O module data link, the I/O module parameters are overwritten with the parameters previously set by the parameter automatic setting.

How to clear parameters

Operating procedure

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

☞ [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Model ⇨ [Basic Settings] ⇨ [Network Configuration Settings]
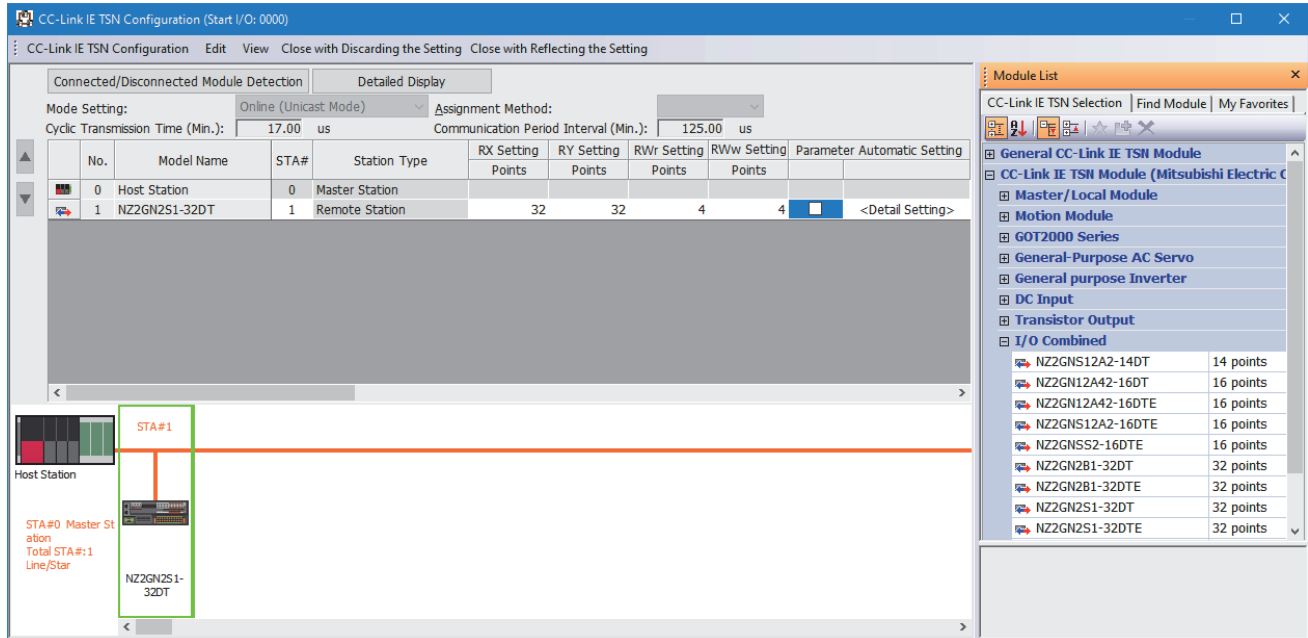
2. Open the "Command Execution of Device Station" window.

☞ Right-click on the command-execution target I/O module, and select [Online] → [Command Execution of Device Station].

3. Set "Method selection" to "Parameter clear request", and click the [Execute] button.
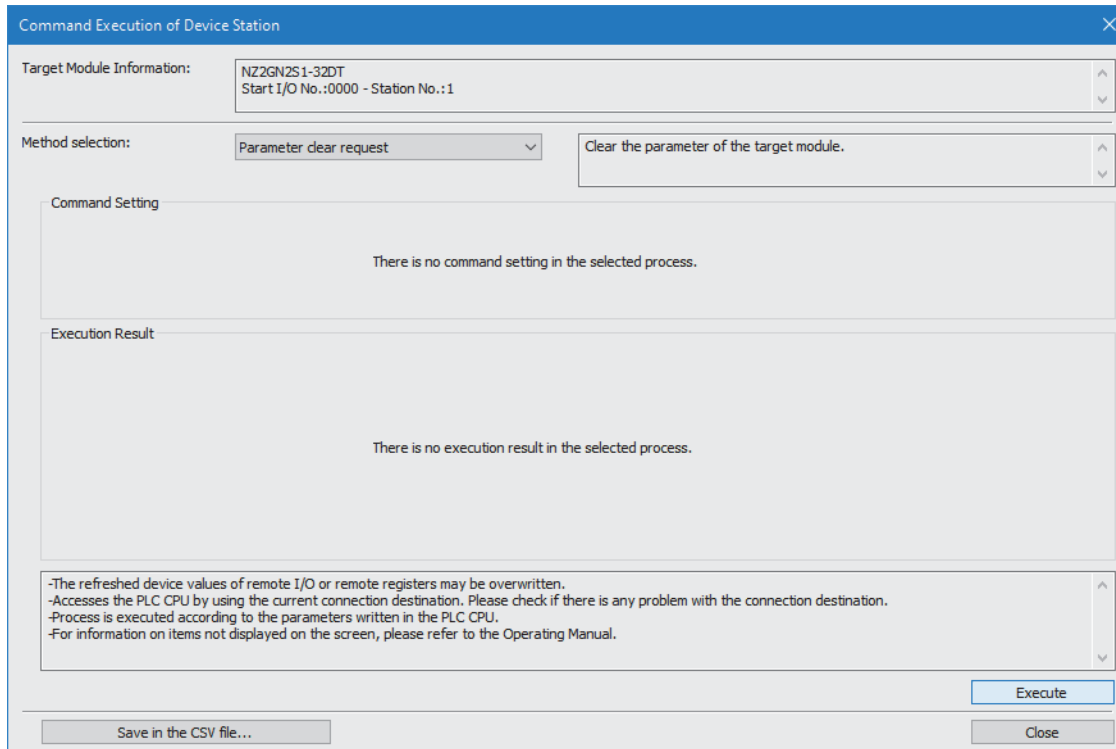
4. When the following window appears, click the [Yes] button to start the parameter clear processing.
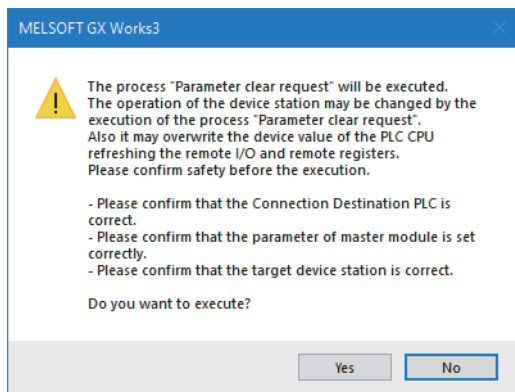
5. Click the [OK] button.
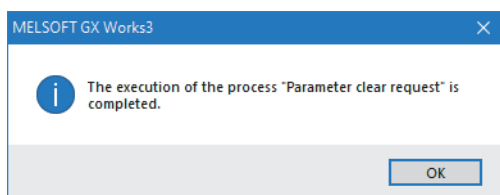
Since the parameter clear execution causes a moderate error (error code: 0109H), turn off and on the power supply of the I/O module or perform remote reset after the completion of parameter clear.

8 FUNCTIONS

This chapter describes the details of the functions available in the I/O module, and the setting procedures for those functions.

For details on remote I/O signals and remote registers, refer to the following.

☞ Page 243 Remote I/O Signal

☞ Page 250 Remote Register

8.1 Input Response Time Setting Function

Prevents an incorrect input due to noise by setting the response time required for the module to recognize an actual input as the X signal.

Setting procedure

Set the input response time using function setting switch 2 to function setting switch 4 of the I/O module, or using the engineering tool.

> **Point**
>
> • When the parameter is set with the engineering tool, the settings of function setting switch 2 to function setting switch 4 are ignored.
> • When the status of one of function setting switches 2 to 4 is changed while the I/O module is on, a minor error (error code: 0202H to 0204H) corresponding to the relevant function setting switch occurs.

■Setting with the function setting switches

Function setting switch 2 to function setting switch 4			Input response time setting
Function setting switch 2	Function setting switch 3	Function setting switch 4	
Off	Off	Off	1ms[*1]
Off	Off	On	0ms
Off	On	Off	0.2ms
Off	On	On	1.5ms
On	Off	Off	5ms
On	Off	On	10ms[*2]
On	On	Off	20ms
On	On	On	70ms

*1 This is a value set to the I/O module (except for waterproof module) as a factory default.

*2 This is a value set to the I/O module (waterproof module) as a factory default.

The input response time setting is determined by the statuses of function setting switch 2 to function setting switch 4 at power-on.

■Setting with the engineering tool

Set the input response time using the engineering tool. For details, refer to the following.

☞ Page 157 Module Parameter Setting

Checking setting status

The setting status of the input response time can be checked by Input response setting status (RWr2.b0 to RWr2.b2). For details, refer to the following.

☞ Page 261 Input response setting status (RWr2.b0 to RWr2.b2)

Precautions

Noise may be taken in as an input depending on the input response time setting.

The pulse width which is taken in as an input varies depending on the input response time.

To set the input response time, consider fully the operating environment.

The following table shows the minimum values of the pulse widths which may be taken in as an input. The pulse widths lower than the values shown below can be filtered as noise.

Value of input response time setting	0ms	0.2ms	1ms	1.5ms	5ms	10ms	20ms	70ms
The minimum value of the pulse width which may be taken in as an input (the maximum pulse widths which can be filtered as noise)	—	0.003ms	0.12ms	0.3ms	2ms	4ms	9ms	36ms

8.2 Output HOLD/CLEAR Setting Function

Sets whether to hold or clear the last output value when the I/O module is disconnected from data link, when the CPU module operating status is STOP, or when the CPU module operation is suspended by an error.

Output HOLD/CLEAR setting and its operation

When HOLD or CLEAR is set for an output, the output is turned on or off as follows.

Operating status		Output HOLD/CLEAR setting CLEAR		Output HOLD/CLEAR setting HOLD	
		Last output status OFF	Last output status ON	Last output status OFF	Last output status ON
Data link in operation	CPU module in RUN	Off	On	Off	On
	CPU module in STOP[*1]	Off	Off	Off	On
	CPU module in PAUSE	Off	On	Off	On
	CPU module in RESET	Off	Off	Off	On
	CPU module suspended by error	Off	Off	Off	On
During disconnection/cyclic stop		Off	Off	Off	On

*1   When the CPU module is in STOP status, the output can be turned on or off at any desired time by performing the CPU module in STOP external output test function.

If a moderate or major error has occurred in the I/O module, output turns off regardless of the output HOLD/CLEAR setting.

Setting procedure

Set HOLD or CLEAR using the function setting switch 5 of I/O module, or using the engineering tool.

> **Point**
>
> • When the setting of function setting switch 5 is changed while the I/O module is on, a function setting switch 5 changed error (error code: 0205H) occurs, and the changed setting of the output HOLD/CLEAR setting function is not applied.
> • When the parameter is set with the engineering tool, the setting of function setting switch 5 is ignored.

■Setting with the function setting switch

Set HOLD or CLEAR using the function setting switch 5 of I/O module.

Function setting switch 5	Output HOLD/CLEAR setting
Off	CLEAR (Factory default)
On	HOLD

The setting of the output HOLD/CLEAR setting function is determined by the status of function setting switch 5 when the I/O module is powered on.

■Setting with the engineering tool

Set HOLD or CLEAR using the engineering tool. For details, refer to the following.

Checking setting status

The setting status of the output HOLD/CLEAR setting can be checked by Output HOLD/CLEAR setting status (RWr2.b3). For details, refer to the following.

8.3 CC-Link IE TSN Network Synchronous Communication Function

Performs I/O with a synchronization cycle of the master station that supports the CC-Link IE TSN Network synchronous communication function.

This enables an I/O module to operate at the same timing as other device stations on the same network.

The CC-Link IE TSN Network synchronous communication function has the following three modes.

- Synchronous X/Y control mode (☞ Page 171 Synchronous X/Y control mode)
- Synchronization cycle timing control mode (☞ Page 173 Synchronization cycle timing control mode)
- Set time synchronization control mode (☞ Page 177 Set time synchronization control mode)

Applicable version

When using the CC-Link IE TSN Network synchronous communication function, check the versions of I/O modules and master stations that support this function.

■Synchronous X/Y control mode

- I/O module

Model	Firmware version
NZ2GN2S1-32D, NZ2GN2B1-32D, NZ2GNCF1-32D, NZ2GNCE3-32D, NZ2GN2S1-32T, NZ2GN2B1-32T, NZ2GNCF1-32T, NZ2GN2S1-32TE, NZ2GN2B1-32TE, NZ2GN2S1-32DT, NZ2GN2B1-32DT, NZ2GNCE3-32DT, NZ2GN2S1-32DTE, NZ2GN2B1-32DTE	"03" or later
NZ2GN2S1-16D, NZ2GN2B1-16D, NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN2S1-16T, NZ2GN2B1-16T, NZ2GN12A2-16T, NZ2GN2S1-16TE, NZ2GN2B1-16TE, NZ2GN12A2-16TE, NZ2GN12A42-16DT, NZ2GN12A42-16DTE	"05" or later

- Master module

Model	Firmware version
RJ71GN11-T2	"10" or later
RD78G4, RD78G8, RD78G16, RD78G32, RD78G64, RD78GHV, RD78GHW	"05" or later[1]

[1] When the NZ2GN12A42-16DT or NZ2GN12A42-16DTE is used, the firmware version of the usable master module is "16" or later.

- CPU module

| Model	Firmware version
R00CPU, R01CPU, R02CPU	"18" or later
R04CPU, R04ENCPU, R08CPU, R08ENCPU, R16CPU, R16ENCPU, R32CPU, R32ENCPU, R120CPU, R120ENCPU	"50" or later

■Synchronization cycle timing control mode, set time synchronization control mode

- I/O module

Model	Firmware version
NZ2GN2S1-16D, NZ2GN2S1-32D, NZ2GN2B1-16D, NZ2GN2B1-32D, NZ2GNCF1-32D, NZ2GNCE3-32D, NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN2S1-16T, NZ2GN2S1-32T, NZ2GN2B1-16T, NZ2GN2B1-32T, NZ2GNCF1-32T, NZ2GN12A2-16T, NZ2GN2S1-16TE, NZ2GN2S1-32TE, NZ2GN2B1-16TE, NZ2GN2B1-32TE, NZ2GN12A2-16TE, NZ2GN2S1-32DT, NZ2GN2B1-32DT, NZ2GNCE3-32DT, NZ2GN12A42-16DT, NZ2GN2S1-32DTE, NZ2GN2B1-32DTE, NZ2GN12A42-16DTE	"05" or later

- Master module

Model	Firmware version
RJ71GN11-T2	"10" or later
RD78G4, RD78G8, RD78G16, RD78G32, RD78G64, RD78GHV, RD78GHW	"16" or later

• CPU module

Model	Firmware version
R00CPU, R01CPU, R02CPU	"18" or later
R04CPU, R04ENCPU, R08CPU, R08ENCPU, R16CPU, R16ENCPU, R32CPU, R32ENCPU, R120CPU, R120ENCPU	"50" or later

| Model	Firmware version
R00CPU, R01CPU, R02CPU	"18" or later
R04CPU, R04ENCPU, R08CPU, R08ENCPU, R16CPU, R16ENCPU, R32CPU, R32ENCPU, R120CPU, R120ENCPU	"50" or later

Synchronous X/Y control mode

Controls I/O by turning on and off the remote input signal and the remote output signal.

An I/O module operating in the synchronous X/Y control mode acquires an input signal at each synchronization cycle, and changes the output signal.

Using the synchronous X/Y control mode enables I/O modules to match an input signal acquisition timing or an output signal change timing between them.

The synchronous X/Y control mode has the following two types.

- Synchronous X input control (☞ Page 172 Synchronous X input control)
- Synchronous Y output control (☞ Page 172 Synchronous Y output control)
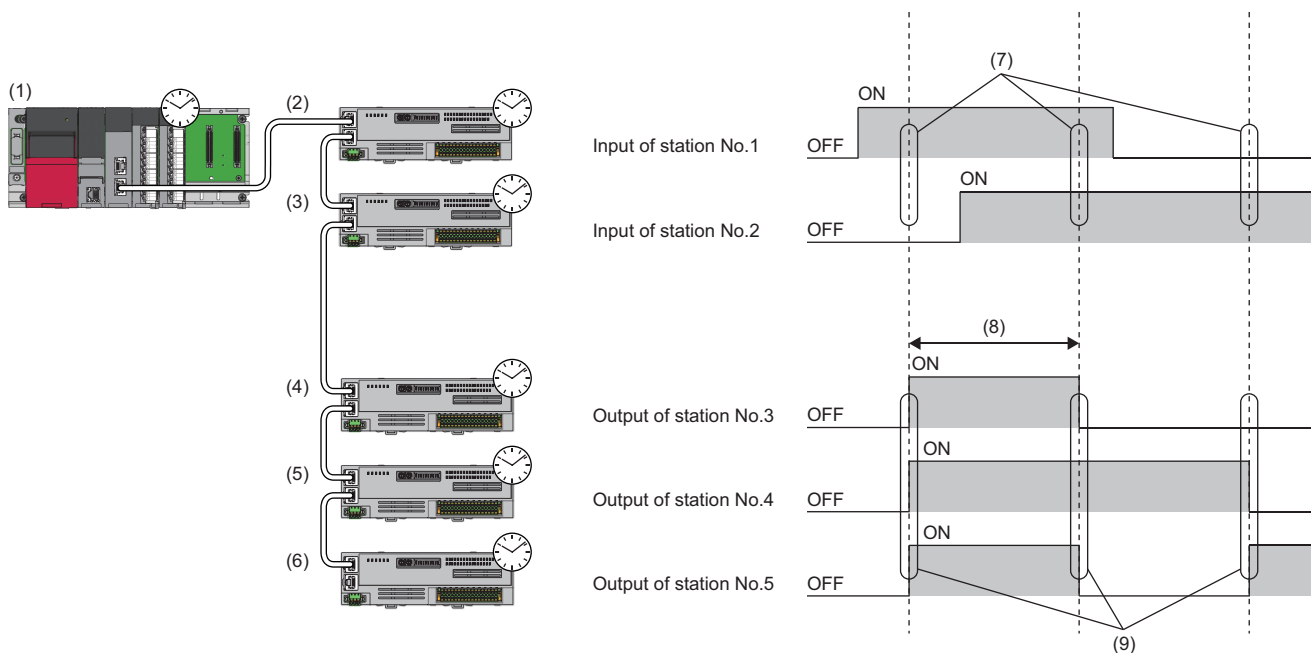
(1) RJ71GN11-T2
(2) Station No.1 input module
(3) Station No.2 input module
(4) Station No.3 output module
(5) Station No.4 output module
(6) Station No.5 output module
(7) Synchronizing input acquisition timings
(8) Synchronization cycle
(9) Synchronizing output change timings

Synchronous X input control

An I/O module operating with synchronous X input control reads out the status of External input X□ (X□ terminal) at each synchronization cycle.

The read value is also sent to the master station within the next synchronization cycle.

-------▶ Performed by the I/O module
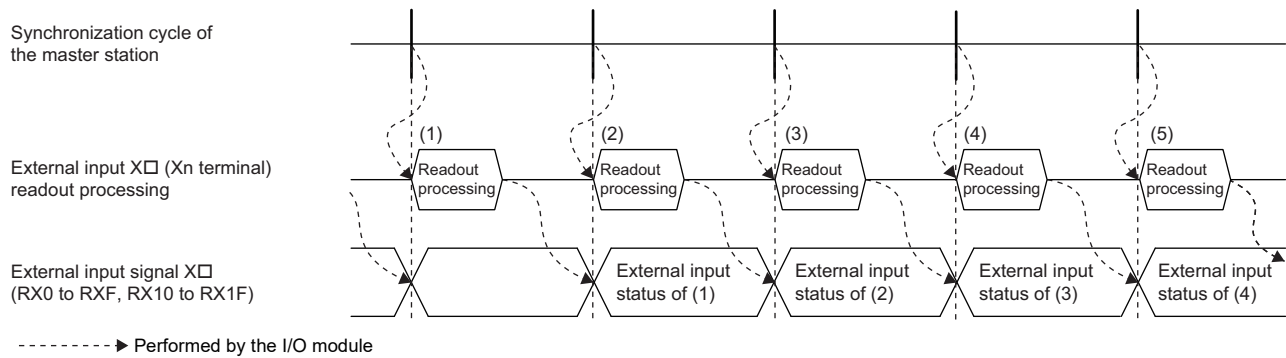
Synchronous Y output control

An I/O module operating with synchronous Y output control receives the external output value from the master station at each synchronization cycle, and outputs the received value at the next synchronization cycle.

-------▶ Performed by the I/O module
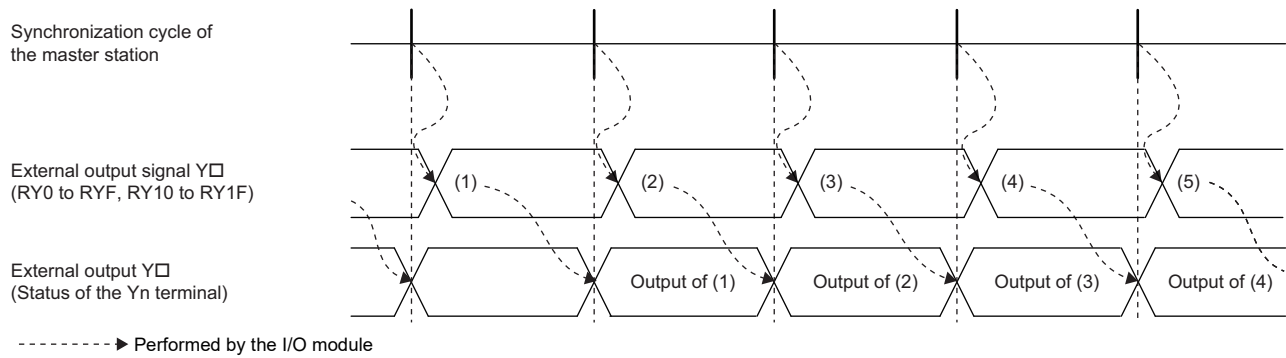
Synchronization cycle timing control mode

Controls I/O by using the time taken from a start of synchronization cycle to when the I/O has changed.

Compared to the I/O control performed every synchronization cycle, the I/O control using the synchronization cycle timing control mode has the higher resolution, enables a user to acquire the more precise time when an input signal has changed or to change an output signal at more precise timing.

The synchronization cycle timing control mode has the following two types.

- Synchronization input timing acquisition control (☞ Page 173 Synchronization input timing acquisition control)
- Synchronization output timing setting control (☞ Page 175 Synchronization output timing setting control)

Synchronization input timing acquisition control

A time when an input has changed can be acquired based on the synchronization cycle start timing.

❶ The I/O module sends the following information to the master station at each synchronization cycle.

- Synchronization input timing information X0 OFF to ON: Storing the time when the input has changed from off to on.
- Synchronization input timing information X0 ON to OFF: Storing the time when the input has changed from on to off.

❷ Synchronization input timing information X0 OFF to ON: 500μs, Synchronization input timing information X0 ON to OFF: No change of ON to OFF

❸ Synchronization input timing information X0 OFF to ON: No change of OFF to ON, Synchronization input timing information X0 ON to OFF: 800μs

❹ Synchronization input timing information X0 OFF to ON: No change of OFF to ON, Synchronization input timing information X0 ON to OFF: No change of ON to OFF
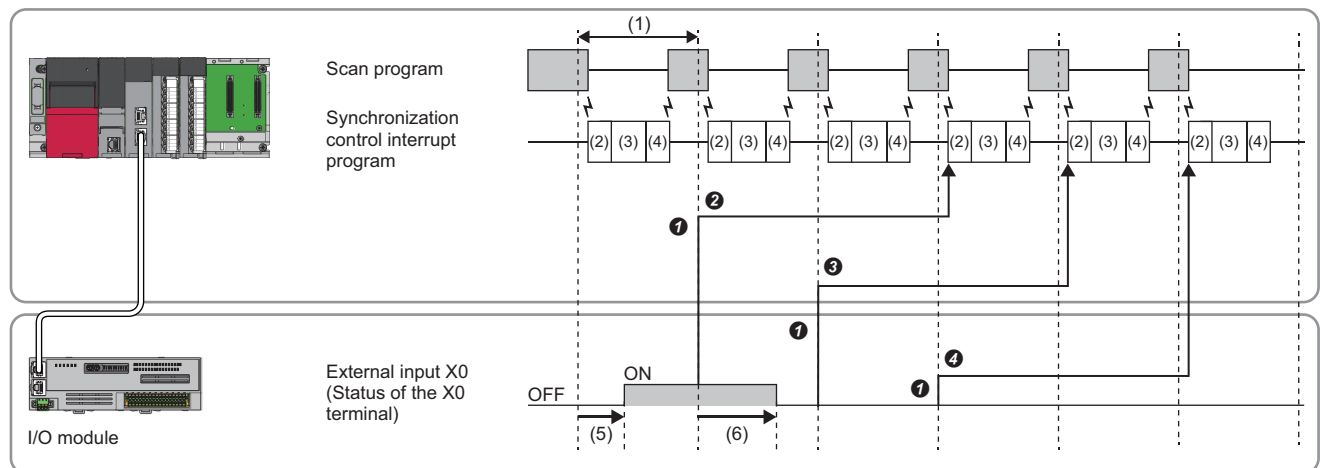
(1) Synchronization cycle
(2) Input
(3) Operation
(4) Output
(5) The input has turned on 500μs later.
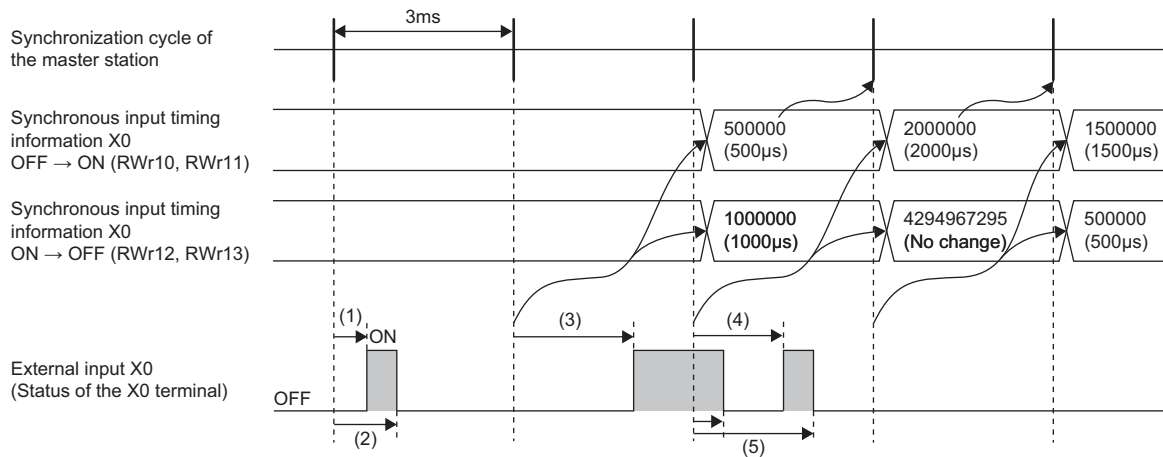(6) The input has turned off 800μs later.

■**Operation**

The following remote registers (RWr) are used for the synchronization input timing acquisition control.

• Synchronization input timing information X□ OFF to ON/ON to OFF (RWr10 to RWr8F) (☞ Page 266 Synchronization input timing information)

Ex.

The following figure shows the operation of synchronization input timing acquisition control using the external input X0, with the synchronization cycle of the master station set to 3ms.

→ Performed by the I/O module

(1) The input has turned on 500μs later.
(2) The input has turned off 1000μs later.
(3) The input has turned on 2000μs later.
(4) The input has turned on 1500μs later.
(5) The input has turned off twice, 500μs later and 2000μs later.

Point

• The operation of external input signal X□ is the same both for the synchronization input timing acquisition control and for the synchronous X input control. Therefore, even when the I/O module is operating with the synchronization input timing acquisition control, a user can get the input status information of each synchronization cycle start timing by referring to External input signal X□ (RX0 to RXF, RX10 to RX1F).

• When the external input X□ (status of the X terminal) has changed OFF to ON to OFF within one synchronization cycle, if the ON status is shorter than the input response time, a value in Synchronization input timing information X□ OFF to ON/ON to OFF (RWr10 to RWr8F) is not updated.

• When the external input X□ (status of the X terminal) has changed ON to OFF to ON within one synchronization cycle, if the OFF status is shorter than the input response time, a value in Synchronization input timing information X□ OFF to ON/ON to OFF (RWr10 to RWr8F) is not updated.

• The resolution of input timing acquisition is 8ns.

• The I/O module adjusts the synchronization cycle periodically to match the start timing of the cycle with those of other stations. When the cycle is adjusted, its length becomes 4μs longer or 4μs shorter at maximum, and thus a value exceeding the synchronization cycle length may be stored in Synchronization input timing information X□ OFF to ON/ON to OFF (RWr10 to RWr8F).

• If a major or moderate error occurs in the I/O module, 4294967295 is stored in Synchronization input timing information X□ OFF to ON/ON to OFF (RWr10 to RWr8F).

Synchronization output timing setting control

This control changes an output status according to the timing that is set based on the synchronization cycle start timing.

❶ Set the following for each synchronization cycle.

 • Synchronization output timing setting Y0 OFF to ON: Set the timing to change the output from off to on.

 • Synchronization output timing setting Y0 ON to OFF: Set the timing to change the output from on to off.

❷ Synchronization output timing setting Y0 OFF to ON: 200μs, Synchronization output timing setting Y0 ON to OFF: Do not change the output from on to off.

❸ Synchronization output timing setting Y0 OFF to ON: Do not change the output from off to on, Synchronization output timing setting Y0 ON to OFF: 800μs

❹ Synchronization output timing setting Y0 OFF to ON: Do not change the output from off to on, Synchronization output timing setting Y0 ON to OFF: Do not change the output from on to off.

❺ The output module performs the output control according to the settings, at the second synchronization cycle from the setting.
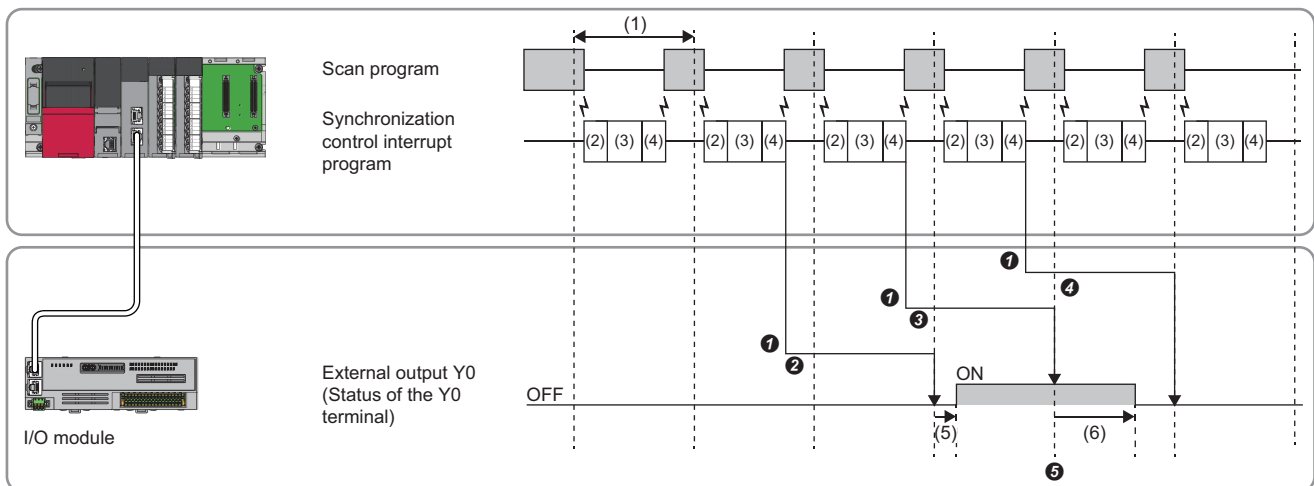
(1) Synchronization cycle
(2) Input
(3) Operation
(4) Output
(5) The output has been turned on 200μs later.
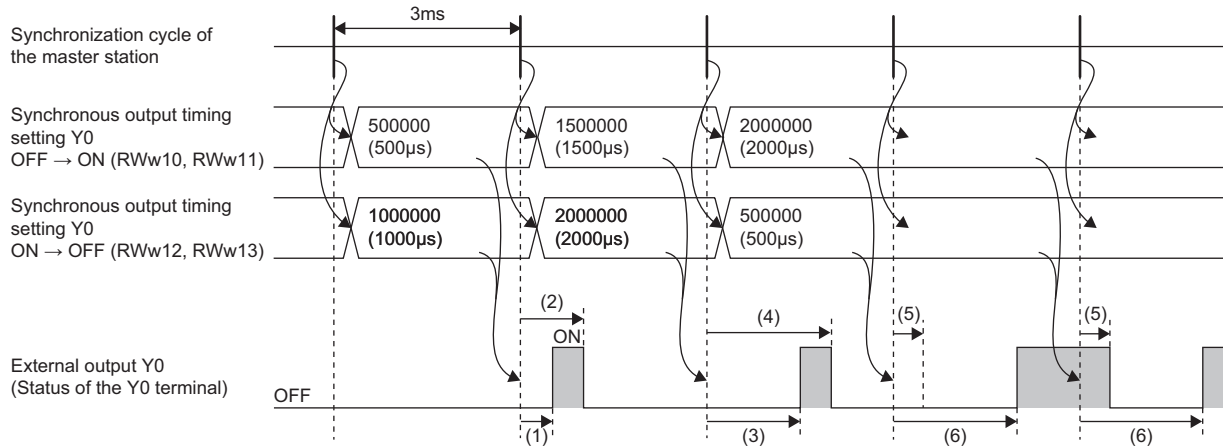(6) The output has been turned off 800μs later.

■Operation

The following remote registers (RWw) are used for the synchronization output timing setting control.
- Synchronization output timing setting Y□ OFF to ON/ON to OFF (RWw10 to RWw8F) (☞ Page 272 Synchronization output timing setting)

Ex.

The following figure shows the operation of synchronization output timing setting control using the external output Y0, with the synchronization cycle of the master station set to 3ms.

——————➤ Performed by the I/O module

(1) The output has been turned on 500μs later.
(2) The output has been turned off 1000μs later.
(3) The output has been turned on 1500μs later.
(4) The output has been turned off 2000μs later.
(5) The output has been turned off 500μs later.
(6) The output has been turned on 2000μs later.

Point

- When the I/O module operates with the synchronization output timing setting control, External output signal Y□ (RY0 to RYF, RY10 to RY1F) becomes invalid.
- A change of the external output Y□ (status of the Y terminal) is sent to the connected device with delay of the maximum output response time. Therefore, if the output is set to turn on or off at an interval shorter than the maximum output response time, the actual output may not turn on or off.
- The resolution of output timing setting control is 8ns.
- The I/O module adjusts the synchronization cycle periodically to match the start timing of the cycle with those of other stations. Because the cycle length becomes 4μs longer or 4μs shorter at maximum when it is adjusted, set a value between 0 and "Synchronization cycle - 4μs" for Synchronization output timing setting Y□ OFF to ON/ON to OFF (RWw10 to RWw8F).
- If the I/O module is disconnected from data link, the CPU module operating status is STOP, or the CPU module operation is suspended by an error, the output HOLD/CLEAR setting function is prioritized. Therefore, the actual external output may turn on or off differently from the way that is set in Synchronization output timing setting Y□ OFF to ON/ON to OFF (RWw10 to RWw8F). (☞ Page 168 Output HOLD/CLEAR Setting Function)

Set time synchronization control mode

Controls I/O by combining the acquisition of an input change time with the setting of a time to change an output.

This makes it easier to perform such operation as outputting a signal from the output module when a certain time has elapsed after a signal input into the input module.

The set time synchronization control mode has the following two types.

- Input time acquisition control (☞ Page 178 Input time acquisition control)
- Output time setting control (☞ Page 180 Output time setting control)
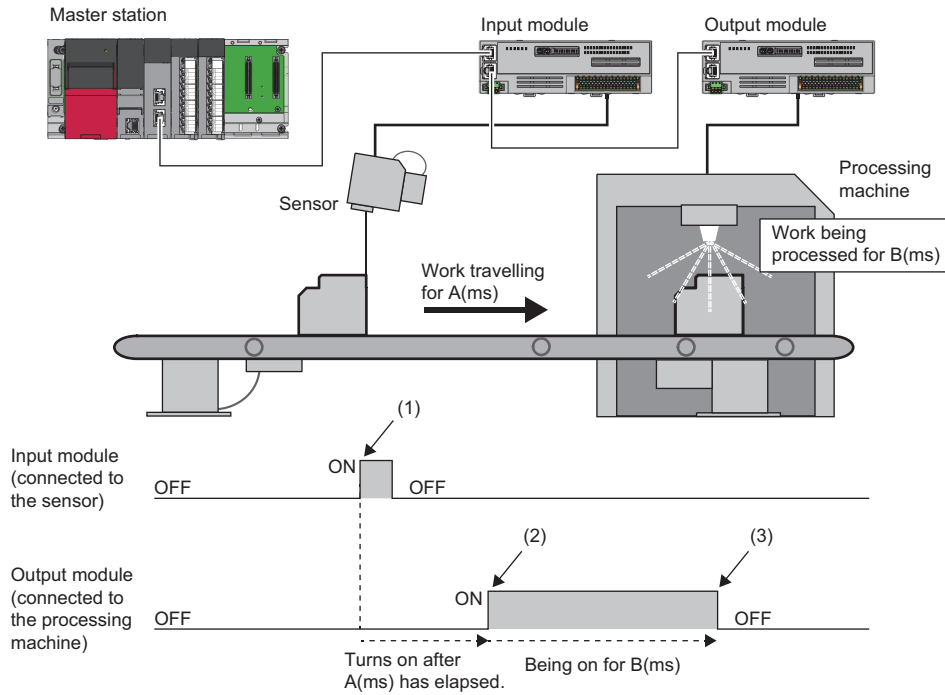
(1) The time when a rising edge of the input signal has occurred is acquired.
(2) The output turns on when A (ms) has elapsed after the rising edge occurrence.
(3) The output turns off when a time of "A + B (ms)" has elapsed after the rising edge occurrence.

Input time acquisition control

The time when an input has changed can be acquired by using the input time acquisition control. Select a type of input change (rising edge or falling edge) to be acquired by setting ON/OFF selection flag (RWw4, RWw5).

❶ Set a type of input change (rising edge or falling edge) for ON/OFF selection flag (RWw4, RWw5).

❷ The I/O module sends the following information to the master station, at the third synchronization cycle from the detection of input change set in ON/OFF selection flag (RWw4, RWw5).
  • Input time information X□ (RWr10 to RWr8F): Time when the input change has been detected
  • Input ON/OFF information (RWr4, RWr5): The type of input change (rising edge or falling edge) that has been detected at the synchronization cycle same as the time stored in Input time information X□ (RWr10 to RWr8F)

❸ ON/OFF selection flag X0: The falling edge is set.

❹ The falling edge has been detected at 20:00, July 24th, 2020.

❺ Input time information X0: 20:00, 7/24/2020, Input ON/OFF information X0: Falling edge
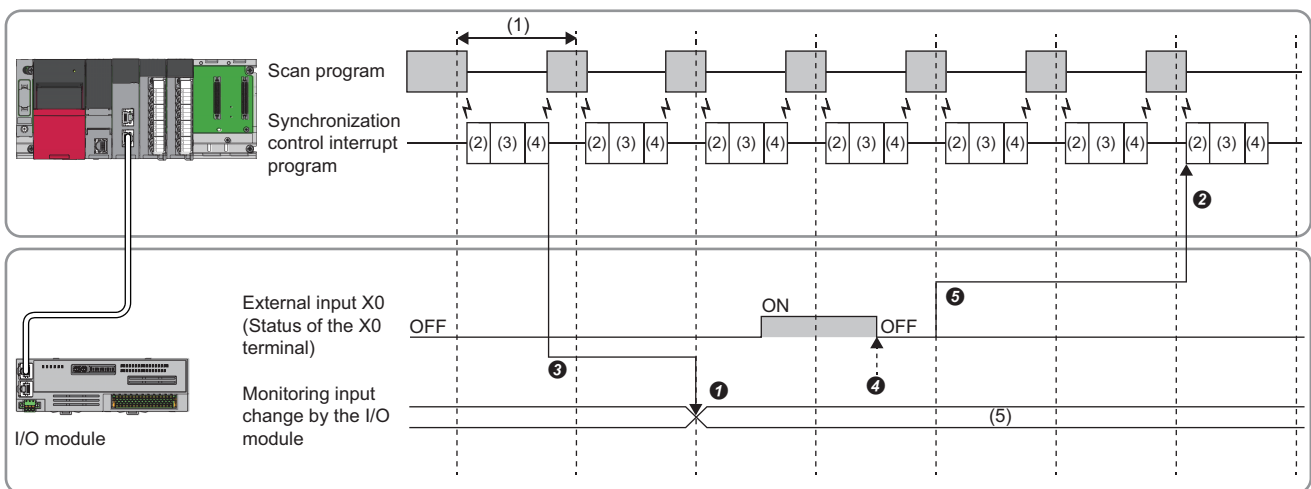
(1) Synchronization cycle
(2) Input
(3) Operation
(4) Output
(5) Falling edge is monitored.

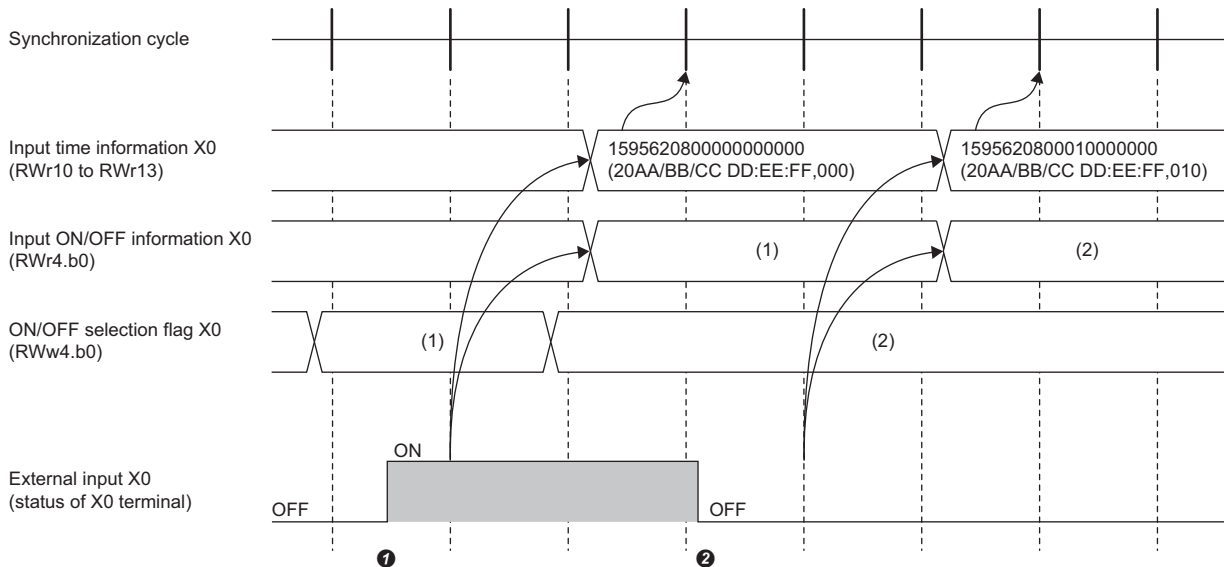### ■Operation

The following remote registers (RWr/RWw) are used for the input time acquisition control.

• Input time information X□ (RWr10 to RWr8F) (☞ Page 266 Input time information)
• Input ON/OFF information (RWr4, RWr5) (☞ Page 262 Input ON/OFF information)
• ON/OFF selection flag (RWw4, RWw5) (☞ Page 270 ON/OFF selection flag)

Ex.

The following figure shows the operation of input time acquisition control using the external input X0.

────────▶ Performed by the I/O module
❶ The rising edge has occurred at DD:EE:FF.000, BB/CC/20AA.
❷ The falling edge has occurred at DD:EE:FF.010, BB/CC/20AA.
(1) 1 (rising edge)
(2) 0 (falling edge)

Point

• The operation of external input signal X□ is the same both for the input time acquisition control and for the synchronous X input control. Therefore, even when the I/O module is operating with the input time acquisition control, a user can get the input status information of each synchronization cycle start timing by referring to External input signal X□ (RX0 to RXF, RX10 to RX1F).
• The input change time is stored in Input time information X□ (RWr10 to RWr8F) at the second synchronization cycle after the input has changed.
• The resolution of input time acquisition control is 8ns.
• If a major or moderate error occurs in the I/O module, 0 is stored in Input time information X□ (RWr10 to RWr8F).
• The input change time to be stored in the buffer memory area is based on the clock of the network where the I/O module performs data link. Note that the clock of the network differs from the clock of the CPU module.

Output time setting control

With this function, the output is controlled to turn on or off according to a preset time. The output turns on or off according to a value set in ON/OFF selection flag (RWw4, RWw5).

❶ Set the following for the I/O module.

- Output time setting Y□ (RWw10 to RWw8F): Set a time to turn on or off the output here.
- ON/OFF selection flag (RWw4, RWw5): Set a type of output to be performed (turning on the output or turning off the output) here.

❷ Output time setting Y0: 20:00, 7/24/2020, ON/OFF selection flag Y0: Turn on the output.

❸ The output turns on at 20:00, July 24th, 2020.
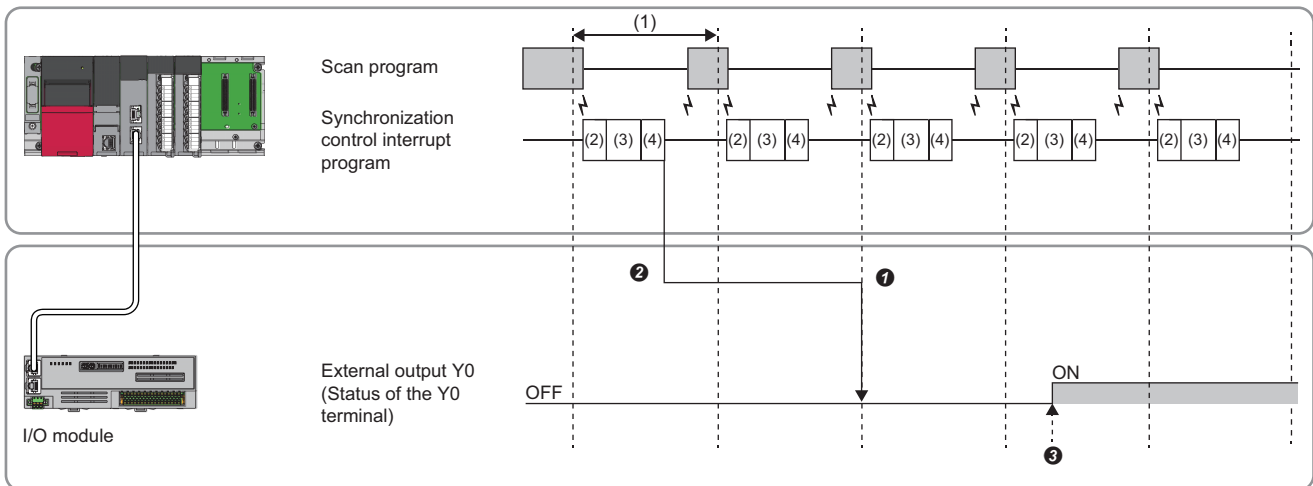
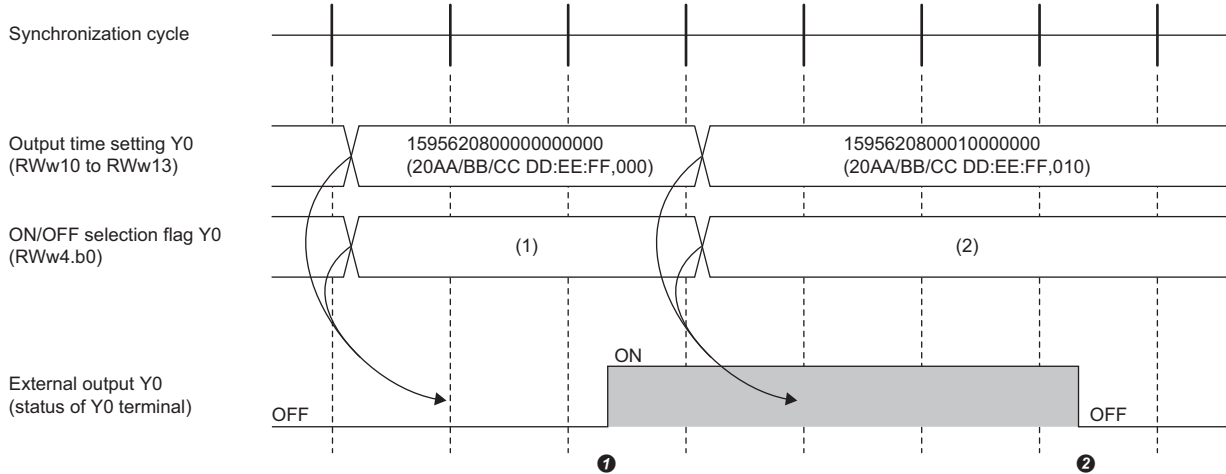(1) Synchronization cycle
(2) Input
(3) Operation
(4) Output

■Operation

The following remote registers (RWr/RWw) are used for the output time setting control.

- ON/OFF selection flag (RWw4, RWw5) (☞ Page 270 ON/OFF selection flag)
- Output time setting Y□ (RWw10 to RWw8F) (☞ Page 273 Output time setting)

Ex.

The following figure shows the operation of output time setting control using the external output Y0.

Synchronization cycle	
Output time setting Y0 (RWw10 to RWw13)	1595620800000000000 (20AA/BB/CC DD:EE:FF,000) 1595620800010000000 (20AA/BB/CC DD:EE:FF,010)
ON/OFF selection flag Y0 (RWw4.b0)	(1) (2)
External output Y0 (status of Y0 terminal)	ON OFF OFF

→ Performed by the I/O module
❶ The output turns on at DD:EE:FF.000, BB/CC/20AA.
❷ The output turns off at DD:EE:FF.010, BB/CC/20AA.
(1) 1 (Turn on the output.)
(2) 0 (Turn off the output.)

Point

- For the I/O module operating with the output time setting control, External output signal Y□ (RY0 to RYF, RY10 to RY1F) becomes invalid.
- A change of the external output Y□ (status of the Y terminal) is sent to the connected device with delay of the maximum output response time.
- Therefore, if the output is set to turn on or off at an interval shorter than the maximum output response time, the actual output may not turn on or off.
- The resolution of output time setting control is 8ns.
- The input change time to be stored in the buffer memory area is based on the clock of the network where the I/O module performs data link. The clock of the network differs from the clock of the CPU module. Therefore, set a time to turn on or off the output based on the input change time.

■Precautions

- If a value set in ON/OFF selection flag (RWw4, RWw5) has been changed while a time earlier than the start timing of the second synchronization cycle from the setting is set for Output time setting Y□ (RWw10 to RWw8F), an output change disabled time setting error (error code: 0210H) occurs.
- The external output YΠ does not change while the I/O module is in the HOLD/CLEAR state, even if it is the time set in Output time setting YΠ (RWw10 to RWw8F).
- When changing a value in Output time setting YΠ (RWw10 to RWw8F), set a time same as or later than the start timing of the second synchronization cycle from the change. If an earlier time is set, the output does not change and an output change disabled time setting error (error code: 0210H) occurs.
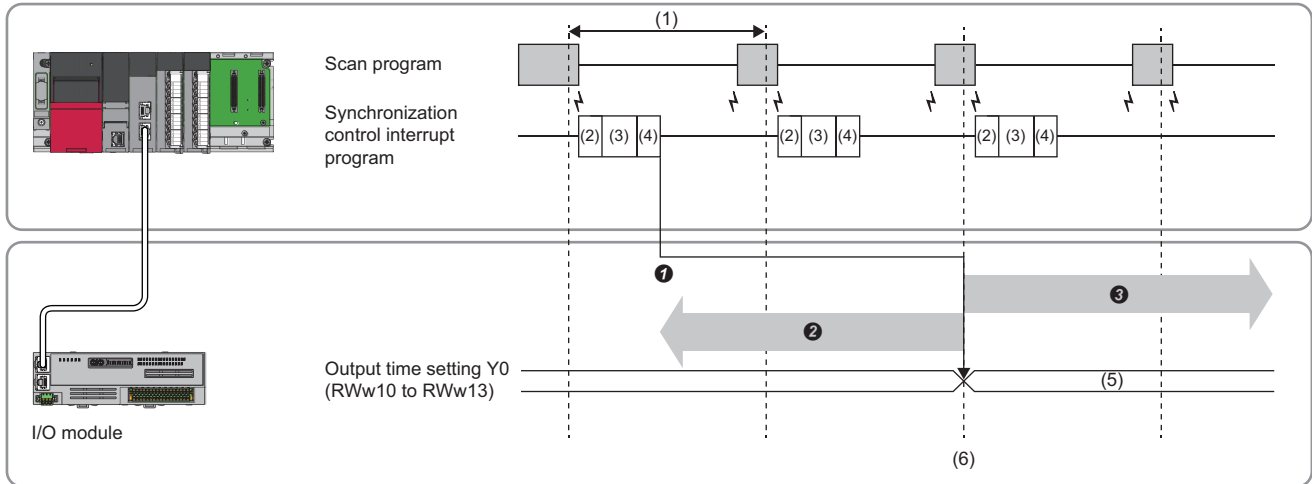

❶ Assume that Time A is to be set for Output time setting Y0 (RWw10 to RWw13).

❷ The range of time that cannot be set as Time A

❸ The range of time that can be set as Time A

(1) Synchronization cycle

(2) Input

(3) Operation

(4) Output

(5) Time A

(6) Start timing of the second synchronization cycle from the setting

Program example

The following shows the program example of the set time synchronization control mode.

■System configuration

When 300ms has elapsed after the rising edge detection of the input signal X0 (input module), the output signal Y0 (output module) turns on. The output signal Y0 remains on for 500ms and turns off.
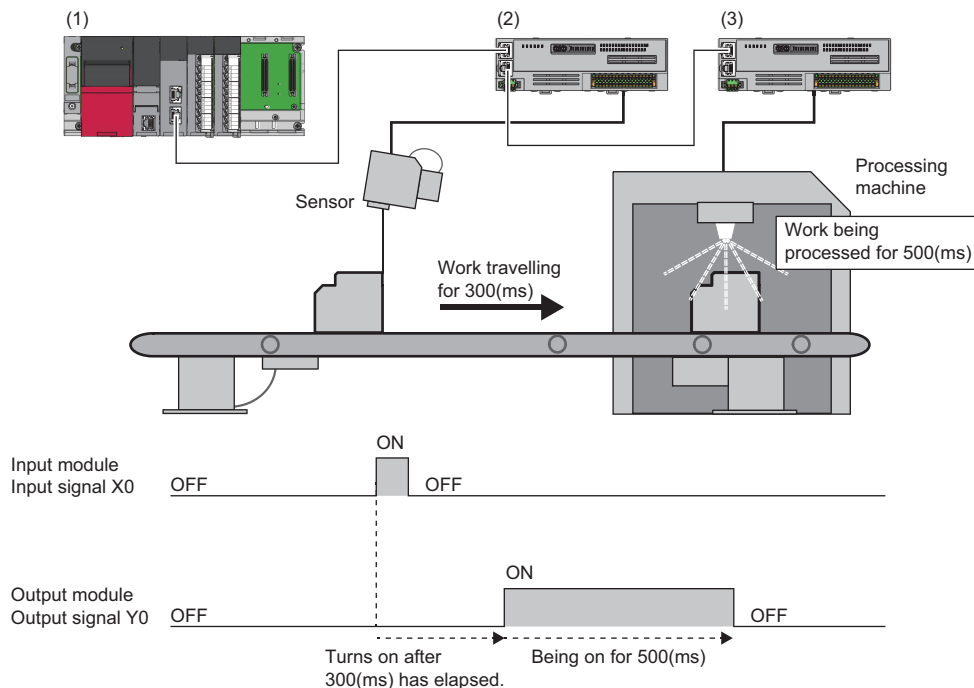
(1) Master station
 • Power supply module: R62P
 • CPU module: R120CPU
 • Master/local module: RJ71GN11-T2
(2) Remote station (IP address/station number setting switch: 1)
 • Input module: NZ2GN2S1-32D
(3) Remote station (IP address/station number setting switch: 2)
 • Output module: NZ2GN2S1-32T

■Refresh parameter setting

Display the refresh parameter setting window and configure the setting as follows.

🖱️ [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Model ⇨ [Basic Settings] ⇨ [Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
–	SB	2048	00000	007FF	↔	Specify Device	SB	2048	00000	007FF
–	SW	2048	00000	007FF	↔	Specify Device	SW	2048	00000	007FF
1	RX	256	00000	000FF	↔	Specify Device	X	256	01000	010FF
2	RY	256	00000	000FF	↔	Specify Device	Y	256	01000	010FF
3	RWr	512	00000	001FF	↔	Specify Device	W	512	00100	002FF
4	RWw	512	00000	001FF	↔	Specify Device	W	512	00300	004FF

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■**Network parameter setting**

Display the "CC-Link IE TSN Configuration" window and set parameters as follows.

✎ [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Model ⇨ [Basic Settings] ⇨ [Network Configuration Settings]
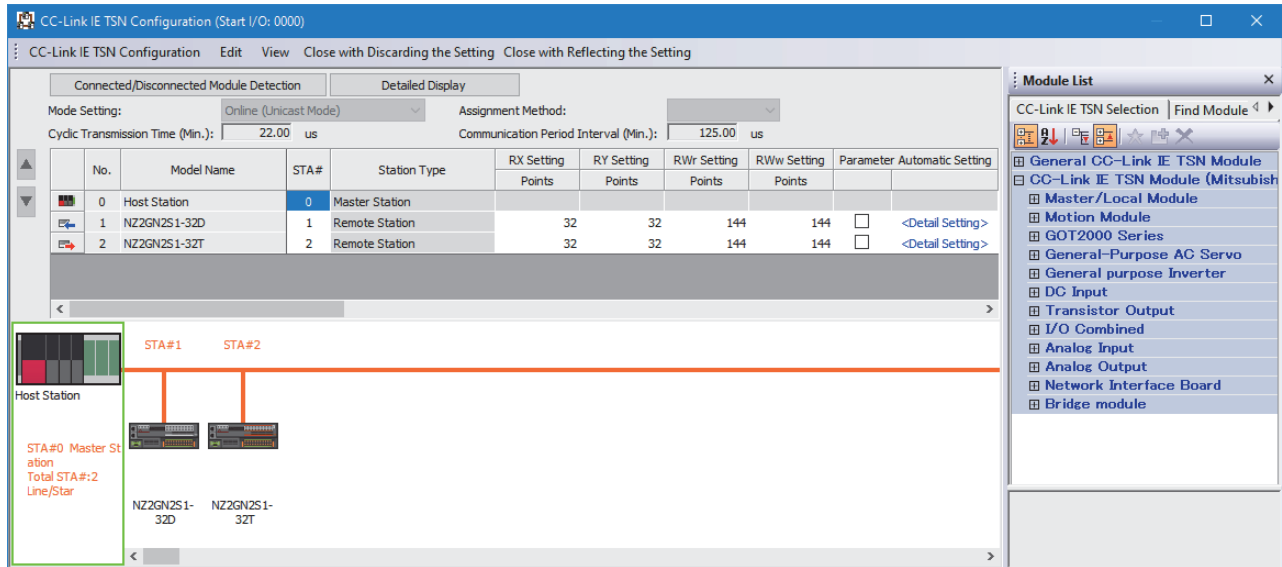
Target station	Setting item		Setting details
Input module (station No.1)	IP address (fourth octet)		1
	RX/RY setting	Points	32
		Start	0000
		End	001F
	RWr/RWw setting	Points	144
		Start	0000
		End	008F
	Network Synchronous Communication		Synchronous
	CC-Link IE TSN Class		CC-Link IE TSN Class B
Output module (station No.2)	IP address (fourth octet)		2
	RX/RY setting	Points	32
		Start	0020
		End	003F
	RWr/RWw setting	Points	144
		Start	0090
		End	011F
	Network Synchronous Communication		Synchronous
	CC-Link IE TSN Class		CC-Link IE TSN Class B

■**Operation mode setting of CC-Link IE TSN Network synchronous communication function**

For the input module and the output module, set the set time synchronization control mode as the operation mode.

For details, refer to the following.

☞ Page 193 Operation mode setting of CC-Link IE TSN Network synchronous communication

■Devices to be used

The following table lists the devices to be used in the program.

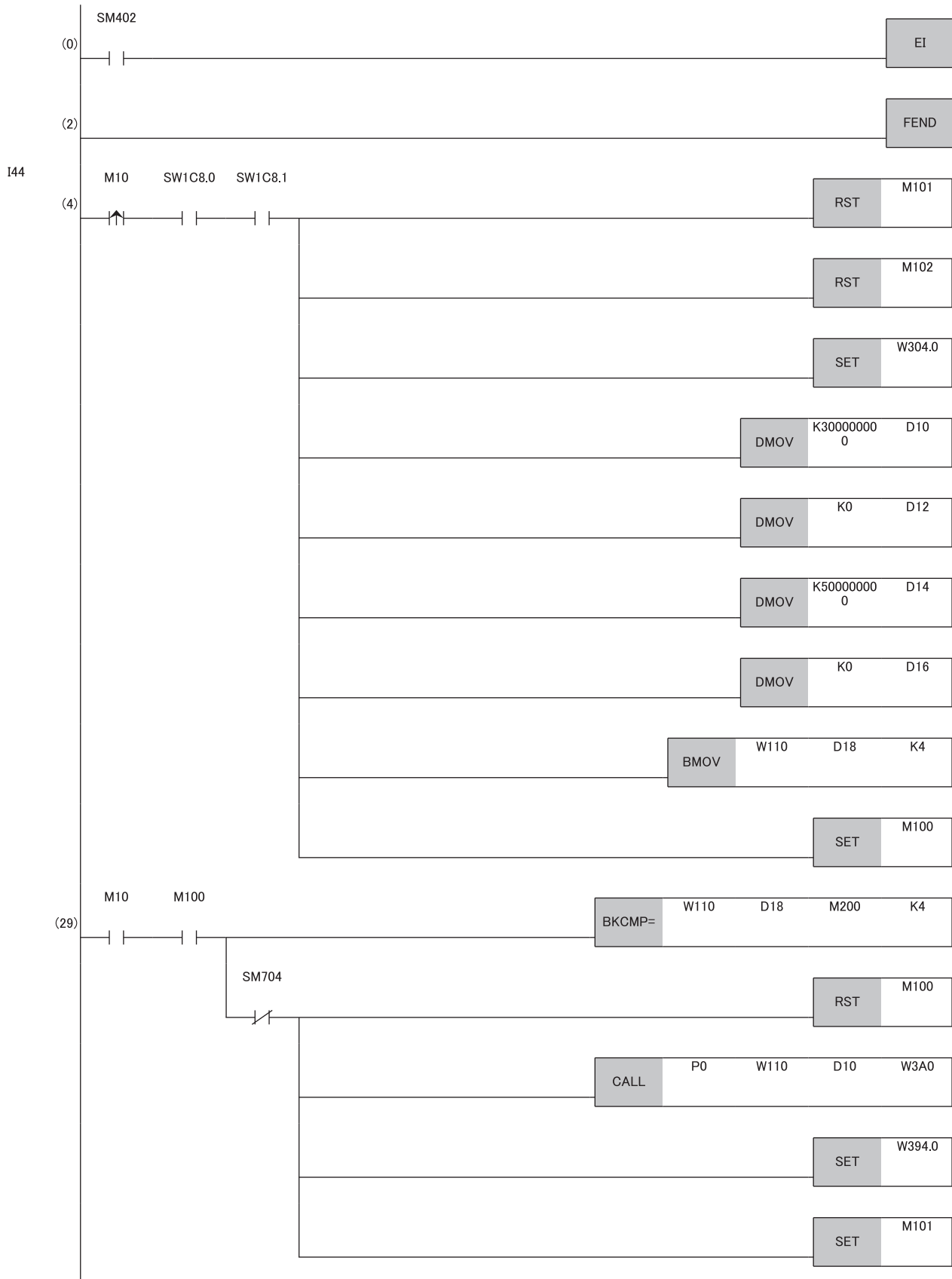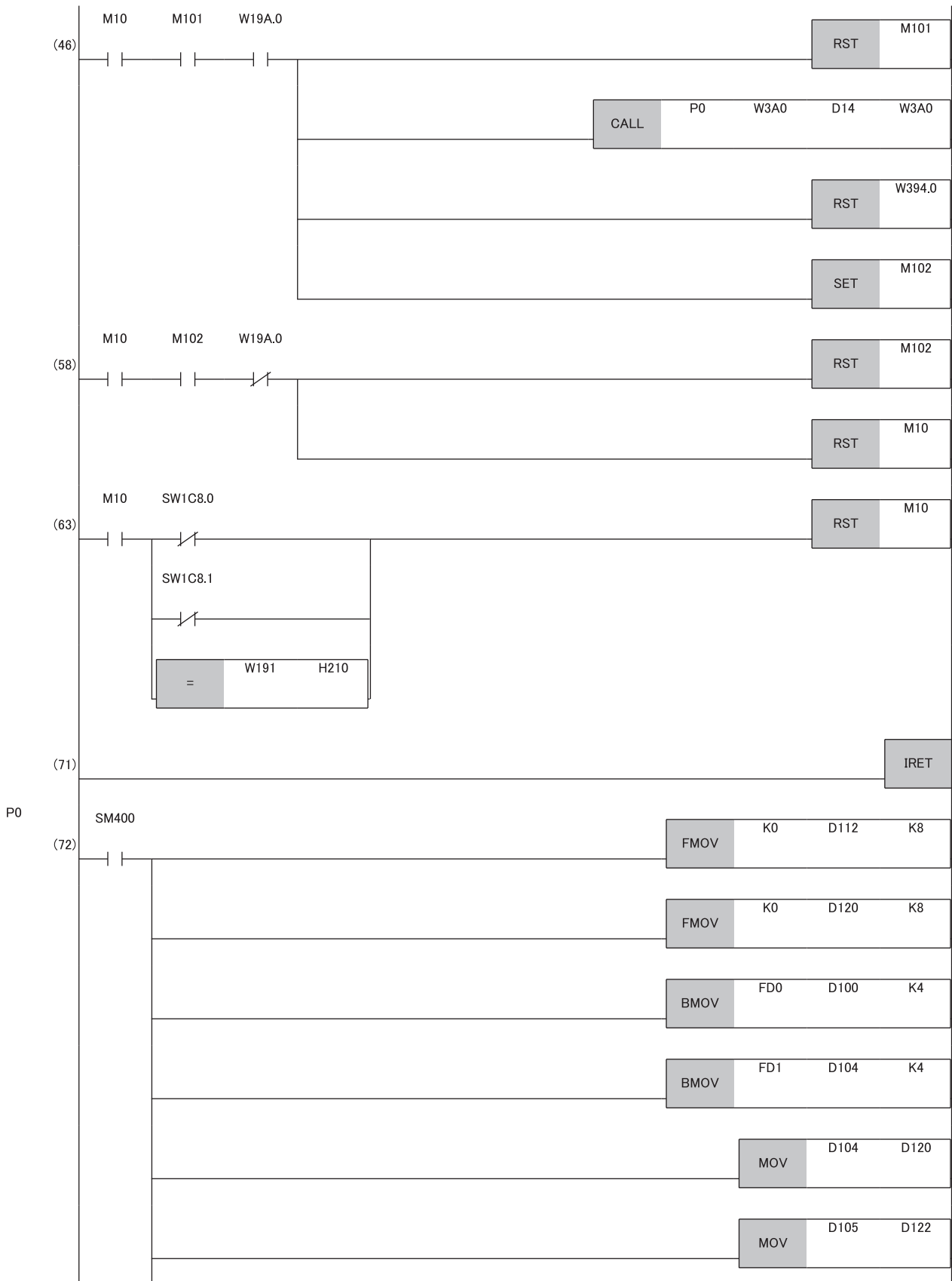| Device	Description	
SW1C8.0	Input module synchronous/asynchronous operation status	A device to be used for the input module
W110 to W113	Input time information X0	
W304.0	ON/OFF selection flag for input X0	
SW1C8.1	Output module synchronous/asynchronous operation status	A device to be used for the output module
W191	Output module error code	
W19A.0	Output Y current value Y0	
W394.0	ON/OFF selection flag for output Y0	
W3A0 to W3A3	Output time setting Y0	
SM704	Block comparison	A device used to check the block comparison result
M10	Set time synchronization control command	It turns on at the start of set time synchronization control. It turns off at the completion of set time synchronization control.
M100	Input signal (X) ON waiting	It turns on when the input signal ON detection has been set, and remains on until the input signal turns on.
M101	Output signal (Y) ON waiting	It turns on when the input signal has turned on, and remains on until the output signal turns on.
M102	Output signal (Y) OFF waiting	It turns on when the output signal has turned on, and remains on until the output signal turns off.
M200 to M203	Comparison result	It stores the comparison result between the input time information and the start time of set time synchronization control.
D10 to D13	Output signal (Y) ON timing	It stores the time taken from input signal rising edge to turning on of output signal.
D14 to D17	Output signal (Y) ON period	It stores the duration of output signal ON.
D18 to D21	Set time synchronization control start time	It stores the start time of set time synchronization control.
P0	64 bit addition	A device to be used for subroutine for 64 bit addition
D100 to D103	Additional value A	
D104 to D107	Additional value B	
D108 to D111	Result of addition	
D112 to D119	Temporary A for operation	
D120 to D127	Temporary B for operation	
FD0	Function register 0	It is equivalent to Additional value A of subroutine for 64 bit addition.
FD1	Function register 1	It is equivalent to Additional value B of subroutine for 64 bit addition.
FD2	Function register 2	It is equivalent to Result of addition of subroutine for 64 bit addition.

8

Precautions

For Output signal (Y) ON timing and Output signal (Y) ON period, set a time equal to or longer than "Synchronization cycle × 5". If a time shorter than "Synchronization cycle × 5" is set, an output change disabled time setting error (error code: 0210H) may occur.

Output time setting Y0 stores the operation results of the following formulas. Set Output signal (Y) ON timing and Output signal (Y) ON period so that the operation results do not exceed 4294967295999999992(3B9AC9FFFFFFFFF8H).
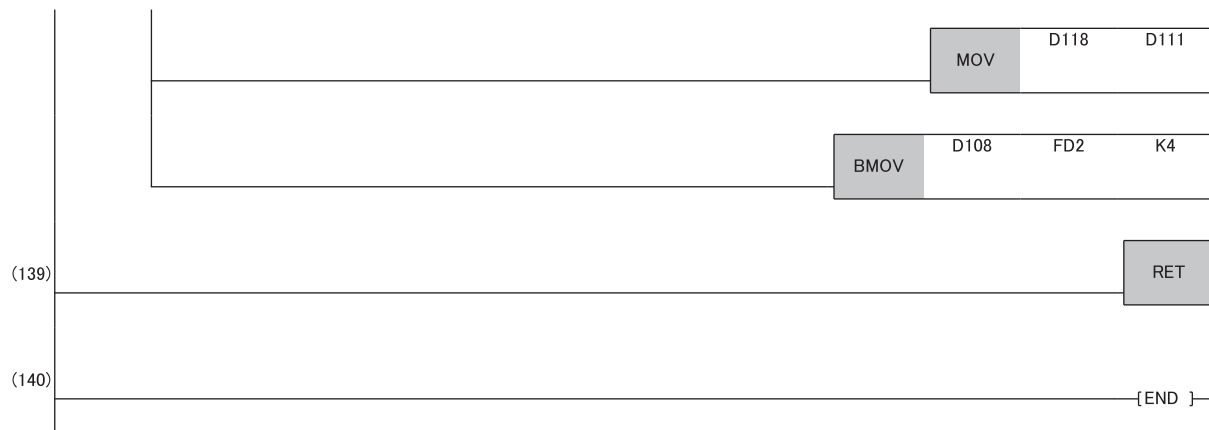
- Time read out from Input time information X0 + Output signal (Y) ON timing
- Time read out from Input time information X0 + Output signal (Y) ON timing + Output signal (Y) ON period

■Program example

```
        M10    M101   W19A.0                                              RST  M101
(46)    ┤├─────┤├──────┤├──┬──────────────────────────────────────────────

                             ├──────────────────────────CALL  P0   W3A0  D14   W3A0

                             ├──────────────────────────────────────────RST  W394.0

                             └──────────────────────────────────────────SET  M102

        M10    M102   W19A.0                                              RST  M102
(58)    ┤├─────┤├──────┤/├──┬──────────────────────────────────────────────

                             └──────────────────────────────────────────RST  M10

        M10    SW1C8.0                                                    RST  M10
(63)    ┤├──┬──┤/├────────┬──────────────────────────────────────────────

              │  SW1C8.1   │
              ├──┤/├───────┤

              │            │
              └──=  W191  H210

(71)    ─────────────────────────────────────────────────────────────────IRET

P0      SM400                                              FMOV  K0   D112  K8
(72)    ┤├──┬──────────────────────────────────────────────

              ├──────────────────────────────────FMOV  K0   D120  K8

              ├──────────────────────────────────BMOV  FD0  D100  K4

              ├──────────────────────────────────BMOV  FD1  D104  K4

              ├──────────────────────────────────MOV   D104 D120

              └──────────────────────────────────MOV   D105 D122
```

MOV	D106	D124
MOV	D107	D126
MOV	D100	D112
D+	D120	D112
D+	D113	D122
MOV	D101	D114
D+	D122	D114
D+	D115	D124
MOV	D102	D116
D+	D124	D116
D+	D117	D126
MOV	D103	D118
D+	D126	D118
MOV	D112	D108
MOV	D114	D109
MOV	D116	D110

```
                                                         ┌──────┬─────────┐
                                                         │ D118 │  D111   │
                                                  ┤ MOV  │      │         ├
                                                         └──────┴─────────┘

                                                  ┌──────┬──────┬─────┬─────┐
                                                  │      │ D108 │ FD2 │ K4  │
                                          ┤ BMOV  │      │      │     │     ├
                                                  └──────┴──────┴─────┴─────┘

                                                                    ┌──────┐
(139)                                                               │ RET  │
─────────────────────────────────────────────────────────────────┤      ├
                                                                    └──────┘

(140)
─────────────────────────────────────────────────────────────────[END]
```

(0) Immediately after RUN, the interrupt is set to be allowed.

(4) On (rising edge) is set for ON/OFF selection flag (X0) of the input module.

(29)With the detection of On (rising edge) of input signal X0 (input module), the following are set for the output module.

• ON/OFF selection flag Y0: On (The output turns on at a set time.)

• Output time setting Y0: Input time information X0 + 300ms

(46)With the detection of On of Output Y current value Y0 (output module), the following are set for the output module.

• ON/OFF selection flag Y0: Off (The output turns off at a set time.)

• Output time setting Y0: Input time information X0 + 300ms + 500ms

(58)The set time synchronization control ends with the detection of Off of Output Y current value Y0 (output module).

(63)If any of the following error states is detected during set time synchronization control, the control ends.

• The synchronous/asynchronous operation status becomes asynchronous for the input module and the output module.

• An output change disabled time setting error (error code: 0210H) occurs in the output module.

(72)Subroutine for 64 bit addition

8

Setting procedure

Setting synchronization cycles

■Calculating synchronization cycles

Calculate synchronization cycles from the formula below.

Synchronization cycle = Basic cycle × Magnification

- Basic cycle is determined by a value in "Communication Period Interval Setting", which is set in the parameter of the master station.
- Magnification is determined by a value in "Multiple Period Setting" and a value in "Communication Period Setting" of each remote station, all of which are set in the parameter of the master station.

Ex.

The following figure shows the synchronization cycle of each I/O module calculated based on the parameter of the master station set as shown in the table below.

Item		Description
Communication Period Interval Setting		250µs
Multiple Period Setting		• Normal-Speed: ×4 • Low-Speed: ×16
Communication Period Setting	I/O module A	Basic Period
	I/O module B	Normal-Speed
	I/O module C	Low-Speed
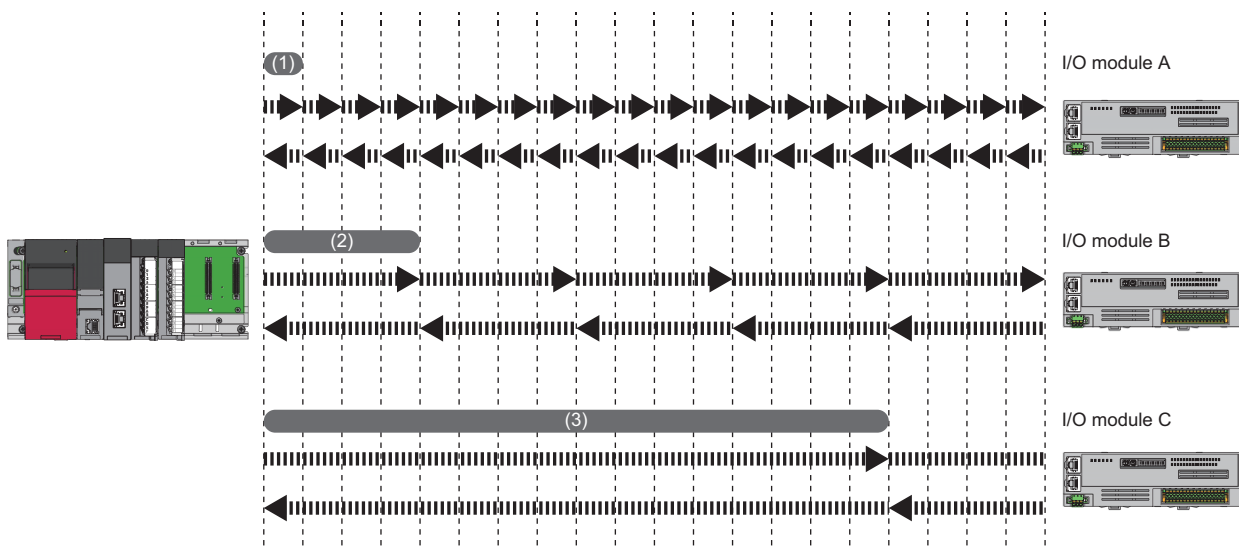
(1) Synchronization cycle of I/O module A = Basic cycle (250µs) × Magnification (Basic Period: ×1) = 250µs
(2) Synchronization cycle of I/O module B = Basic cycle (250µs) × Magnification (Normal-Speed: ×4) = 1ms
(3) Synchronization cycle of I/O module C = Basic cycle (250µs) × Magnification (Low-Speed: ×16) = 4ms

■How to set synchronization cycles

Set the synchronization cycles of the CC-Link IE TSN Network synchronous communication function at the master station.

For details, refer to the following.

📖 MELSEC iQ-R Inter-Module Synchronization Function Reference Manual

Setting conditions

Set the synchronization cycle and the transient transmission time according to the operation mode of CC-Link IE TSN Network synchronous communication, to satisfy the following conditions.

■Synchronous X/Y control mode

There is no restrictions. When using an I/O combined module (16-point module), however, set the same conditions as those of the synchronization cycle timing control mode and the set time synchronization control mode.

■Synchronization cycle timing control mode, set time synchronization control mode

Set the conditions that satisfy the following.
 • The synchronization cycle (basic cycle × magnification) must be 400 to 1000000μs.
 • Note that values that can be set as the transient transmission time vary depending on the communication speed.

No.	Communication speed		Values that can be set as the transient transmission time
	Master station	**I/O module**	
1	1Gbps	1Gbps	250μs or more
2		100Mbps	16μs or more
3	100Mbps	1Gbps	250μs or more
4		100Mbps	

Setting of the CC-Link IE TSN Network synchronous communication function

The CC-Link IE TSN Network synchronous communication function of the I/O module is set with the network configuration setting.

Operating procedure

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

    🖑 [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Model ⇨ [Basic Settings] ⇨ [Network Configuration Settings]

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

3. Set "Network Synchronous Communication" to "Synchronous".
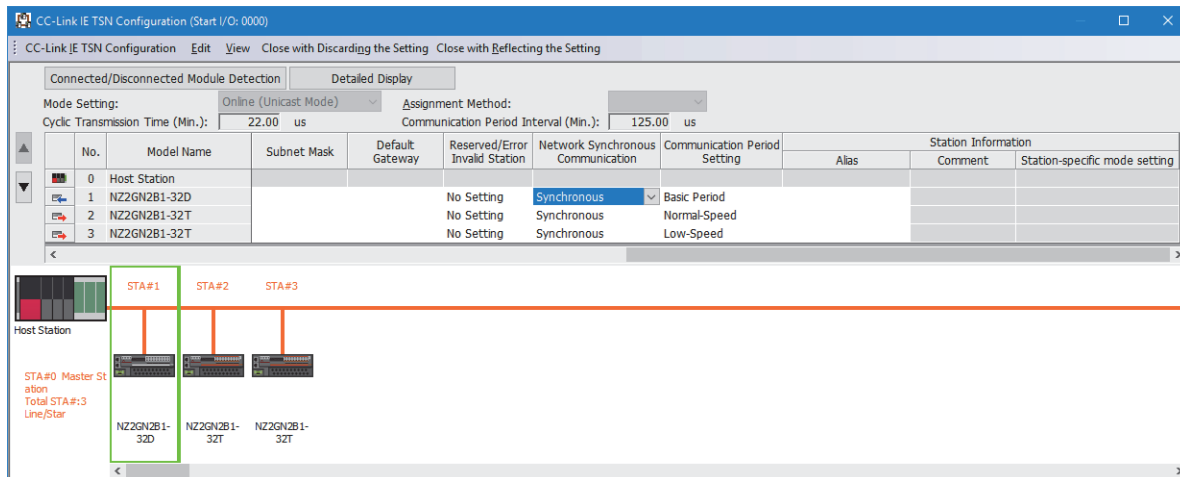
4. Click the [Close with Reflecting the Setting] button to complete the setting process and close the window.

> **Point** 🖉
>
> To use the CC-Link IE TSN Network synchronous communication function for the I/O module, enable the CC-Link IE TSN Network synchronous communication function of the master station.
> For details, refer to the following.
> 📖 User's manual for the master station used

Precautions

- If "Network Synchronous Communication" is set to "Synchronous" for an I/O module not supporting the CC-Link IE TSN Network synchronous communication function, a network synchronous communication setting error (error code: D020H) occurs in the I/O module or the event code of 00C71 is registered with event history of the master station.
- When setting "Network Synchronous Communication" to "Asynchronous", set the synchronous X/Y control mode (factory default) as the operation mode of CC-Link IE TSN Network synchronous communication. If "Network Synchronous Communication" is set to "Asynchronous" for the I/O module whose operation mode is the synchronization cycle timing control mode or the set time synchronization control mode, a synchronous communication settings inconsistent (error code: 010BH) occurs.

Operation mode setting of CC-Link IE TSN Network synchronous communication

Set the operation mode of CC-Link IE TSN Network synchronous communication using the function setting switch 6 and the function setting switch 7 of the I/O module, or using the engineering tool.

> **Point**
> - If the status of function setting switch 6 or 7 has been changed while the I/O module is on, the operation mode setting remains the same. When changing the operation mode, power off and on the module power supply or perform remote reset.
> - When the parameter is set with the engineering tool, the operation mode setting of function setting switch 6 and function setting switch 7 is ignored.

■Setting with the function setting switches

Set the operation mode of CC-Link IE TSN Network synchronous communication using the function setting switch 6 and the function setting switch 7 of the I/O module.

The mode is determined by the combined status of function setting switches 6 and 7 when the I/O module is powered on.

Function setting switch 6	Function setting switch 7	Operation mode	CC-Link IE TSN Class setting[3]
Off	Off	Synchronous X/Y control mode (factory default)	CC-Link IE TSN Class B (factory default)
Off	On	Synchronization cycle timing control mode[1]	CC-Link IE TSN Class B
On	Off	Set time synchronization control mode[1]	CC-Link IE TSN Class B
On	On	—[2]	CC-Link IE TSN Class A

*1   This mode cannot be used for the I/O module with the firmware version of "04" or earlier.
*2   Do not set this combination for the I/O modules with the firmware version of "07" or earlier. If it is set, a MODE switch incorrect (error code: 0107H) occurs.
*3   The function setting switches 6 and 7 are also used to set the CC-Link IE TSN Class. For details, refer to the following.
    ☞ Page 194 Setting procedure

■Setting with the engineering tool

Set the operation mode of CC-Link IE TSN Network synchronous communication using the engineering tool. For details, refer to the following.
☞ Page 157 Module Parameter Setting

Checking setting status

The setting status of the CC-Link IE TSN Network synchronous communication function can be checked with Function selection status area (RWr2).
☞ Page 261 CC-Link IE TSN Network synchronous communication setting status (RWr2.b4, RWr2.b5)

8

8.4 CC-Link IE TSN Class Setting Function

Sets the I/O module to CC-Link IE TSN Class B or CC-Link IE TSN Class A.

For differences between system configurations where the I/O module with CC-Link IE TSN Class B or CC-Link IE TSN Class A can be incorporated, refer to the following.

📖 User's manual for the master station used

Applicable version

- When using the CC-Link IE TSN Class setting function, check the firmware version and the profile version of the I/O module. An I/O module with the versions that do not support this function operates with CC-Link IE TSN Class B.

☞ Page 295 Added and Changed Functions

- When operating the I/O module with CC-Link IE TSN Class A, use the master station that can operate with the CC-Link IE TSN protocol version 2.0. For the applicable master station, refer to the user's manual for the master station used.

📖 User's manual for the master station used

Setting procedure

Set the CC-Link IE TSN Class using function setting switches 6 and 7 of I/O module, and using the engineering tool.

> **Point** 🔎
>
> If the CC-Link IE TSN Class set with the function setting switches 6 and 7 of I/O module is different from the CC-Link IE TSN Class set with the engineering tool, the event code of 00C81 is registered with event history of the master station, and the I/O module does not perform data link.

■Setting with the function setting switches

The CC-Link IE TSN Class setting is determined by the status of the function setting switches 6 and 7 when the I/O module is powered on.

When the status of one of function setting switches 6 and 7 is changed while the I/O module is on, a minor error (error code: 0206H or 0207H) corresponding to the relevant function setting switch occurs, but the CC-Link IE TSN Class setting does not change.

Function setting switch 6	Function setting switch 7	CC-Link IE TSN Class setting	CC-Link IE TSN Network synchronous communication operation mode[1]
Off	Off	CC-Link IE TSN Class B (factory default)	Synchronous X/Y control mode (factory default)
Off	On	CC-Link IE TSN Class B	Synchronization cycle timing control mode
On	Off	CC-Link IE TSN Class B	Set time synchronization control mode
On	On	CC-Link IE TSN Class A	—

[1] The function setting switches 6 and 7 are also used for the CC-Link IE TSN Network synchronous communication operation mode setting. For details, refer to the following.
☞ Page 193 Operation mode setting of CC-Link IE TSN Network synchronous communication

■Setting with the engineering tool

Set the CC-Link IE TSN Class using the engineering tool. For details, refer to the following.

☞ Page 153 Network Configuration Setting

Checking setting status

The setting status of the CC-Link IE TSN Class can be checked with the remote register or the engineering tool.

■Check with the remote register

Which class is set as the CC-Link IE TSN Class can be checked by using CC-Link IE TSN Class setting status (RWr2.b11). For details, refer to the following.

☞ Page 262 CC-Link IE TSN Class setting status (RWr2.b11)

■Check with the engineering tool

Which class is set as the CC-Link IE TSN Class can be checked with the "Selected Station Communication Status Monitor" window of "CC-Link IE TSN/CC-Link IE Field Diagnostics". For details, refer to the user's manual for the master station used.

Precautions

- The range of values that can be set for the communication cycle interval setting of the master station parameter varies depending on CC-Link IE TSN Class. For details, refer to the following.

☞ Page 153 Communication cycle interval setting

- The CC-Link IE TSN Network synchronous communication function cannot be used when CC-Link IE TSN Class A is set for the CC-Link IE TSN Class. To use this function, set CC-Link IE TSN Class B.

- Ring topology cannot be used when CC-Link IE TSN Class A is set for the CC-Link IE TSN Class. To use ring topology, set CC-Link IE TSN Class B.

8

8.5 Communication Speed Setting Function

Sets the communication speed.

Setting procedure

Set the communication speed using function setting switch 10 of I/O module.

This setting is common to P1 and P2.

| Function setting switch 10	Setting value
Off	1Gbps (Factory default)
On	100Mbps

> **Point**
> - The communication speed setting is determined by the status of function setting switch 10 when the I/O module is powered on.
> - When the status of function setting switch 10 is changed while the I/O module is on, a function setting switch 10 changed error (error code: 020AH) occurs, but the communication speed setting does not change.

Setting status

The communication speed setting status can be checked by Communication speed setting status (RWr2.b8). For details, refer to the following.

☞ Page 261 Communication speed setting status (RWr2.b8)

Applicable version

When setting the communication speed, check the firmware version of the I/O module. (☞ Page 295 Added and Changed Functions)

An I/O module with a firmware version that does not support the communication speed setting operates at a fixed communication speed of 1Gbps.

Precautions

- Depending on the communication speed, the communication cycle range that can be set varies. For details, refer to the following.

☞ Page 153 Communication cycle interval setting

- For details on the system configuration when using a remote station that operates at a communication speed of 100Mbps, refer to the following.

📖 User's manual for the master station used

8.6 Output ON/OFF Information Hold Function

Checks whether the output has been turned on or off.

Output ON information

Output ON information is stored in Output Y ON information Y□ (RWrC, RWrD).

Whether the output has been turned on or not can be checked with Output Y ON information Y□ (RWrC, RWrD).

Output Y ON information Y□ (RWrC, RWrD) can be cleared using Output Y ON information clear request Y□ (RWwC, RWwD).

The amount of time delay from when Output Y ON information Y□ (RWrC, RWrD) changes until the external output accordingly changes is no more than the maximum output response time.

For the on and off timing, refer to the following.

☞ Page 264 Output Y ON information

Output OFF information

Output OFF information is stored in Output Y OFF information Y□ (RWrE, RWrF).

Whether the output has been turned off or not can be checked with Output Y OFF information Y□ (RWrE, RWrF).

Output Y OFF information Y□ (RWrE, RWrF) can be cleared using Output Y OFF information clear request Y□ (RWwE, RWwF).

The amount of time delay from when Output Y OFF information Y□ (RWrE, RWrF) changes until the external output accordingly changes is no more than the maximum output response time.

For the on and off timing, refer to the following.

☞ Page 265 Output Y OFF information

8

8.7 Protection Function

The transistor output module and the I/O combined module (transistor output part) have the overload protection function and the overheat protection function.

Overload protection function

If the I/O module detects overcurrent, the module performs the current limiting operation (which limits the overcurrent to a certain value to continue to provide output).
For the overcurrent detection value and the limited current, refer to the overload protection function in the specifications for each I/O module.
☞ Page 47 Output module
☞ Page 80 I/O combined module
If the load current becomes equal to the overcurrent detection value or lower, the module returns to normal operation.

Overheat protection function

If the I/O module keeps outputting the overcurrent caused by an overload, heat is generated inside the I/O module. If excessive heat is detected within the I/O module, it turns off the output.
The multiple points at which the overheat protection function operates depend on the I/O module. Refer to the "Overheat protection function" column in the specifications table for each I/O module.
☞ Page 47 Output module
☞ Page 80 I/O combined module
If the heat descends, the module automatically returns to normal operation.

> **Point**
>
> The overload protection function and the overheat protection function do not protect external devices; they protect the internal circuit of the I/O module.
> An abnormal load may raise the internal temperature of the I/O module, causing deterioration in output elements and discoloration of the case and the printed-circuit board. Turn off the corresponding output as soon as a problem on a load is found, and remove the cause.

8.8 Module Power Supply Voltage Drop Detection Function

Detects a voltage drop of the module power supply.

This function makes troubleshooting easy when the voltage of power supplied to the I/O module drops or when poor connection in the wiring occurs.

Operation

The module power supply voltage drop detection function starts from the time 500ms passes after the I/O module is powered on.

When the module power supply voltage drops below 20.4VDC, a module power supply voltage drop error (error code: 0240H) occurs.

Precautions

The voltage to be detected varies depending on the environment.

When an error is detected, since the power supply environment is out of specification range, the operation is not guaranteed.

A power supply voltage drop is not detected in the event of a sudden power failure or when power-off operation is performed.

8.9 External Power Supply Monitoring Function

Monitors the ON/OFF status of the external power supply.

Setting procedure

Sets whether to enable or disable the external power supply monitoring function with External power supply monitor request (RWw2.b9).

Remote register	State	Setting value
External power supply monitor request (RWw2.b9)	On	External power supply monitoring function enable
	Off	External power supply monitoring function disable

The setting status of the external power supply monitoring function can be checked with External power supply monitor status (RWr2.b9). For details, refer to the following.

☞ Page 262 External power supply monitor status (RWr2.b9)

Operation

When External power supply monitor request (RWw2.b9) is turned on, if a state of external power supply being turned off is detected, an external power supply OFF error (error code: 0104H) occurs.

Precautions

When using the external power supply monitoring function, check that the external power supply stabilizes before turning on External power supply monitor request (RWw2.b9). Also, turn off External power supply monitor request (RWw2.b9) before turning off the external power supply.

8.10 Firmware Update Function

This function updates the firmware of the I/O module via CC-Link IE TSN.

Update the firmware by using the CC-Link IE TSN Firmware Update Tool.

When the CC-Link IE TSN Firmware Update Tool is necessary, please consult your local Mitsubishi representative.

System configuration

Connect a personal computer and the I/O modules that are the firmware update targets with an Ethernet cable.
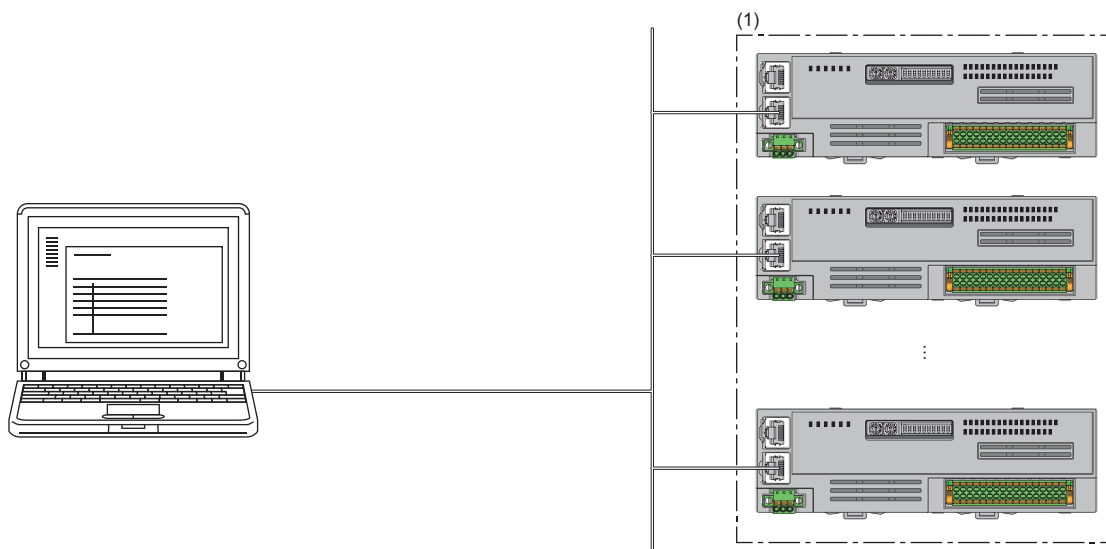
(1) Firmware update target I/O modules

Firmware update file

When the firmware update file is necessary, please consult your local Mitsubishi representative.

The file name of the firmware update file is as follows.

Model	File name	Firmware version
NZ2GN2S1-32D, NZ2GN2B1-32D, NZ2GNCF1-32D, NZ2GNCE3-32D, NZ2GN2S1-32T, NZ2GN2B1-32T, NZ2GNCF1-32T, NZ2GN2S1-32TE, NZ2GN2B1-32TE, NZ2GN2S1-32DT, NZ2GN2B1-32DT, NZ2GNCE3-32DT, NZ2GN2S1-32DTE, NZ2GN2B1-32DTE	CCIET_DIO.SYF	"01" or later
NZ2GN2S1-16D, NZ2GN2B1-16D, NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN2S1-16T, NZ2GN2B1-16T, NZ2GN12A2-16T, NZ2GN2S1-16TE, NZ2GN2B1-16TE, NZ2GN12A2-16TE, NZ2GN12A42-16DT, NZ2GN12A42-16DTE		"05" or later

Point

If a file of the firmware version that cannot be used for updating the target I/O module is specified, a firmware version error (error information: 0010H) occurs.

Setting procedure

To perform a firmware update on the I/O module, the CC-Link IE TSN Firmware Update Tool must be set.

For details on the CC-Link IE TSN Firmware Update Tool, refer to the "Help".

■Setting the Network Configuration Settings window

Set the following items in the Network Configuration Settings window.

| Item	Setting details
Module Name	Set the model names of the firmware update target I/O modules.
IP Address	Set the IP addresses of the firmware update target I/O modules.
Equipment Name	This setting is optional. Set this item when you register multiple pieces of equipment and need to distinguish them.
FTP User name	Set CCIET_DIO in this column.
FTP Password	Set CCIET_DIO in this column.
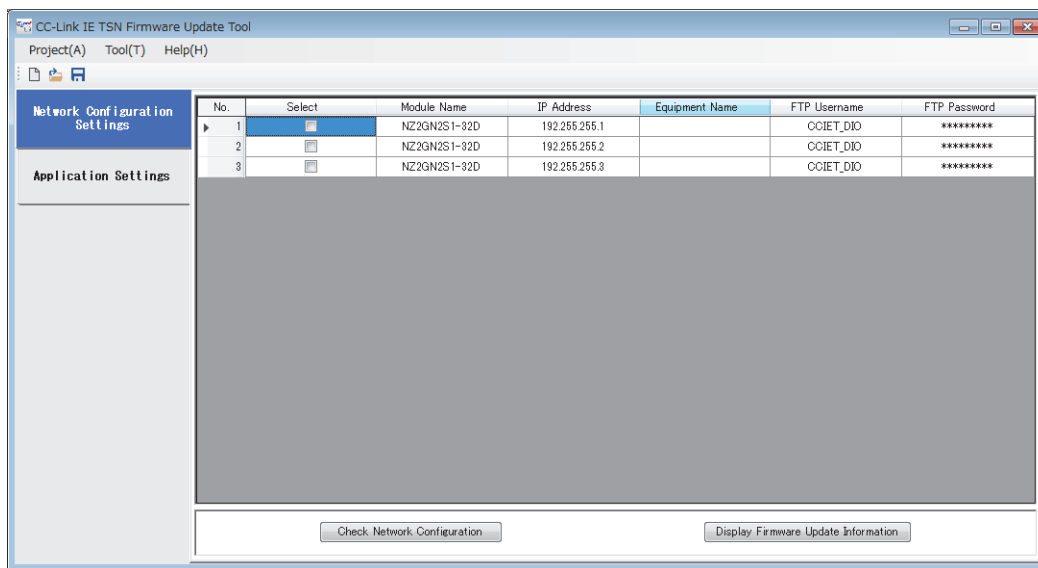
Point

- When CCIET_DIO is used for "Module Name", CCIET_DIO is automatically set for "FTP User name" and "FTP Password".
- When the firmware update file to be used is the same, and the strings of the module names set in the CC-Link IE TSN Firmware Update Tool also match (the model names of the actual devices can differ), a firmware update can be performed on I/O modules with different model names simultaneously.

Example: All the module names of the firmware update target I/O modules are set to NZ2GN2B1.

■**Setting the Application Settings window**

Set the following items in the Application Settings window.

Classification	Item	Setting range	Setting details
PC Settings	IP Address	0.0.0.1 to 223.255.255.254	Set the IP address of the personal computer.
	Port Number	0, 49152 to 65535	Set 0.
FTP Settings	FTP Mode	"Active Mode" (fixed)	I/O modules support only "Active Mode".
	FTP Timeout(s)	1 to 600(s)	Set the FTP timeout time.
Watching Time Settings	Firmware Update Timeout(s)	1 to 1200(s)	Set "Firmware Update Timeout(s)".
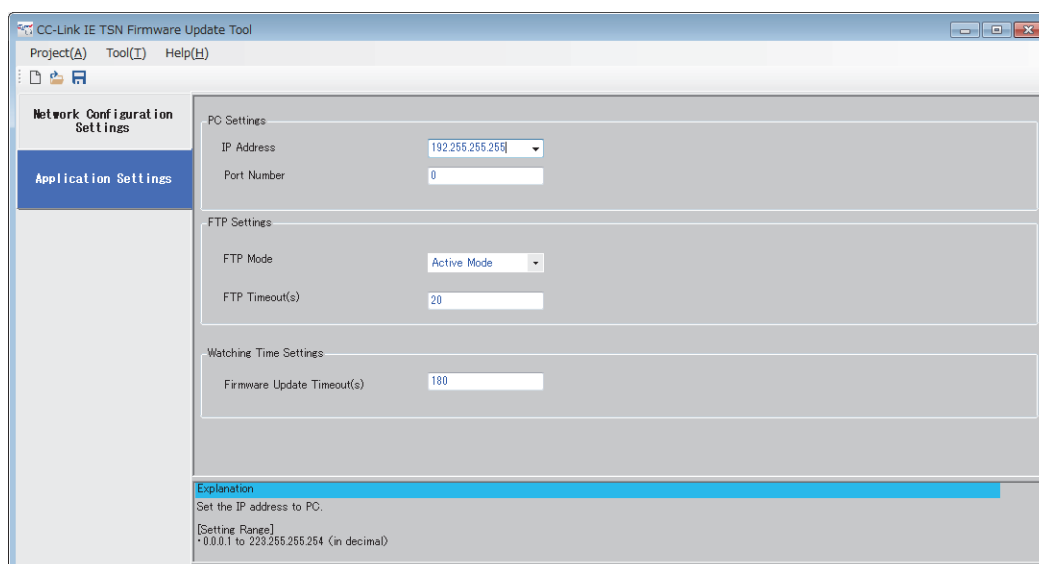
Operation

■**LED status**

The firmware update status can be checked by the LED of the I/O module.

LED	Normal operation	Firmware update in progress	Firmware update completed (completed successfully or completed with an error)
RUN LED	On	Flashing	Off

Point📎

During indicator display (RUN LED flashing), stop indicator display before starting firmware update. If firmware update is attempted during indicator display (RUN LED flashing), the RUN LED keeps flashing even after firmware update is completed.

Error information list

The following table lists the error information of I/O module-specific errors that occur when a firmware update is performed.

Error information	Error name	Description and cause	Action
0001H	File error	A file that cannot be used for the update target I/O module is specified.	Check the firmware update file specified by the CC-Link IE TSN Firmware Update Tool. After specifying a correct file, turn off and on the power supply of the I/O module, and perform the firmware update again.
0002H	Communication error	A communication error occurred during firmware update.	• Check the Ethernet cable connection. • Take measures against noise on the transmission path. After performing the above, turn off and on the power supply of the I/O module, and perform the firmware update again.

Error information	Error name	Description and cause	Action
0003H	Module error	An error occurred in the module during firmware update.	Turn off and on the module power supply, and restart the CC-Link IE TSN Firmware Update Tool. If this error occurs again, the possible cause is a module failure. Please consult your local Mitsubishi representative.
0004H	Firmware update failure	The firmware update was performed while a data link was in operation.	Perform the firmware update when a data link is not performed (disconnected).
0010H	Firmware version error	A file of the firmware version that cannot be used for updating the target I/O module is specified.	Check the firmware version of the firmware update file specified by the CC-Link IE TSN Firmware Update Tool. After specifying a correct file, turn off and on the power supply of the I/O module, and perform the firmware update again.

Precautions

If error information other than the above is displayed on the CC-Link IE TSN Firmware Update Tool, refer to the "Help" on the CC-Link IE TSN Firmware Update Tool.

8

Precautions

- After completing a firmware update, turn off and on the power supply of the I/O module. Note that because restoration processing is performed when restarting after a firmware update, compared to normal start, it may take time for the I/O module to start (RUN LED on).
- A firmware update cannot be performed on an I/O module with data link established. To perform a firmware update on the I/O module, do not connect the I/O module with the master station. If a firmware update is performed on an I/O module with data link established, in the error information of the firmware update information window, Firmware update failure (error code: 0004H) is displayed.
- If an error has occurred during a firmware update, before attempting the firmware update again, turn off and on the power supply of the I/O module, or perform remote reset.
- Do not perform a firmware update on I/O modules simultaneously with multiple CC-Link IE TSN Firmware Update Tools.

8.11 SLMP Communication Function

This function allows communications with the I/O modules using SLMP.

For details on SLMP, refer to the following.

📖 SLMP Reference Manual

Available commands

SLMP command[1]				Application
Type	Operation	Command	Subcommand	
Remote Control	Remote Reset	1006H	0000H	Remotely resets the I/O module.
Memory	Read	0613H	0000H	Reads data from the remote buffer memory.
	Write	1613H	0000H	Writes data to the remote buffer memory.
Clear Error		1617H	0000H	Initializes an error code of the I/O module and turns off the ERR LED.

[1] The SLMP commands are compatible with 3E frame, 4E frame, and station number extension frame.

> **Point**
>
> For a single I/O module, do not execute multiple SLMP commands at the same time. If multiple SLMP commands are executed at the same time, the I/O module may be unable to receive the SLMP commands, and the SLMP commands may time out.

Communication settings

To communicate with the I/O modules using SLMP, set as follows.
- TCP/UDP: UDP
- Port: 45239
- Code: Binary code

How to communicate

Use the SLMPSND instruction to send SLMP commands to the I/O module from the CPU module.

For the SLMPSND instruction, refer to the following.

📖 MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

End codes for SLMP communications

If the I/O module sends back an abnormal response, any of the following codes is stored in the end code of the message.

End code	Description and cause	Action
C059H	The command or subcommand is not specified correctly.	Correct the command or subcommand and send the SLMP command again.
C05CH	The request content is not specified correctly.	Correct the request content and send the SLMP command again.
C061H	The request data length and the number of data do not match.	Correct the request data content or the request data length, and send the SLMP command again.
CF44H	The request destination cannot handle divided data.	The I/O module cannot handle divided data. Send a request message without dividing it.

For details on the error codes, refer to the following.

9 PROGRAMMING

This chapter describes the programming of the I/O module.

9.1 Precautions for Programming

This section describes precautions to create CC-Link IE TSN programs.
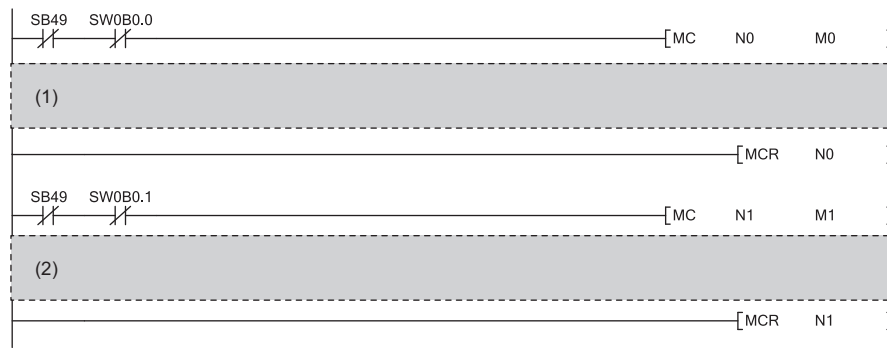
Cyclic transmission program

For a cyclic transmission program, interlock with the following link special relay (SB) and link special register (SW).
- Own station data link status (master station) (SB0049)
- Data link status (each station) (SW00B0 to SW00B7)

📖 User's manual for the master station used

Ex.
Interlock example

(1) Program of communication with a station with station number 1
(2) Program of communication with a station with station number 2

CC-Link IE TSN Network synchronous communication program

For a CC-Link IE TSN Network synchronous communication program, interlock with the following link special register (SW).
The program is to check that I/O module operation is synchronized properly.
If the module operation is not synchronized due to a factor such as an error, prevent an unintended operation by stopping I/O control.
- Synchronous/asynchronous operation status information (each station) (SW01C8 to SW01CF) of the master station

📖 User's manual for the master station used

Ex.
Example of interlock when X0 and Y10 of the I/O module on the station No.1 are assigned to X1000 and Y1010 of the CPU module respectively

(1) Synchronous/asynchronous operation status information (each station) of the station No.1
(2) X0 of the station No.1
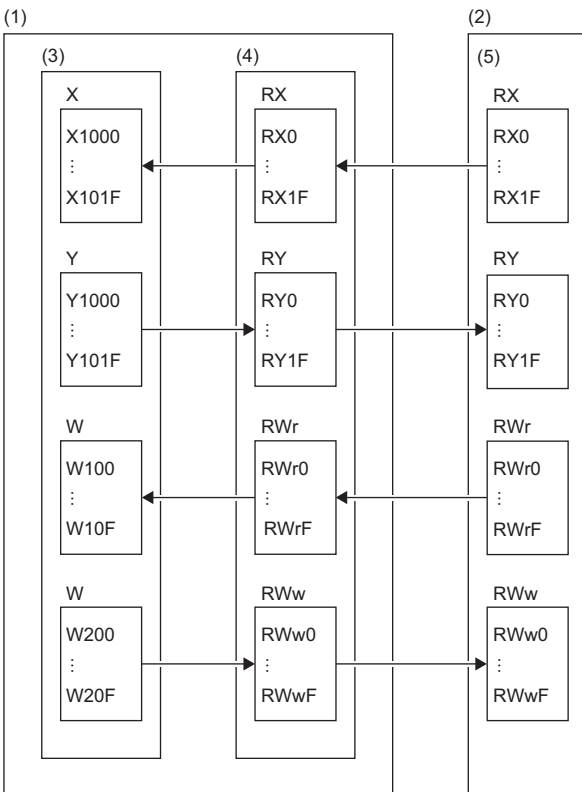(3) When X0 of the I/O module turns on, Y10 turns on.

9.2 Program Example

System configuration
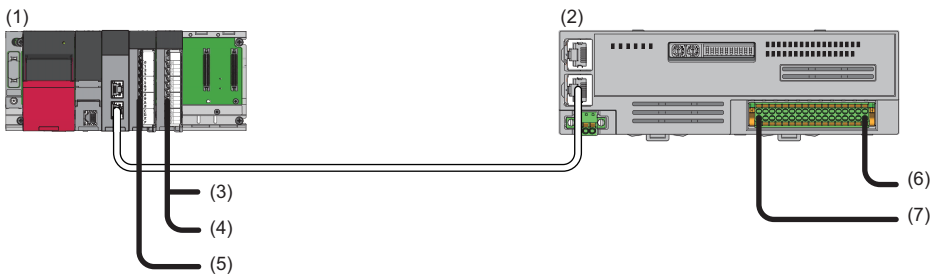
(1) Master station
 • Power supply module: R62P
 • CPU module: R120CPU
 • Master/local module: RJ71GN11-T2 (Start I/O number: 0000H to 001FH)
 • Input module: RX40C7 (Start I/O number: 0020H to 002FH)
 • Output module: RY40NT5P (Start I/O number: 0030H to 003FH)
(2) Remote station (IP address/station number setting switch: 1)
 • I/O module: NZ2GN2S1-32DT
(3) Y30: Major error/moderate error lamp
(4) Y31: Minor error lamp
(5) X20: Error clear switch
(6) Y1010: Lamp
(7) X1000: Push button switch

■Assignment of link devices

(1) Master station
(2) Remote station
(3) CPU module
(4) Master/local module
(5) I/O module

Programming condition

When RX0 of the I/O module turns on, RY10 turns on.

When an error occurs, an output module (RY40NT5P) outputs a digital signal.

Devices to be used

Device	Description	
X1000	RX0 input signal (push button) of the I/O module	NZ2GN2S1-32DT (RX0 to RX1F)
Y1010	RY10 output signal (lamp) of the I/O module	NZ2GN2S1-32DT (RY0 to RY1F)
X20	Error clear switch	Input module (X20 to X2F)
Y30	Major error/moderate error lamp	Output module (Y30 to Y3F)
Y31	Minor error lamp	
D100	Error code	
M0	Contact for master control	
N0	Nesting	
SB49	Own station data link status (master station)	
SM400	Always ON	
SW0B0.0	Data link status (remote station)	
SW100.0	Major error/moderate error occurrence status (remote station)	
SW110.0	Minor error occurrence status (remote station)	
W101	Error code	Device to be written by link refresh
W200.A	Error clear request flag	

Setting procedure

Operating procedure

1. Create a project.

✎ [Project] ⇨ [New...]

New

Series	🔲 RCPU ▼
Type	🔲 R120 ▼
Mode	▼
Program Language	🔲 Ladder ▼

OK   Cancel
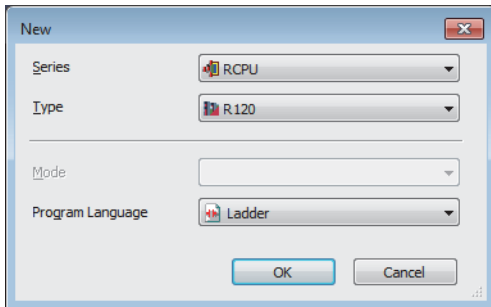
2. For "CPU Parameter" in "Link Direct Device Setting", set "Extended Mode (iQ-R Series Mode)".

✎ [CPU Parameter] ⇨ [Memory/Device Setting] ⇨ [Link Direct Device Setting] ⇨ [Link Direct Device Setting]

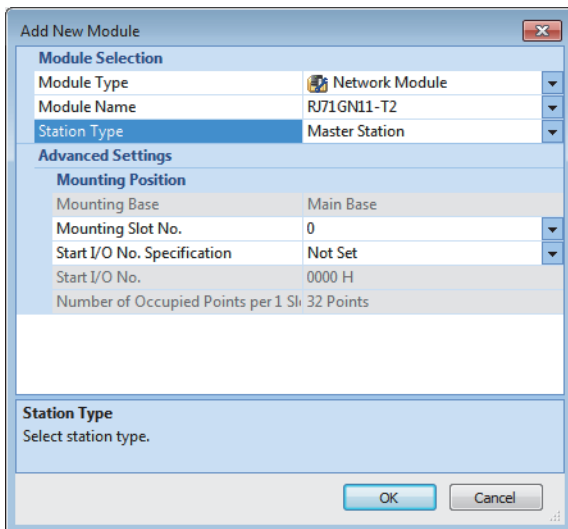| ⊟ Link Direct Device Setting	
Link Direct Device Setting	Extended Mode (iQ-R Series Mode)
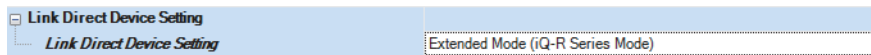
Restriction🖑

When writing the module parameters of the RJ71GN11-T2 to the CPU module with the engineering tool, set "Extended Mode (iQ-R Series Mode)" for "Link Direct Device Setting".
When "Q Series Compatible Mode" is set for "Link Direct Device Setting", "Write to PLC" cannot be executed.

3. Set the master/local module in the following window.

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

Add New Module

Module Selection	
Module Type	🔲 Network Module ▼
Module Name	RJ71GN11-T2 ▼
Station Type	Master Station ▼
Advanced Settings	
Mounting Position	
Mounting Base	Main Base
Mounting Slot No.	0 ▼
Start I/O No. Specification	Not Set ▼
Start I/O No.	0000 H
Number of Occupied Points per 1 Sl	32 Points

Station Type
Select station type.

OK   Cancel

4. Display the "CC-Link IE TSN Configuration" window and set parameters as follows.

🖰 [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Model ⇨ [Basic Settings] ⇨ [Network Configuration Settings]
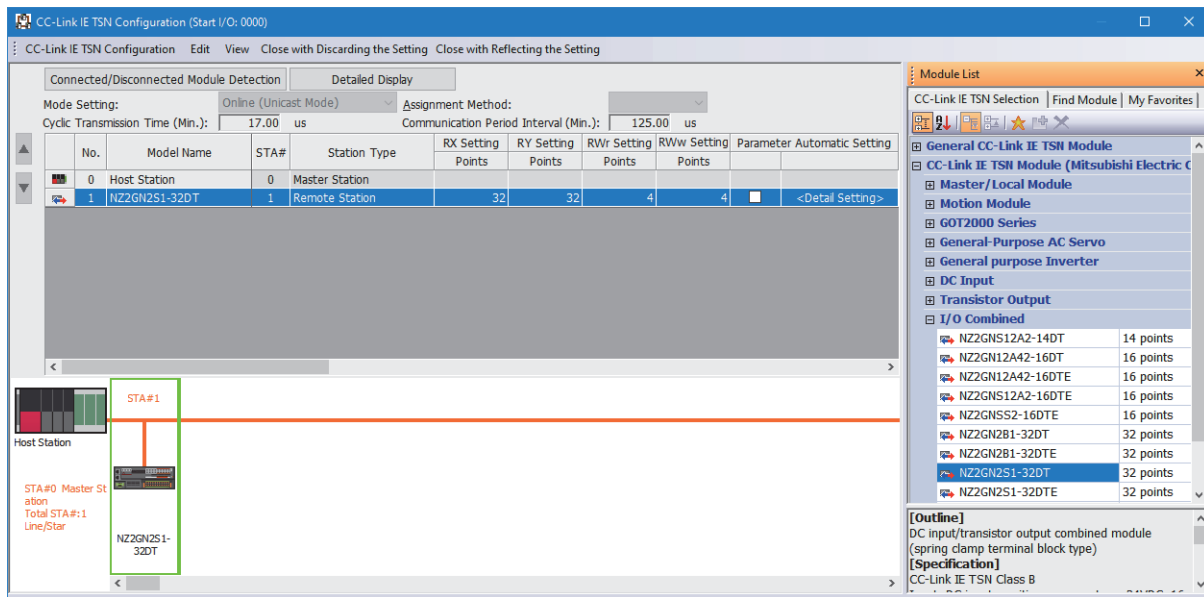
5. Select [Close with Reflecting the Setting] and close the "CC-Link IE TSN Configuration" window.

6. Display the refresh parameter setting window and configure the setting as follows.

🖰 [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Model ⇨ [Basic Settings] ⇨ [Refresh Settings]

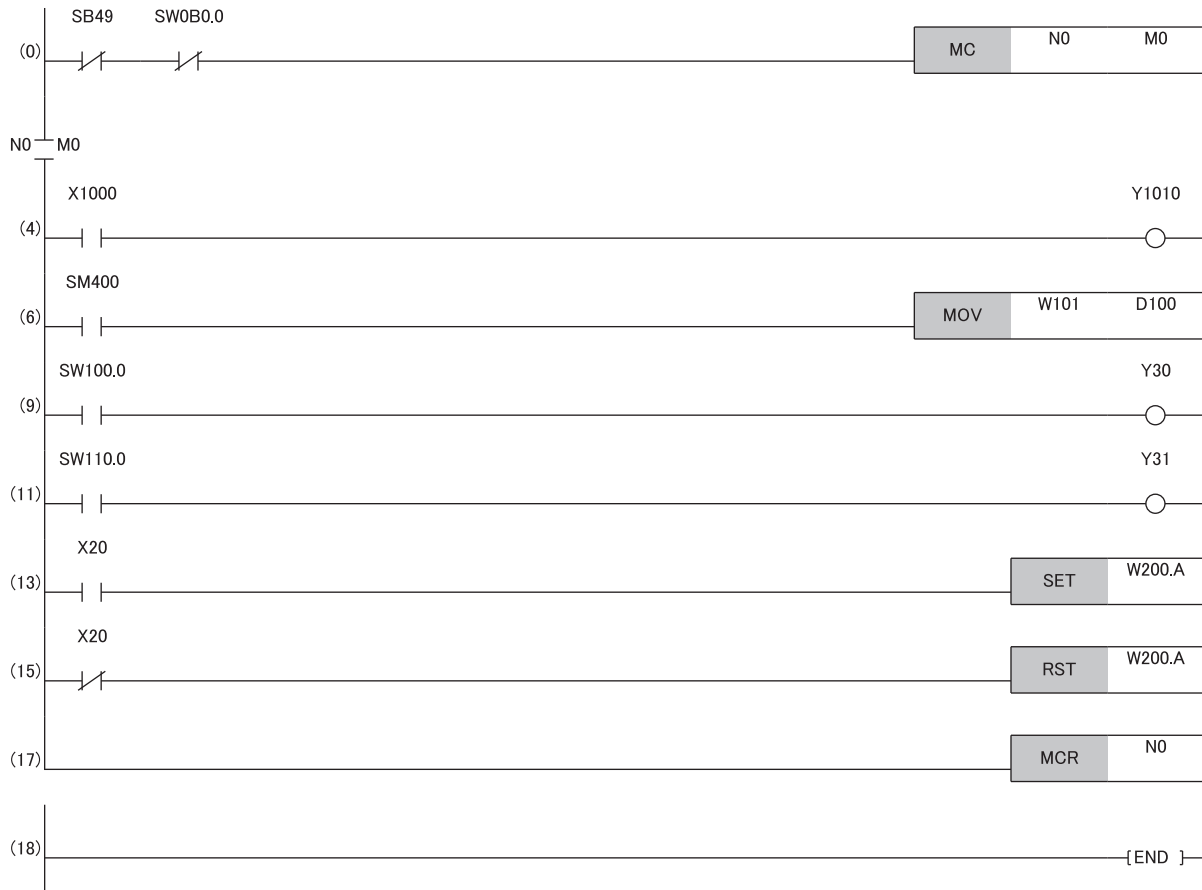| No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF	⬌	Specify Device	SB	512	00000	001FF
-	SW	512	00000	001FF	⬌	Specify Device	SW	512	00000	001FF
1	RX	32	00000	0001F	⬌	Specify Device	X	32	01000	0101F
2	RY	32	00000	0001F	⬌	Specify Device	Y	32	01000	0101F
3	RWr	16	00000	0000F	⬌	Specify Device	W	16	00100	0010F
4	RWw	16	00000	0000F	⬌	Specify Device	W	16	00200	0020F

7. Click the [Apply] button.

8. Write the set parameters to the CPU module of the master station and reset the CPU module of the master station, or turn off and on the power supply of the programmable controller.

🖰 [Online] ⇨ [Write to PLC]

9. Set the CPU module of the master station to RUN, and check that the DATA LINK LED of the I/O module is turned on.

Program example


```
         SB49      SW0B0.0
(0)    ──┤/├──────┤/├─────────────────────────────────────────┤ MC │  N0        M0 │

N0 ─┬─ M0
    │     X1000                                                                Y1010
(4) ├───┤ ├──────────────────────────────────────────────────────────────────( )

          SM400
(6) ├───┤ ├────────────────────────────────────────────────┤ MOV │  W101      D100 │

          SW100.0                                                             Y30
(9) ├───┤ ├────────────────────────────────────────────────────────────────( )

          SW110.0                                                             Y31
(11)├───┤ ├────────────────────────────────────────────────────────────────( )

          X20
(13)├───┤ ├─────────────────────────────────────────────────┤ SET │  W200.A      │

          X20
(15)├───┤/├─────────────────────────────────────────────────┤ RST │  W200.A      │

(17)├─────────────────────────────────────────────────────────┤ MCR │  N0        │

(18)├───────────────────────────────────────────────────────────────────────[END ]
```

(4) When RX0 of the I/O module is on, turn RY10 of the I/O module on.

(6) Read the latest error code.

(9) Perform the processing to be performed when a major error or moderate error occurs.

(11) Perform the processing to be performed when a minor error occurs.

(13) Clear the error code.

10 MAINTENANCE AND INSPECTION

The I/O module has no special item to be inspected. However, to maintain the best condition of the system, perform the inspection in accordance with the items described in the MELSEC iQ-R Module Configuration Manual.

MEMO

11 TROUBLESHOOTING

This chapter describes error contents that may occur while the I/O module is used and those troubleshooting.

11.1 CC-Link IE TSN/CC-Link IE Field Diagnostics

For CC-Link IE TSN, monitor the status and conduct an operation test.
For details on CC-Link IE TSN/CC-Link IE Field diagnostics, refer to the following.
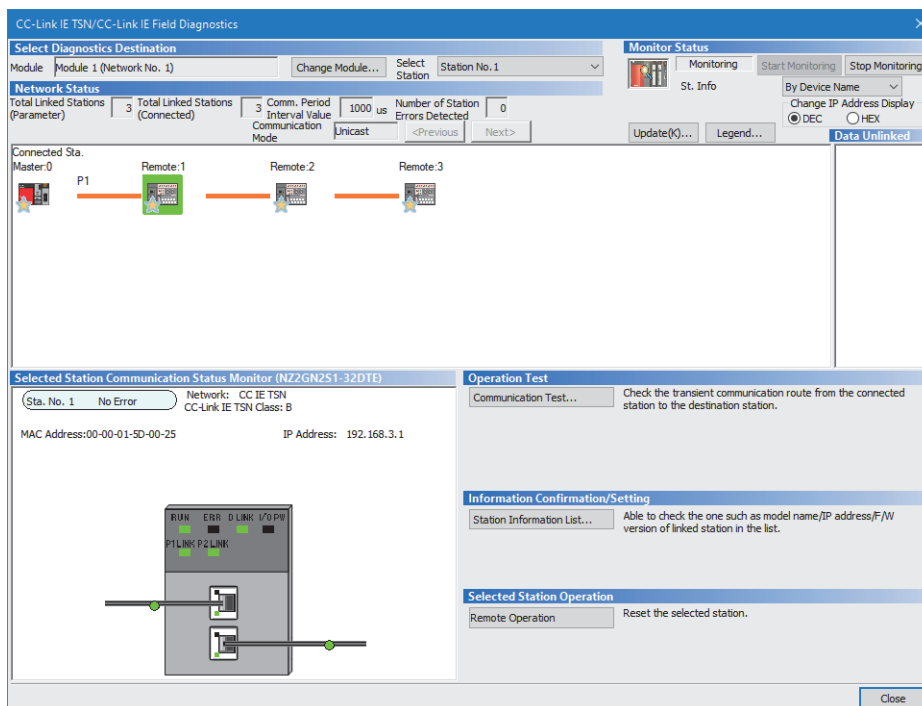📖 User's manual for the master station used

Remote reset

Perform the following operation to remotely reset a selected I/O module.

Operating procedure

1. Select a device station to be reset and click the [Remote Operation] button.

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

2. Follow the on-screen instructions and click the [Yes] button.

3. Follow the on-screen instructions and click the [OK] button.

Precautions

■Remote reset
Remote reset of an I/O module may cause the following because it affects communications on another station.
• Another station is disconnected.
• A synchronous communication error 1 (error code: 0102H) occurs on another I/O module using the CC-Link IE TSN Network synchronous communication function.

■Setting of function setting switches
When remote reset is performed, if the setting of either of the following function setting switches is different from the setting at power-on, a Remote reset disable error (error code: 0270H) occurs, and the I/O module is not reset.
• Function setting switch 1
• Function setting switch 10

Checking station information

Information on I/O modules where data link is established are displayed in the "Station Information List" window.

Information on each I/O module, such as the production information, firmware version, and module inherent information, can be checked by clicking the [Station Information List] button in the "CC-Link IE TSN/CC-Link IE Field Diagnostics" window.

The module inherent information shows the status of function setting switches of each I/O module.

Ex.

When only the function setting switch 10 is on: The module inherent information is "0001".

When only the function setting switch 4 is on: The module inherent information is "0040".

> **Point**
>
> For items displayed in the "Station Information List" window, refer to the following.
> 📖 User's manual for the master station used

■Applicable version

The following table lists the firmware versions of I/O modules and the software versions of engineering tools that support the station information display function.

Model	Firmware version	Software version
NZ2GN2S1-32D, NZ2GN2B1-32D, NZ2GN2S1-32T, NZ2GN2B1-32T, NZ2GN2S1-32TE, NZ2GN2B1-32TE, NZ2GN2S1-32DT, NZ2GN2B1-32DT, NZ2GN2S1-32DTE, NZ2GN2B1-32DTE, NZ2GNCE3-32D, NZ2GNCE3-32DT, NZ2GNCF1-32D, NZ2GNCF1-32T	"03" or later	Version 1.065T or later
NZ2GN2S1-16D, NZ2GN2B1-16D, NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN2S1-16T, NZ2GN2B1-16T, NZ2GN12A2-16T, NZ2GN2S1-16TE, NZ2GN2B1-16TE, NZ2GN12A2-16TE, NZ2GN12A42-16DT, NZ2GN12A42-16DTE	"05" or later	Version 1.075D or later

11.2 Checking the LEDs

This section describes how to troubleshoot the system by the LEDs.

Determining the module error status

An error status can be determined by the On/Off status of RUN LED and ERR. LED as follows.

RUN LED	ERR. LED	Error type[1]	Description
Off	On[2]	Major error	When this error occurs, the module stops operating, and the customer must consult with their local Mitsubishi representative for troubleshooting.
On	On	Moderate error	When this error occurs, the module stops operating, but the error can be handled through operation by the customer.
On	Flashing	Minor error	When this error occurs, the module continues to operate.

*1 When multiple errors occur, the error status is displayed in the order of major error > moderate error > minor error.
*2 When the module is faulty, the LED may not turn on.

When the PW LED does not turn on

When the PW LED does not turn on, check the following items.

Check item	Action
Is any LED other than the PW LED turned on?	When any LED other than the PW LED turns on, the possible cause is a hardware error. Please consult your local Mitsubishi representative.
Is the module power supply (24VDC) wired?	Wire the module power supply (24VDC).
Is the module power supply (24VDC) turned on?	Turn on the module power supply (24VDC).
Is the voltage of the module power supply (24VDC) within the specified range?	Set the voltage value within the range of performance specifications.

When the RUN LED does not turn on

When the RUN LED does not turn on, check the following items.

Check item	Action
Has any hardware error occurred?	Check that the module power supply voltage is within the range of performance specifications. (☞ Page 22 Performance Specifications) After the check, power off and on the module. If the RUN LED does not turn on even after the module power supply is turned off and on, the possible cause is a module failure. Please consult your local Mitsubishi representative.

When the RUN LED flashes

When the RUN LED flashes, check the following items.

Check item	Action
Is the IP address/station number setting switch (x16) of the I/O module set to F, and is function setting switch 1 set to ON?	When a unit test is conducted on the I/O module, the RUN LED turns on after the unit test is completed. Take corrective action according to the result of the unit test. (☞ Page 221 Unit Test) When a unit test is not conducted, set the IP address/station number setting switches to an appropriate value, and set function setting switch 1 to OFF.
Has indicator display been started?	Stop indicator display for the device station from "Network Configuration Settings". Or, turn off and on the module power supply.

When the ERR. LED turns on or flashes

When the ERR. LED turns on or flashes, check the following items.

Check item	Action
Has any error occurred?	Identify the error factor of the I/O module with the engineering tool to take the corrective action. (☞ Page 235 Method for Checking Error Codes)

When the P1 LINK LED or P2 LINK LED turns off

When the P1 LINK LED or P2 LINK LED turns off, check the following items.

Check item	Action
Are Ethernet cables used compliant with the relevant standard?	Replace the cable with an Ethernet cable compliant with the relevant standard. (🕮 User's manual for the master station used)
Is the segment length 100m or less?	Change the segment length to 100m or less.
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable used, and correct the bending radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Do other stations connected to the I/O module normally operate?	Check that the power supplies of the other stations are turned on.
Does the switching hub in use normally operate?	• Check that the power supply of the switching hub is turned on. • Check that the switching hub compliant with the specifications of the master module in use is used. (🕮 User's manual for the master station used) • Disconnect Ethernet cables, and then reconnect them. • Power off and on the switching hub.
Does the connected device support the communication speed of the I/O module?	• When function setting switch 10 is set to OFF, connect to a device that can communicate at 1Gbps, and when function setting switch 10 is set to ON, connect to a device that can communicate at 100Mbps. • When the firmware version of the I/O module is "01", either perform a firmware update or connect to a device that can communication at 1Gbps.
When the communication speed of the I/O module is set to 100Mbps, is auto-negotiation of the connected device enabled?	Enable auto-negotiation of the connected device. Alternatively, connect a device with auto-negotiation enabled.

> **Point**
>
> If link-up processing is repeated due to a condition of a device on the line, it may take a longer time for the P1 LINK LED/P2 LINK LED to turn on.
>
> This phenomenon may be eliminated by changing the PORT of the relevant module to which the Ethernet cable is connected (example: PORT1→PORT2).
>
> For details on Ethernet cable wiring, refer to the following.
>
> ☞ Page 135 Wiring of Ethernet Cable

When the DATA LINK LED turns off

When the DATA LINK LED turns off, check the following items.

Check item	Action
Are Ethernet cables used compliant with the relevant standard?	Replace the cable with an Ethernet cable compliant with the relevant standard. (📖 User's manual for the master station used)
Is the segment length 100m or less?	Change the segment length to 100m or less.
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable used, and correct the bending radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Do other stations connected to the I/O module normally operate?	Check that the power supplies of the other stations are turned on.
Does the switching hub in use normally operate?	• Check that the power supply of the switching hub is turned on. • Check that the switching hub compliant with the specifications of the master module in use is used. (📖 User's manual for the master station used) • Disconnect Ethernet cables, and then reconnect them. • Power off and on the switching hub.
Does the master station connected to the network operate normally?	If an error occurs in the master station, clear the error in the master station. • Check that the master station in use is supported. (☞ Page 112 Applicable master station)
Is another station that is powered off or in the middle of remote reset connected between the master station and the I/O module?	• Power on the I/O module(s) that is off because an I/O module becomes disconnected when it is off. • The I/O module becomes disconnected during remote reset. Avoid unnecessary remote reset.
Does another station between the master station and the I/O module link up at the desired communication speed?	Change the communication speed of another station or the switching hub to satisfy the communication speed.
Is the IP address of the I/O module duplicated with any of other devices within the access range of CC-Link IE TSN?	Change the IP address so that no IP address duplication occurs in the access range of CC-Link IE TSN.
Is function setting switch 1 turned off?	Turn off function setting switch 1 if it is turned on, and turn off and on the module power supply.
Is a device that is operating as a network other than CC-Link IE TSN connected between the master station and the I/O module?	Disconnect a device that is not operating as CC-Link IE TSN from the system. For a device that can be set to operate on CC-Link IE TSN, make sure that it is operating as CC-Link IE TSN.

When the DATA LINK LED flashes

When the DATA LINK LED flashes, check the following items.

Check item	Action
Is the station type remote station?	In the network configuration settings of the master station, change "Station type" for the I/O module to "Remote station".
Is the I/O module a reserved station?	Change the setting of "Reserved/error invalid station" to a value other than "Reserved station" in the network configuration settings of the master station.
Is the IP address of the I/O module duplicated with that of other station?	If two or more duplicate IP addresses exist, change the setting so that they are different from each other.
In the network configuration settings of the master station, is the third or fourth octet of IP address duplicated with that of other station?	Configure the setting so that there is no duplication in the third and fourth octet of IP address for all the stations.
In the network configuration settings of the master station, does each network address (the subnet mask part of IP address) match that of the master station?	Set each IP address and subnet mask so that the network addresses of all the stations are the same.
Is another station in which a communication error has occurred connected between the master station and the I/O module?	An I/O module cannot establish data link if there is no path available with which the I/O module can communicate with the master station without relaying data via a station with a communication error. If a communication error has occurred in two or more stations, clear the error one by one, starting from the station closest to the master station on the communication path.
Has another station been reset or powered off?	Disconnection temporarily occurs due to reset or power-off of another station. Wait until communication restarts.
Does another station on the network link up at the desired communication speed?	Change the communication speed of another station or the switching hub to satisfy the communication speed.
Does the time synchronization source station operate normally?	• If an error occurs in the time synchronization source station, clear the error. • When the time synchronization source station is reset or powered off, disconnection temporarily occurs due to switching of time synchronization sources. Wait until communication restarts.
Is a time synchronization source station with a higher priority newly connected to the network?	Disconnection temporarily occurs due to switching of time synchronization sources. Wait until communication restarts.

Check item	Action
Does the master station connected to the network operate normally?	If an error occurs in the master station, clear the error in the master station.
Does the model name of the device station set in the network configuration settings match the model name of the actual device?	Change the network configuration settings so that the model name of the device station set in the network configuration settings matches the model name of the actual device. Or, in the network configuration settings, set the I/O module as a "General Remote Station".
Is the parameter automatic setting completed with an error when the parameter automatic setting is enabled?	If Device station parameter automatic setting interruption (00C40H) is stored in the event history of the master station, take an action corresponding to the code stored in the device station response code (end code). For details, refer to the following. ☞ Page 161 Precautions
Is the event code of 00C81 registered with event history of the master station?	• For the I/O module that does not support the CC-Link IE TSN Class setting function, set "CC-Link IE TSN Class" of the network configuration settings to "CC-Link IE TSN Class B", or perform a firmware update. • The profile may not support the CC-Link IE TSN Class setting function. In this case, set the class to CC-Link IE TSN Class B (setting other than the function setting switches 6 and 7 both on) using the CC-Link IE TSN Class setting function, or change the profile to a profile that supports the CC-Link IE TSN Class setting function. • Change "CC-Link IE TSN Class" of the network configuration settings or CC-Link IE TSN Class setting of the function setting switches 6 and 7 so that the CC-Link IE TSN Class set with the network configuration settings matches with the CC-Link IE TSN Class set with the function setting switches.
Is the event code of 00C71 registered with event history of the master station?	• The CC-Link IE TSN Network synchronous communication function may be enabled for an I/O module not supporting the CC-Link IE TSN Network synchronous communication function. Disable the CC-Link IE TSN Network synchronous communication function or perform a firmware update for the I/O module. • The CC-Link IE TSN Network synchronous communication function may be enabled for an I/O module where the CC-Link IE TSN Class is set to CC-Link IE TSN Class A (function setting switches 6 and 7 both on). Disable the CC-Link IE TSN Network synchronous communication function or set the CC-Link IE TSN Class to CC-Link IE TSN Class B (setting other than the function setting switches 6 and 7 both on). If the event code of 00C71 is still registered even after the above actions are taken, check the manual for the master station in use and eliminate the cause of event code 00C71.
Has any error occurred in the I/O module?	If an error has occurred in the I/O module, a network parameter may be set to a value that the I/O module cannot handle. Check following errors in order from the top one, and find the error cause by referring to "Description and cause" described in "Error Code List". When the cause is found, eliminate it by referring to "Action" described in "Error Code List". (☞ Page 239 Error Code List) • Communication cycle setting error (CC-Link IE TSN Class B/1Gbps) (error code: D023H) • Communication cycle setting error (CC-Link IE TSN Class B/100Mbps) (error code: D024H) • Communication cycle setting error (CC-Link IE TSN Class A) (error code: D028H) • Synchronization cycle setting error (error code: D026H) • Number of RX/RY points error (error code: D021H) • RWr/RWw number of points error (error code: D022H) • RWr/RWw setting error (error code: D025H) • Network synchronous communication setting error (error code: D020H) • Communication setting error 2 (error code: D001H) • Communication setting error 1 (error code: D000H)
Is the system configured with ring topology?	• When the firmware version of the I/O module is "02" or earlier, perform a firmware update or configure the system with line topology, star topology, or mixture of line topology and star topology. • When the CC-Link IE TSN Class of the I/O module is CC-Link IE TSN Class A (function setting switches 6 and 7 both on), change the class to CC-Link IE TSN Class B (setting other than the function setting switches 6 and 7 both on), or configure the system with line topology, star topology, or mixture of line topology and star topology.
Is the CC-Link IE TSN Class of the I/O module set to CC-Link IE TSN Class A (function setting switches 6 and 7 both on)?	When CC-Link IE TSN Class A is set, refer to the following. • The master station may not support the CC-Link IE TSN protocol version 2.0. If it does not support the protocol version 2.0, update the master station to the version supporting the protocol version 2.0.
Is the network overloaded?	Reduce the load on the network. • If a broadcast storm has occurred, eliminate the cause. • The I/O module may not be able to send packet because it intermittently relays packet sent from an Ethernet device to other stations. Reduce the frequency of packet sending from the Ethernet device.

When the I/O PW LED does not turn on

When the I/O PW LED does not turn on, check the following items.

Check item	Action
Is the external power supply (24VDC) wired?	Wire the external power supply (24VDC).
Is the external power supply (24VDC) turned on?	Turn on the external power supply (24VDC).
Is the voltage of the external power supply (24VDC) within the specified range?	Set the voltage value within the range of performance specifications.

11.3 Unit Test

Run a unit test to check if there is any abnormality in the hardware of I/O module.

1. Power off the I/O module.

2. Connect P1 and P2 of the I/O module with an Ethernet cable.

3. Set the IP address/station number setting switches and the function setting switches as follows.
 • IP address/station number setting switch (x1): Any position
 • IP address/station number setting switch (x16): F
 • Function setting switch 1: ON
 • Function setting switch 2 to function setting switch 10: Any position

4. Power on the I/O module.

5. Unit test begins.
The RUN LED flashes during the unit test.

6. The RUN LED turns on when the unit test is completed.
 • If the test is completed normally, the ERR. LED does not turn on, but remains off.
 • If the test is completed with an error, the ERR. LED turns on. If the test is completed with an error, replace the Ethernet cable and run the test again. If the test is completed with an error again, it may be due to a hardware error in the I/O module. Please consult your local Mitsubishi representative.

Precautions

If the I/O module is connected to the network while the IP address/station number setting switch (x16) is set to F and the function setting switch 1 is set to ON, data link may not be properly performed on modules of other stations.
Set appropriate values both for the IP address/station number setting switch (x16) and the function setting switch 1, and connect the I/O module to the network.

11.4 Troubleshooting by Symptom

Perform troubleshooting by symptom when the I/O module does not operate properly even with no error. If an error occurs in the I/O module, identify the cause of the error using the engineering tool.

When the ON/OFF status of an external input cannot be read

When the ON/OFF status of an external input cannot be read, check the following items.

Check item	Action
Is the corresponding LED (X0 LED to X1F LED) of the I/O module on when an external input device is on?	If the LED does not turn on, there is a problem on the input wiring. Check the wiring confirming that the input wiring is not disconnected or short-circuited, or the voltage of the input signal is correct. For the rated input voltage, check the "Rated input voltage" column of each I/O module specifications. ☞ Page 22 Input module ☞ Page 80 I/O combined module Refer to the following as well. ☞ Page 225 Troubleshooting for input circuit If the LED does not turn on even after the input wiring is corrected, the possible cause is an I/O module failure. Please consult your local Mitsubishi representative.
When the LEDs from X0 LED to X1F LED are turned on, does the corresponding RX device turn on?	If the RX device does not turn on, check and correct the refresh parameter so that the refresh device setting matches the corresponding setting in the program. For the refresh parameter setting, refer to the following. 📖 User's manual for the master station used
Is Operation condition setting request flag (RWw0.b9) on?	Turn off Operation condition setting request flag (RWw0.b9). ☞ Page 267 Operation condition setting request flag (RWw0.b9)
Is the inter-module synchronous interrupt program created when the CC-Link IE TSN Network synchronous communication function is used?	Create the inter-module synchronous interrupt program when the CC-Link IE TSN Network synchronous communication function is used. 📖 User's manual for the master station used
When the CC-Link IE TSN Network synchronous communication function is used, does the master station used support that function?	When using the CC-Link IE TSN Network synchronous communication function, use the master station that supports the function. To check the master station supporting the function, refer to the following. ☞ Page 169 Applicable version
Has "Network Synchronous Communication" of the network configuration setting or the CC-Link IE TSN Network synchronous communication setting been changed, to use the synchronization cycle timing control mode or the set time synchronization control mode?	When using the synchronization cycle timing control mode or the set time synchronization control mode (CC-Link IE TSN Network synchronous communication function), perform the following. • Set "Network Synchronous Communication" to "Synchronous". • Check and correct the CC-Link IE TSN Network synchronous communication setting. Power off and on the module power supply or perform remote reset after changing the CC-Link IE TSN Network synchronous communication setting.
Is there any problem with other equipment such as the master station and connected devices?	If there is no problem with other equipment, the possible cause is a failure of the I/O module or waterproof I/O module. Please consult your local Mitsubishi representative.

When the ON/OFF status of an external output cannot be changed

When the ON/OFF status of an external output cannot be changed, check the following items.

Check item	Action
Is the I/O PW LED turned on?	Refer to the following. ☞ Page 220 When the I/O PW LED does not turn on
When External output signal (RY0 to RY1F) is turned on, is the corresponding LED (Y0 LED to Y1F LED) of the I/O module turned on?	If the above LED is not turned on, check and correct the refresh parameter so that the refresh device setting matches the corresponding setting in the program. For the refresh parameter setting, refer to the following. 📖 User's manual for the master station used
When External output signal (RY0 to RY1F) is used, is the synchronous X/Y control mode set for the CC-Link IE TSN Network synchronous communication setting?	There is a problem with the CC-Link IE TSN Network synchronous communication setting. When using External output signal (RY0 to RY1F), set the synchronous X/Y control mode for the CC-Link IE TSN Network synchronous communication setting. After changing the CC-Link IE TSN Network synchronous communication setting, power off and on the module power supply or perform remote reset.
Are signals output from the output terminal Y on which the LED (Y0 LED to Y1F LED) is on?	If signals are not output, there is a problem with the output wiring. Check the wiring confirming that the output wiring is not disconnected or short-circuited. Refer to the following as well. ☞ Page 228 Troubleshooting for output circuit
Is Operation condition setting request flag (RWw0.b9) on?	Turn off Operation condition setting request flag (RWw0.b9). ☞ Page 267 Operation condition setting request flag (RWw0.b9)
Is the inter-module synchronous interrupt program created when the CC-Link IE TSN Network synchronous communication function is used?	Create the inter-module synchronous interrupt program when the CC-Link IE TSN Network synchronous communication function is used. 📖 User's manual for the master station used
When the CC-Link IE TSN Network synchronous communication function is used, does the master station used support that function?	When using the CC-Link IE TSN Network synchronous communication function, use the master station that supports the function. To check the master station supporting the function, refer to the following. ☞ Page 169 Applicable version
Has "Network Synchronous Communication" of the network configuration setting or the CC-Link IE TSN Network synchronous communication setting been changed, to use the synchronization cycle timing control mode or the set time synchronization control mode?	When using the synchronization cycle timing control mode or the set time synchronization control mode (CC-Link IE TSN Network synchronous communication function), perform the following. • Set "Network Synchronous Communication" to "Synchronous". • Check and correct the CC-Link IE TSN Network synchronous communication setting. Power off and on the module power supply or perform remote reset after changing the CC-Link IE TSN Network synchronous communication setting.
Is RWw10 to RWw8F set for the refresh device setting when the synchronization cycle timing control mode or the set time synchronization control mode (CC-Link IE TSN Network synchronous communication function) is used?	There is a problem with the refresh device setting. Check and correct the refresh parameter so that the refresh device setting matches the corresponding setting in the program.
Is the value set in Synchronization output timing setting Y☐ OFF to ON/ON to OFF (RWw10 to RWw8F) appropriate when the synchronization cycle timing control mode (CC-Link IE TSN Network synchronous communication function) is used?	Set a value between 0 and "Synchronization cycle - 4µs" for Synchronization output timing setting Y☐ OFF to ON/ON to OFF (RWw10 to RWw8F). (☞ Page 272 Synchronization output timing setting)
Is the output set to turn on or off at an interval shorter than the maximum output response time when the synchronization cycle timing control mode (CC-Link IE TSN Network synchronous communication function) is used?	If the output is set to turn on or off at an interval shorter than the maximum output response time, the actual output may not turn on or off. Correct the value in Synchronization output timing setting OFF to ON/ON to OFF (Y0 to Y1F) so that the interval becomes longer than the maximum output response time.
Is the time set based on the CPU module clock when the set time synchronization control mode (CC-Link IE TSN Network synchronous communication function) is used?	Do not use the CPU module clock for the set time synchronization control. Set Output time setting based on the input change time (network clock) acquired from the input module. (☞ Page 273 Output time setting)
Is there any problem with other equipment such as the master station and connected devices?	If there is no problem with other equipment, the possible cause is an I/O module failure. Please consult your local Mitsubishi representative.

When CC-Link IE TSN/CC-Link IE Field diagnostics cannot be performed

When CC-Link IE TSN/CC-Link IE Field diagnostics cannot be performed, check the following items.

Check item	Action
Is the version of the engineering tool supported?	Check the version of the engineering tool, and if it is prior to the compatible versions, update it.

When the parameter setting/clear cannot be performed with the engineering tool

When the parameter automatic setting, device station parameter processing, or command execution of device station (parameter clear request) cannot be performed with the engineering tool, check the following item.

Check item	Action
Does the profile used support the parameter automatic setting, device station parameter processing, or command execution of device station (parameter clear request)?	Replace the profile with the one supporting the parameter automatic setting, device station parameter processing, or command execution of device station (parameter clear request).

When the I/O module is repeatedly disconnected and reconnected

Refer to the following and take actions from the top item.

☞ Page 218 When the DATA LINK LED flashes

When IP address setting, indicator display, or actual device information detection fails

When IP address setting, indicator display, or "Real Machine Information Detection" cannot be performed using the engineering tool, check the following items.

| Check item	Action
Are the versions of the master module, I/O module, and engineering tool supported?	Check the firmware versions of the master module and I/O module. If the version is prior to the supported ones, update it to a supported version. Or, check the version of the engineering tool, and if it is older than the supported versions, update it to a supported version.
Does the profile support IP address setting and indicator display?	Change the profile to a profile that supports IP address setting and indicator display.
Is the IP address of the I/O module duplicated with that of the master station?	For the master station, set an IP address that is different from the I/O module.

11.5 Examples of Troubles with the I/O Module

Troubleshooting for input circuit

This section describes the troubleshooting for input circuit.

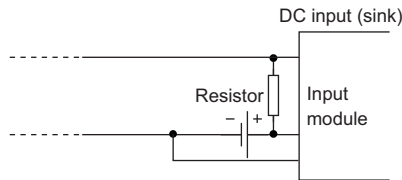### An input signal does not turn off No.1

■Cause

Drive by a switch with LED indicator
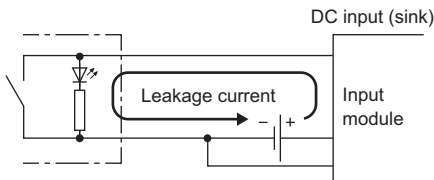

■Action

Connect an appropriate resistor as shown below so that a current through the input module may become lower than the OFF current.
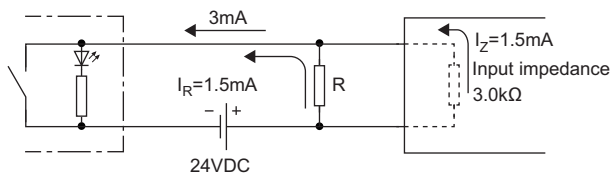

For the calculation example of a resistor to be connected, refer to the following.

■Calculation example

If the switch with LED indicator with maximum leakage current of 3mA when 24VDC external power supply is provided to the NZ2GN2B1-32D is connected
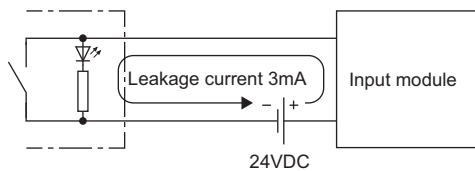
1. The OFF current of NZ2GN2B1-32D is not 1.5mA or lower. Therefore, connect a resistor as shown below.

2. To satisfy the condition that the OFF current of NZ2GN2B1-32D is 1.5mA or lower, the current through the connected resistor should be 1.5mA or higher. From the formula below, the connected resistor (R) is lower than 3.0kΩ.

I_R: I_Z = Z (Input impedance): R

$$R \leq \frac{I_Z}{I_R} \times Z \text{ (Input impedance)} = \frac{1.5}{1.5} \times 3.0 = 3.0 [k\Omega]$$

3. When the resistor (R) is 2.5kΩ, for example, the power capacity (W) of the resistor (R) becomes 0.332W.

$$W = \text{(Input voltage)}^2 \div R = 28.8^2 \div 2500 = 0.332 [W]$$

4. Because the resistor requires a power capacity that is 3 to 5 times larger than the actual current consumption, the resistor connected to the terminal should be 2.5kΩ; and 1 to 2W.
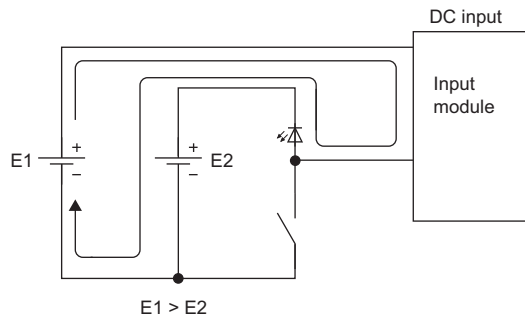
5. OFF voltage when the resistor (R) is connected becomes 4.09V. This satisfies that the OFF voltage of NZ2GN2B1-32D is 5V or lower.

$$\frac{1}{\dfrac{1}{2.5[k\Omega]} + \dfrac{1}{3.0[k\Omega]}} \times 3[mA] = 4.09[V]$$

An input signal does not turn off No.2
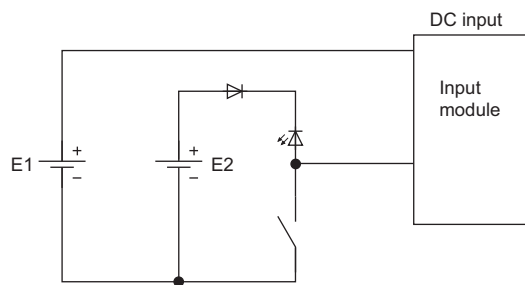
■Cause

By using two power supplies, a sneak path is configured.

■Action

- Use one power supply.
- To prevent the sneak path, connect a diode as shown below.

A signal incorrectly inputs data

■Cause

Noise is taken as input data.

■Action

- To prevent excessive noise, avoid installing power cables together with I/O cables.
- Set a longer input response time. (☞ Page 166 Input Response Time Setting Function)
- Connect surge absorbers to noise-generating devices such as relays and conductors using the same power supply or take other noise reduction measures.
- To prevent noise from being taken in, take measures to reduce noise for the I/O cable by using a part such as a ferrite core.
- To prevent radiation noise, take measures to reduce noise by using a shielded cable.

Troubleshooting for output circuit

This section describes the troubleshooting for output circuit.

A load momentarily turns on when the external power supply is powered on

■Cause

An incorrect output occurs due to the stray capacitance (C) between collector and emitter of a photocoupler.

(When a high sensitivity load (such as solid state relay) is used, this incorrect output may occur.)
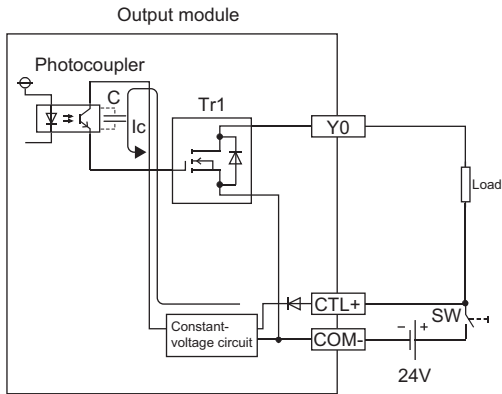
When the external power supply is powered on rapidly, the current (Ic) flows due to the stray capacitance(C).

The current (Ic) flows to the gate of the transistor (Tr1) of the next stage and the output Y0 turns on for approximately 100μs.
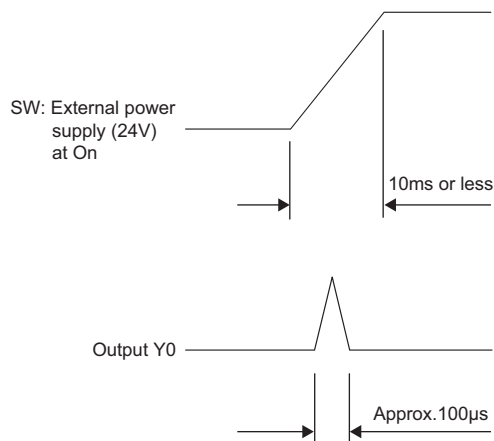
■Action

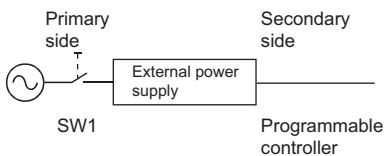Before turning on or off the external power supply, check that the rise time of the external power supply is 10ms or more.

Then, install a switch (SW1) to the primary side of the external power supply.

When installing the switch to the secondary side, connect a capacitor and resistor, and increase the rise time (10ms or more).

- Sink output
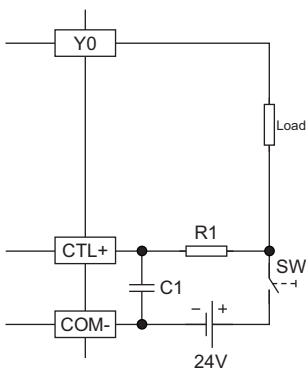
- Source output
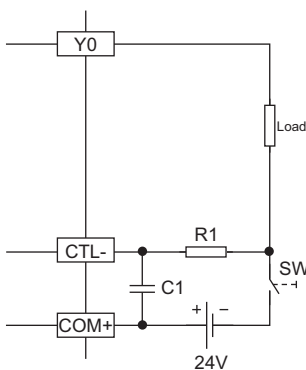
R1:Several tens of ohms

Power capacity $\geq$ (External power supply current[*1])$^2 \times$ Resistance value $\times$ (3 to 5)[*2]

C1:Several hundreds of microfarads 50V

(Example)

R1 = 40Ω, C1 = 300μF

Time constant is calculated as shown below.

C1 $\times$ R1 = 300 $\times$ 10^{-6} $\times$ 40

= 12 $\times$ 10^{-3}s

= 12ms

*1   For details on the current consumption of the external power supply for output part to be used, refer to the performance specifications.

*2   Select the power capacity of resistor to be 3 to 5 times as large as the actual power consumption.

A load momentarily turns on from off when the system is powered off

■Cause

When an inductive load is connected, [2] Load may turn on from off due to a diversion of back electromotive force at [1] Shutoff.
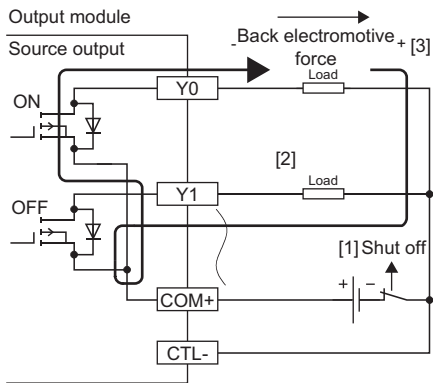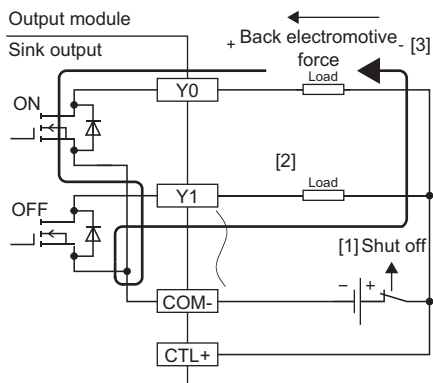
■Action

Take one of the two actions shown below.

Action 1.To suppress the back electromotive force, connect a diode parallel to the load where back electromotive force is generated.

• Sink output

[3]
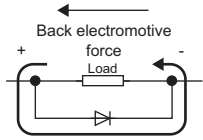
• Source output

[3]
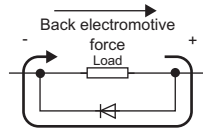
Action 2.Configure a sneak current path by connecting a diode across positive and negative of the external power supply.
When taking the action described in Example 1 at a time, connect a diode parallel to C1 and R1.
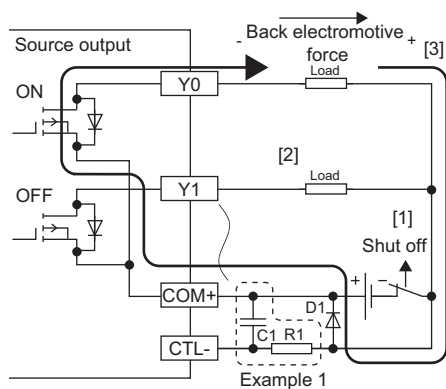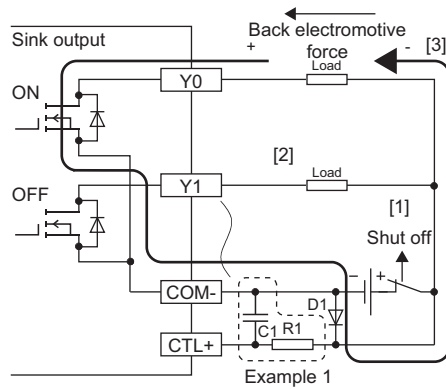
D1:

Reverse voltage VR (VRM)[*1]

Forward current IF (IFM)[*2]

*1 Approximately 10 times the rated voltage in the specifications
    Example: 24VDC → Approx. 200VDC
*2 Twice the maximum load current (common) in the performance specifications or more
    Example: 5A/1 common → 10A or more

When the output module is off, the LED connected as a load dimly turns on

■Cause

The load operates by the leakage current when the output module is off.
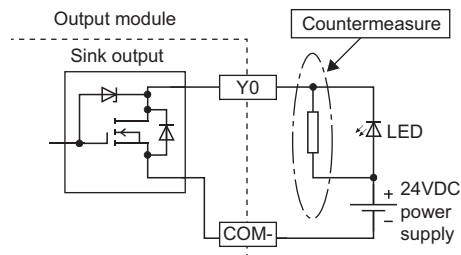
■Action

Connect a resistor of 5 to 50kΩ in parallel with the LED load.

When a digital display unit is connected as a load, data may not be displayed normally

■Cause

The load operates by the leakage current when the output module is off.
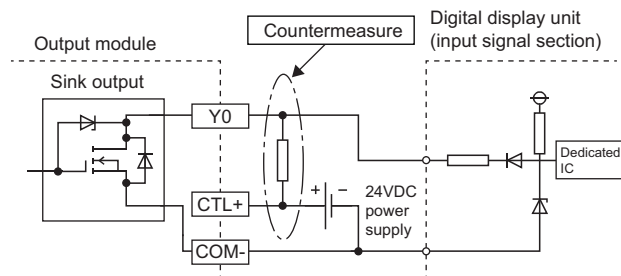
■Action

Install a pull-up resistor of 5 to 50kΩ and 0.5W between the outputs of 24VDC power supply and the output module.

When output is turned on, load connected to other outputs is turned on simultaneously

■Cause

When a non-wiring state occurs due to, for example, a shutoff or disconnection between 0V of the external power supply and the common of a load, a current flows across the load that is off through an unexpected circuit of the output element that is off.
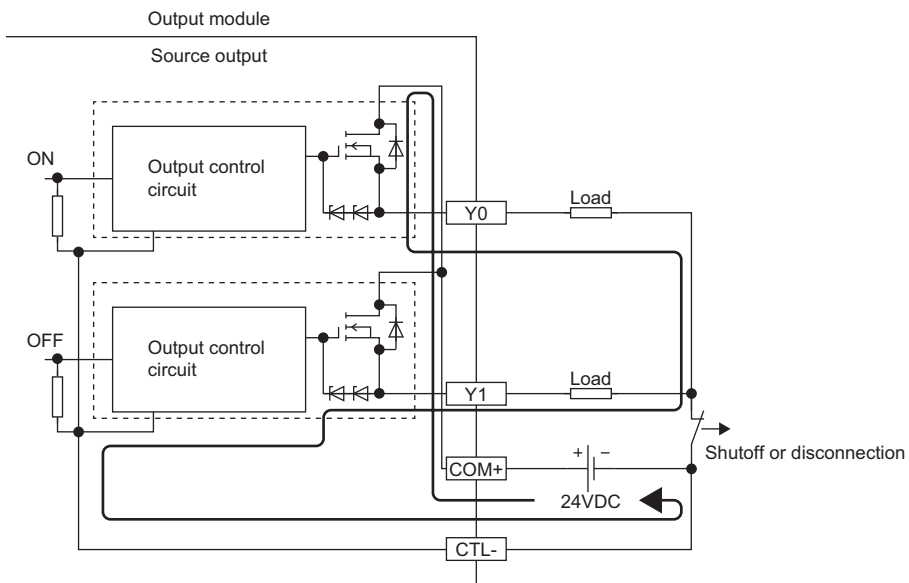
■Action

Connect external power supply and the load correctly.

To prevent the state described above, install diodes in each output terminal as shown below.
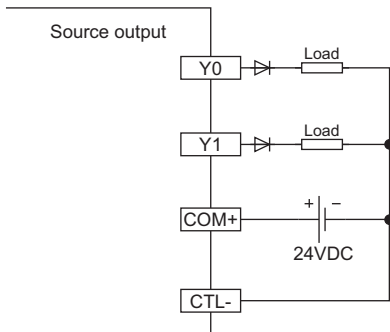
A load operates only by turning on the external power supply (transistor output)

■Cause

• The external power supply is connected with its polarity reversed.

Sink output

Output element
protection diode

Source output

Output element
protection diode
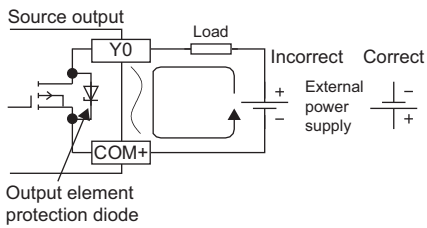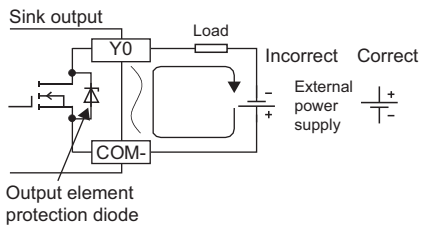
• The reversed polarity may allow current to flow via the output element protection diode into the load.

■Action

Connect the external power supply with the correct polarity.

11.6 Method for Checking Error Codes

Error codes can be checked by any of the following methods:
- Checking with the engineering tool
- Checking by Error code (RWr1)

Checking with the engineering tool

The error history held in the I/O module can be read. Errors that occurred before powering-off can be checked as well.

The error history can be checked by using CC-Link IE TSN/CC-Link IE Field diagnostics.

Point

- The error history records a maximum of 16 errors in reverse chronological order of occurrence. If more than 16 errors occur, errors are deleted from the oldest.
- If the same error occurs continuously, only the error that occurred first is stored to the error history.
- The error history is stored in the non-volatile memory in the I/O module. It is not lost when the power is cut off. However, when the upper limit for the number of writes to the non-volatile memory is reached, the error history cannot be stored in the non-volatile memory.
- "Occurrence Date" information in the error history is recorded after clock information is distributed from the master station. When an error occurs before clock information is distributed from the master station, "Occurrence Date" information is not recorded.

■Checking by using CC-Link IE TSN/CC-Link IE Field diagnostics

Operating procedure

1. Connect the engineering tool to the CPU module.

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

☞ [Diagnostics] ➩ [CC-Link IE TSN/CC-Link IE Field Diagnostics]

3. Right-click the device station whose error history is to be checked, and select "Error/Event History".

4. Follow the on-screen instructions and click the [Yes] button.

5. The error history appears.

Checking by Error code (RWr1)

Check the latest error code with the remote register of the master/local module.

Operating procedure

👆 [Online] ⇨ [Monitor] ⇨ [Device/Buffer Memory Batch Monitor]

Ex.
When the refresh target device for Error code (RWr1) is W101

■How to clear an error

How to clear an error depends on the error type.

Error type	How to clear an error
Major error	An error cannot be cleared.
Moderate error	Eliminate the error cause, and power off and on the I/O module. Or, turn on and off Error clear request flag (RWw0.b10).
Minor error	Eliminate the error cause, and power off and on the I/O module. Or, turn on and off Error clear request flag (RWw0.b10).

■How to clear an error using the command execution of device station

Follow the procedure below to clear an error using the command execution of device station.

Operating procedure

1. Select an I/O module from the station list on the "CC-Link IE TSN Configuration" window.

2. Open the "Command Execution of Device Station" window.

📖 Right-click on the target I/O module ⇨ [Online] ⇨ [Command Execution of Device Station]
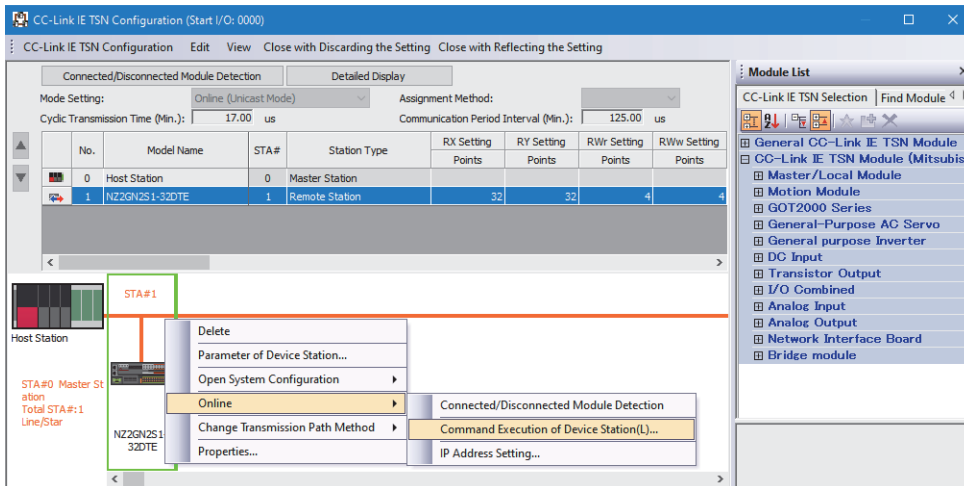
3. Set "Method selection" to "Error clear request", and click the [Execute] button.
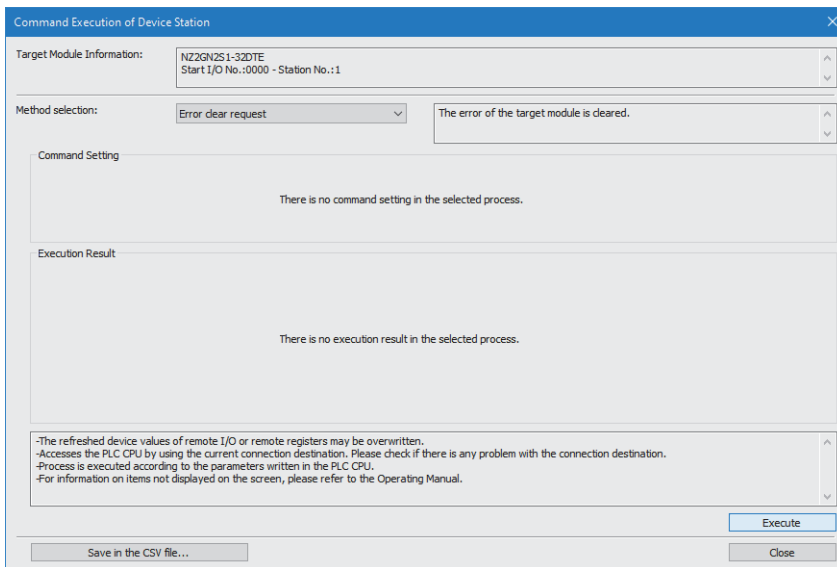
4. When the following window appears, click the [OK] button.
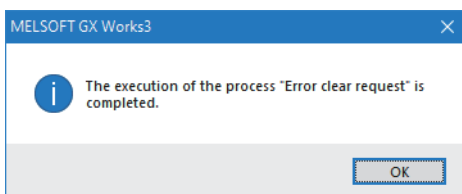
5. An error on the I/O module is cleared.

11.7   Error Code List

The error codes are classified into the following three types.

Classification	Description
Major error	An error that cannot be recovered. The RUN LED turns off.
Moderate error	An error where the module cannot continue to operate. The ERR. LED turns on.
Minor error	An error where the module can continue to operate. The ERR. LED flashes.

I/O module error codes are as follows.

| Error code	Error type	Error name	Description and cause	Action
0010H	Major error	Hardware error	Module hardware error	Power off and on the module power supply. If this error occurs again, the possible cause is a module failure. Please consult your local Mitsubishi representative.
0102H	Moderate error	Synchronous communication error 1	An error has been detected on synchronous communications with the master station.	Take any of the following actions, and then turn off and on the power supply of the I/O module or perform remote reset. • Check that the system configuration meets the specifications by referring to the manual for the master station. • Check that no communication error has occurred on the other stations. • Check that no remote reset has been performed to the other stations. • Take measures against noise on the transmission path. If this error occurs again, the possible cause is a module failure. Please consult your local Mitsubishi representative.
0103H	Moderate error	Synchronous communication error 2	An error has been detected on synchronous communications with the master station.	Take any of the following actions, and then turn off and on the power supply of the I/O module or perform remote reset. • Set a longer time for the synchronization cycle of the master station. • Reduce the number of device stations that operate with the CC-Link IE TSN Network synchronous communication function. • Take measures against noise on the transmission path.
0104H	Moderate error	External power supply OFF error	The external power supply voltage turns off.	• Check the state of the external power supply. • Check if the power supply voltage satisfies the specifications for the I/O module. • Correct the timing of turning on or off External power supply monitor request (RWw2.b9) if an error occurs when starting or stopping the system.
0105H	Moderate error	Non-volatile memory data error (IP address)	The IP address and subnet mask stored in the non-volatile memory are abnormal.	• The module will be automatically recovered immediately after the error occurs. However, the stored IP address and subnet mask are lost, and operation is performed assuming that the following are stored. IP address: 192.168.3.250 Subnet mask: 255.255.255.0 • Take measures against noise with a shielded cable for connection. • If this error occurs again, the possible cause is a module failure. Please consult your local Mitsubishi representative.
0106H	Moderate error	IP address/station number setting switch out of range error	The IP address/station number setting switches are set to 255.	Turn on the power supply with the IP address/station number setting switches set to a value in the range 0 to 254.
0107H	Moderate error	MODE switch incorrect	The MODE switch is set to an incorrect state.	Set the MODE switch correctly.
0108H	Moderate error	Non-volatile memory data error (parameter)	The parameter data stored in the non-volatile memory are abnormal.	• Set the parameter correctly. The I/O module is operating with the parameter set by the function setting switches. • When the parameter is set by the function setting switches, perform the parameter clear. • Take measures against noise with a shielded cable for connection. • If this error occurs again, the possible cause is a module failure. Please consult your local Mitsubishi representative.

Error code	Error type	Error name	Description and cause	Action
0109H	Moderate error	Parameter clear execution	The parameter saved in the non-volatile memory has been cleared.	Turn off and on the power supply of the I/O module or perform remote reset. After the reset, the I/O module operates with the parameter set by the function setting switches.
010AH	Moderate error	Non-volatile memory access error (module parameter)	The module parameters cannot be saved because an error in access to the non-volatile memory was detected.	• The module parameters are not saved in the non-volatile memory. • Take measures against noise with a shielded cable for connection. • If this error occurs again, the possible cause is a module failure. Please consult your local Mitsubishi representative.
010BH	Moderate error	Synchronous communication settings inconsistent	"Network Synchronous Communication" of the network configuration setting is set to "Asynchronous" for the I/O module where the operation mode is set to the synchronization cycle timing control mode or the set time synchronization control mode in the CC-Link IE TSN Network synchronous communication setting.	Take any of the following actions, and then turn off and on the power supply of the I/O module or perform remote reset. • Set "Network Synchronous Communication" to "Synchronous" when setting the synchronization cycle timing control mode or the set time synchronization control mode as the operation mode. • When setting "Network Synchronous Communication" to "Asynchronous", set the synchronous X/Y control mode as the operation mode.
0200H	Minor error	IP address/station number setting switch changed error	An IP address/station number setting switch has been changed with the module power supply on.	Return the IP address/station number setting switch to the setting it had when the module was powered on.
0201H	Minor error	Function setting switch 1 changed error	The function setting switch 1 has been changed with the module power supply on.	Return the function setting switch 1 to the setting when the module power supply was on.
0202H	Minor error	Function setting switch 2 changed error	The function setting switch 2 has been changed with the module power supply on.	Return the function setting switch 2 to the setting when the module power supply was on.
0203H	Minor error	Function setting switch 3 changed error	The function setting switch 3 has been changed with the module power supply on.	Return the function setting switch 3 to the setting when the module power supply was on.
0204H	Minor error	Function setting switch 4 changed error	The function setting switch 4 has been changed with the module power supply on.	Return the function setting switch 4 to the setting when the module power supply was on.
0205H	Minor error	Function setting switch 5 changed error	The function setting switch 5 has been changed with the module power supply on.	Return the function setting switch 5 to the setting when the module power supply was on.
0206H	Minor error	Function setting switch 6 changed error	The function setting switch 6 has been changed with the module power supply on.	Return the function setting switch 6 to the setting when the module power supply was on.
0207H	Minor error	Function setting switch 7 changed error	The function setting switch 7 has been changed with the module power supply on.	Return the function setting switch 7 to the setting when the module power supply was on.
0208H	Minor error	Function setting switch 8 changed error	The function setting switch 8 has been changed with the module power supply on.	Return the function setting switch 8 to the setting when the module power supply was on.
0209H	Minor error	Function setting switch 9 changed error	The function setting switch 9 has been changed with the module power supply on.	Return the function setting switch 9 to the setting when the module power supply was on.
020AH	Minor error	Function setting switch 10 changed error	The function setting switch 10 has been changed with the module power supply on.	Return the function setting switch 10 to the setting when the module power supply was on.
0210H	Minor error	Output change disabled time setting error	A time with which the output change becomes disabled has been set for Output time setting Y□ while the I/O module is operating in the set time synchronization control mode.	The output cannot be changed because the period from the setting done to the set time is too short. Set a time same as or later than the start timing of the second synchronization cycle from the setting.
0220H	Minor error	Error history save limit error	The upper limit for the number of times an error is saved in the error history is reached.	No more errors can be saved in the error history. Check the error by the latest error code.
0221H	Minor error	IP address save limit error	The upper limit for the number of times the IP address is changed is reached.	An IP address change made when and after this error occurred is not saved into the non-volatile memory.

Error code	Error type	Error name	Description and cause	Action
0222H	Minor error	Module parameter save limit error	The upper limit for the number of times a module parameter is saved is reached.	A module parameter change made in and after this error will not be saved into the non-volatile memory.
0230H	Minor error	IP address change disable error 1	IP address setting was executed via the engineering tool with the IP address/station number setting switches set to 1 to 255.	For an I/O module whose IP address is to be set by the engineering tool, power it on with the IP address/station number setting switches set to 0.
0231H	Minor error	IP address change disable error 2	IP address setting via the engineering tool was executed for the I/O module on which the firmware update had started.	Turn off and on the module power supply then execute the IP address setting using the engineering tool again.
0232H	Minor error	IP address change not reflected	IP address setting was executed via the engineering tool after the communications with the master station started.	Although the I/O module saved the set IP address in the non-volatile memory, the change in the IP address was not reflected in the module operation and the operation is being performed using the IP address before the change. Turn off and on the module power supply or perform remote reset. This will reflect the change in the IP address to module operation.
0240H	Minor error	Module power supply voltage drop error	The module power supply voltage is dropped.	• Check the state of the module power supply. • Check if the power supply voltage satisfies the specifications for the I/O module.
0250H	Minor error	Non-volatile memory access error (IP address)	The IP address cannot be saved because an error in access to the non-volatile memory was detected.	• The IP address is not saved into the non-volatile memory. • Take measures against noise with a shielded cable for connection. • If this error occurs again, the possible cause is a module failure. Please consult your local Mitsubishi representative.
0251H	Minor error	Non-volatile memory access error (error history)	The error cannot be saved because an error in access to the non-volatile memory was detected.	• An error that occurred at the time of or before this error may not be saved into the non-volatile memory. • Take measures against noise with a shielded cable for connection. • If this error occurs again, the possible cause is a module failure. Please consult your local Mitsubishi representative.
0263H	Minor error	CC-Link IE TSN Network synchronous communication setting change	The CC-Link IE TSN Network synchronous communication setting has been changed after the I/O module started data link.	Turn off and on the power supply of the I/O module or perform remote reset. The module operates with the setting after the change.
0270H	Minor error	Remote reset disable error	Remote reset could not be performed because the setting of the NETWORK switch or the LINK SPEED switch is different from the setting it had when the module was powered on.	Return the NETWORK switch and LINK SPEED switch to the settings they had when the module was powered on, and then perform remote reset again.
0280H	Minor error	Indicator display disable error	Indicator display was performed (started or stopped) on an I/O module on which firmware update had started.	Turn off and on the module power supply then perform indicator display again.
D000H[*1][*2]	Minor error	Communication setting error 1	Invalid network settings are received.	Power off and on the module power supply. If this error occurs again, the possible cause is a module failure. Please consult your local Mitsubishi representative.
D001H[*1][*2]	Minor error	Communication setting error 2	Network settings that cannot be handled by the I/O module are received.	Check that the model name of the device station set in the network configuration settings matches the model name of the actual device. If this error occurs even when the model names match, perform a firmware update so that the firmware of the I/O module becomes the latest. If this error occurs even with the latest firmware, the possible cause is a module failure. Please consult your local Mitsubishi representative.
D010H[*1]	Minor error	IP address duplication detection	An IP address duplication is detected.	Change the IP address so that no IP address duplication occurs in the access range of CC-Link IE TSN. After change, power off and on the module power supply.

Error code	Error type	Error name	Description and cause	Action
D011H[*1][*2]	Moderate error	IP address setting error	Values the I/O module cannot use were set for the IP address and subnet mask settings.	• Without using the set IP address and subnet mask, the module is operated based on the previous IP address and subnet mask. • The set IP address and subnet mask will not be saved in non-volatile memory. • Check the IP address and subnet mask again, and change the settings to values the I/O module can use. After change, power off and on the module power supply.
D020H[*1][*2]	Minor error	Network synchronous communication setting error	"Network Synchronous Communication" of the I/O module is set to "Synchronous".	• Set "Network Synchronous Communication" of the I/O module to "Asynchronous". • Perform a firmware update so that the firmware of the I/O module becomes the latest.
D021H[*1][*2]	Minor error	Number of RX/RY points error	RX/RY with a number of points that cannot be handled by the I/O module are set.	Set 32 or less for the number of points for RX and RY in the network configuration setting.
D022H[*1][*2]	Minor error	RWr/RWw number of points error	RWr/RWw with a number of points that cannot be handled by the I/O module are set.	Set 144 or less for the number of points for RWr and RWw in the network configuration setting.
D023H[*1][*2]	Minor error	Communication cycle setting error (CC-Link IE TSN Class B/1Gbps)	The communication cycle that cannot be handled by the I/O module is set while the I/O module is operating with CC-Link IE TSN Class B and the communication speed of 1Gbps.	Correct the communication cycle setting so that the I/O module can operate with the set communication cycle.
D024H[*1][*2]	Minor error	Communication cycle setting error (CC-Link IE TSN Class B/100Mbps)	The communication cycle that cannot be handled by the I/O module is set while the I/O module is operating with CC-Link IE TSN Class B and the communication speed of 100Mbps.	Correct the communication cycle setting so that the I/O module can operate with the set communication cycle.
D025H[*1][*2]	Minor error	RWr/RWw setting error	The system area (RWr3/RWw3) is not set in "RWr Setting" and "RWw Setting".	Correct the "RWr Setting" and "RWw Setting" in the network configuration setting to assign the system area (RWr3/RWw3).
D026H[*1][*2]	Minor error	Synchronization cycle setting error	The synchronization cycle set in the master station is not supported by the I/O module.	Correct the synchronization cycle of the master station, and then turn off and on the power supply of the I/O module or perform remote reset.
D028H[*1][*2]	Minor error	Communication cycle setting error (CC-Link IE TSN Class A)	The communication cycle that cannot be handled by the I/O module is set while the I/O module is operating with CC-Link IE TSN Class A.	Correct the communication cycle setting so that the I/O module can operate with the set communication cycle.

*1 This error occurs only once when an abnormality is detected. Before clearing the error, eliminate the cause and check that a data link is established.

*2 For these types of errors, more than one error may not occur at the same time. If errors occur, eliminate the cause of one error after another until a data link is established.

APPENDICES

Appendix 1 Remote I/O Signal

List of remote I/O signals

I/O signals for a master/local module are listed as follows.

The I/O signals in this section are the examples with the start of remote I/O signals of the I/O module assigned to the device number of RX0 and RY0.

Remote input (RX) indicates the input signal from the I/O module to the master/local module.

Remote output (RY) indicates the output signal from the master/local module to the I/O module.

> **Point**
>
> Do not use any "Use prohibited" remote I/O signals. Doing so may result in an accident due to an incorrect output or malfunction.

Input module (16-point module)

■**Remote input signal**

Device number	Name
RX0	External input signal X0
RX1	External input signal X1
RX2	External input signal X2
RX3	External input signal X3
RX4	External input signal X4
RX5	External input signal X5
RX6	External input signal X6
RX7	External input signal X7
RX8	External input signal X8
RX9	External input signal X9
RXA	External input signal XA
RXB	External input signal XB
RXC	External input signal XC
RXD	External input signal XD
RXE	External input signal XE
RXF	External input signal XF

■**Remote output signal**

Device number	Name
RY0 to RYF	Use prohibited

Input module (32-point module)

■Remote input signal

Device number	Name
RX0	External input signal X0
RX1	External input signal X1
RX2	External input signal X2
RX3	External input signal X3
RX4	External input signal X4
RX5	External input signal X5
RX6	External input signal X6
RX7	External input signal X7
RX8	External input signal X8
RX9	External input signal X9
RXA	External input signal XA
RXB	External input signal XB
RXC	External input signal XC
RXD	External input signal XD
RXE	External input signal XE
RXF	External input signal XF
RX10	External input signal X10
RX11	External input signal X11
RX12	External input signal X12
RX13	External input signal X13
RX14	External input signal X14
RX15	External input signal X15
RX16	External input signal X16
RX17	External input signal X17
RX18	External input signal X18
RX19	External input signal X19
RX1A	External input signal X1A
RX1B	External input signal X1B
RX1C	External input signal X1C
RX1D	External input signal X1D
RX1E	External input signal X1E
RX1F	External input signal X1F

■Remote output signal

Device number	Name
RY0 to RY1F	Use prohibited

Output module (16-point module)

■Remote input signal

Device number	Name
RX0 to RXF	Use prohibited

■Remote output signal

Device number	Name
RY0	External output signal Y0
RY1	External output signal Y1
RY2	External output signal Y2
RY3	External output signal Y3
RY4	External output signal Y4
RY5	External output signal Y5
RY6	External output signal Y6
RY7	External output signal Y7
RY8	External output signal Y8
RY9	External output signal Y9
RYA	External output signal YA
RYB	External output signal YB
RYC	External output signal YC
RYD	External output signal YD
RYE	External output signal YE
RYF	External output signal YF

A

Output module (32-point module)

■Remote input signal

Device number	Name
RX0 to RX1F	Use prohibited

■Remote output signal

Device number	Name
RY0	External output signal Y0
RY1	External output signal Y1
RY2	External output signal Y2
RY3	External output signal Y3
RY4	External output signal Y4
RY5	External output signal Y5
RY6	External output signal Y6
RY7	External output signal Y7
RY8	External output signal Y8
RY9	External output signal Y9
RYA	External output signal YA
RYB	External output signal YB
RYC	External output signal YC
RYD	External output signal YD
RYE	External output signal YE
RYF	External output signal YF
RY10	External output signal Y10
RY11	External output signal Y11
RY12	External output signal Y12
RY13	External output signal Y13
RY14	External output signal Y14
RY15	External output signal Y15
RY16	External output signal Y16
RY17	External output signal Y17
RY18	External output signal Y18
RY19	External output signal Y19
RY1A	External output signal Y1A
RY1B	External output signal Y1B
RY1C	External output signal Y1C
RY1D	External output signal Y1D
RY1E	External output signal Y1E
RY1F	External output signal Y1F

I/O combined module (16-point module)

■Remote input signal

Device number	Name
RX0	External input signal X0
RX1	External input signal X1
RX2	External input signal X2
RX3	External input signal X3
RX4	External input signal X4
RX5	External input signal X5
RX6	External input signal X6
RX7	External input signal X7
RX8 to RXF	Use prohibited

■Remote output signal

Device number	Name
RY0 to RY7	Use prohibited
RY8	External output signal Y8
RY9	External output signal Y9
RYA	External output signal YA
RYB	External output signal YB
RYC	External output signal YC
RYD	External output signal YD
RYE	External output signal YE
RYF	External output signal YF

A

I/O combined module (32-point module)

■Remote input signal

Device number	Name
RX0	External input signal X0
RX1	External input signal X1
RX2	External input signal X2
RX3	External input signal X3
RX4	External input signal X4
RX5	External input signal X5
RX6	External input signal X6
RX7	External input signal X7
RX8	External input signal X8
RX9	External input signal X9
RXA	External input signal XA
RXB	External input signal XB
RXC	External input signal XC
RXD	External input signal XD
RXE	External input signal XE
RXF	External input signal XF
RX10 to RX1F	Use prohibited

■Remote output signal

Device number	Name
RY0 to RYF	Use prohibited
RY10	External output signal Y10
RY11	External output signal Y11
RY12	External output signal Y12
RY13	External output signal Y13
RY14	External output signal Y14
RY15	External output signal Y15
RY16	External output signal Y16
RY17	External output signal Y17
RY18	External output signal Y18
RY19	External output signal Y19
RY1A	External output signal Y1A
RY1B	External output signal Y1B
RY1C	External output signal Y1C
RY1D	External output signal Y1D
RY1E	External output signal Y1E
RY1F	External output signal Y1F

Details of remote input signals

The following describes the details of the remote input signals for the master/local module.

External input signal

■Device number

Name	Device number
External input signal X0 to external input signal X1F	RX0 to RX1F

■Description

This signal shows the on/off status of the external input of input module and I/O combined module.

Point📎

When a major or moderate error occurs in the I/O module, the external input signal turns off.

Details of remote output signals

The following describes the details of the remote output signals for the master/local module.

External output signal

■Device number

Name	Device number
External output signal Y0 to external output signal Y1F	RY0 to RY1F

■Description

This signal turns on/off the external output of output module and I/O combined module.

Point📎

When a major or moderate error occurs in the I/O module, external output turns off, regardless of the status of the external output signal.

In addition, when either of the following conditions is applied, due to the output HOLD/CLEAR setting function, external output may operate differently than the status of the external output signal.

 • The I/O module is disconnected from the data link.
 • The operation status of the CPU module is STOP or it is suspended by an error.

For details on the output HOLD/CLEAR setting function, refer to the following.

A

Appendix 2 Remote Register

List of remote registers

This section lists remote registers for a master/local module.

The remote registers shown are the examples with the start of remote registers of the I/O module assigned to the device number of RWr0 and RWw0.

Remote register (RWr) is the information input from the I/O module to the master/local module.

Remote register (RWw) is the information output from the master/local module to the I/O module.

Input module (16-point module)

■Remote register (RWr)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	Synchronous X/Y control mode	Synchronization cycle timing control mode	Set time synchronization control mode
RWr0	Module status area	Module status area	Module status area	Module status area
RWr1	Error code	Error code	Error code	Error code
RWr2	Function selection status area	Function selection status area	Function selection status area	Function selection status area
RWr3	Use prohibited	Use prohibited	Use prohibited[*1]	Use prohibited[*1]
RWr4	Use prohibited	Use prohibited	Use prohibited	Input ON/OFF information X0 to XF
RWr5 to RWrF	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWr10, RWr11	Use prohibited	Use prohibited	Synchronization input timing information X0 OFF to ON	Input time information X0
RWr12, RWr13	Use prohibited	Use prohibited	Synchronization input timing information X0 ON to OFF	
⋮	⋮			
RWr4C, RWr4D	Use prohibited	Use prohibited	Synchronization input timing information XF OFF to ON	Input time information XF
RWr4E, RWr4F	Use prohibited	Use prohibited	Synchronization input timing information XF ON to OFF	

*1 The area is used for the system.

■Remote register (RWw)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	Synchronous X/Y control mode	Synchronization cycle timing control mode	Set time synchronization control mode
RWw0	Module operation area	Module operation area	Module operation area	Module operation area
RWw1	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw2	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw3	Use prohibited	Use prohibited	Use prohibited[*1]	Use prohibited[*1]
RWw4	Use prohibited	Use prohibited	Use prohibited	ON/OFF selection flag X0 to XF
RWw5 to RWw4F	Use prohibited	Use prohibited	Use prohibited	Use prohibited

*1 The area is used for the system.

Input module (32-point module)

■Remote register (RWr)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	Synchronous X/Y control mode	Synchronization cycle timing control mode	Set time synchronization control mode
RWr0	Module status area	Module status area	Module status area	Module status area
RWr1	Error code	Error code	Error code	Error code
RWr2	Function selection status area	Function selection status area	Function selection status area	Function selection status area
RWr3	Use prohibited	Use prohibited	Use prohibited[*1]	Use prohibited[*1]
RWr4	Use prohibited	Use prohibited	Use prohibited	Input ON/OFF information X0 to XF
RWr5	Use prohibited	Use prohibited	Use prohibited	Input ON/OFF information X10 to X1F
RWr6 to RWrF	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWr10, RWr11	Use prohibited	Use prohibited	Synchronization input timing information X0 OFF to ON	Input time information X0
RWr12, RWr13	Use prohibited	Use prohibited	Synchronization input timing information X0 ON to OFF	
⋮	⋮			
RWr8C, RWr8D	Use prohibited	Use prohibited	Synchronization input timing information X1F OFF to ON	Input time information X1F
RWr8E, RWr8F	Use prohibited	Use prohibited	Synchronization input timing information X1F ON to OFF	

*1   The area is used for the system.

■Remote register (RWw)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	Synchronous X/Y control mode	Synchronization cycle timing control mode	Set time synchronization control mode
RWw0	Module operation area	Module operation area	Module operation area	Module operation area
RWw1, RWw2	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw3	Use prohibited	Use prohibited	Use prohibited[*1]	Use prohibited[*1]
RWw4	Use prohibited	Use prohibited	Use prohibited	ON/OFF selection flag X0 to XF
RWw5	Use prohibited	Use prohibited	Use prohibited	ON/OFF selection flag X10 to X1F
RWw6 to RWw8F	Use prohibited	Use prohibited	Use prohibited	Use prohibited

*1   The area is used for the system.

Output module (16-point module)

■Remote register (RWr)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	**Synchronous X/Y control mode**	**Synchronization cycle timing control mode**	**Set time synchronization control mode**
RWr0	Module status area	Module status area	Module status area	Module status area
RWr1	Error code	Error code	Error code	Error code
RWr2	Function selection status area	Function selection status area	Function selection status area	Function selection status area
RWr3	Use prohibited	Use prohibited	Use prohibited[*1]	Use prohibited[*1]
RWr4 to RWr9	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrA	Output Y current value Y0 to YF	Output Y current value Y0 to YF	Output Y current value Y0 to YF	Output Y current value Y0 to YF
RWrB	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrC	Output Y ON information Y0 to YF	Output Y ON information Y0 to YF	Output Y ON information Y0 to YF	Output Y ON information Y0 to YF
RWrD	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrE	Output Y OFF information Y0 to YF	Output Y OFF information Y0 to YF	Output Y OFF information Y0 to YF	Output Y OFF information Y0 to YF
RWrF to RWr4F	Use prohibited	Use prohibited	Use prohibited	Use prohibited

*1 The area is used for the system.

■Remote register (RWw)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	**Synchronous X/Y control mode**	**Synchronization cycle timing control mode**	**Set time synchronization control mode**
RWw0	Module operation area	Module operation area	Module operation area	Module operation area
RWw1	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw2	Function selection setting area	Function selection setting area	Function selection setting area	Function selection setting area
RWw3	Use prohibited	Use prohibited	Use prohibited[*1]	Use prohibited[*1]
RWw4	Use prohibited	Use prohibited	Use prohibited	ON/OFF selection flag Y0 to YF
RWw5 to RWwB	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWwC	Output Y ON information clear request Y0 to YF	Output Y ON information clear request Y0 to YF	Output Y ON information clear request Y0 to YF	Output Y ON information clear request Y0 to YF
RWwD	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWwE	Output Y OFF information clear request Y0 to YF	Output Y OFF information clear request Y0 to YF	Output Y OFF information clear request Y0 to YF	Output Y OFF information clear request Y0 to YF
RWwF	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw10, RWw11	Use prohibited	Use prohibited	Synchronization output timing setting Y0 OFF to ON	Output time setting Y0
RWw12, RWw13	Use prohibited	Use prohibited	Synchronization output timing setting Y0 ON to OFF	
⋮	⋮			
RWw4C, RWw4D	Use prohibited	Use prohibited	Synchronization output timing setting YF OFF to ON	Output time setting YF
RWw4E, RWw4F	Use prohibited	Use prohibited	Synchronization output timing setting YF ON to OFF	

*1 The area is used for the system.

Output module (32-point module)

■Remote register (RWr)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	Synchronous X/Y control mode	Synchronization cycle timing control mode	Set time synchronization control mode
RWr0	Module status area	Module status area	Module status area	Module status area
RWr1	Error code	Error code	Error code	Error code
RWr2	Function selection status area	Function selection status area	Function selection status area	Function selection status area
RWr3	Use prohibited	Use prohibited	Use prohibited[1]	Use prohibited[1]
RWr4 to RWr9	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrA	Output Y current value Y0 to YF	Output Y current value Y0 to YF	Output Y current value Y0 to YF	Output Y current value Y0 to YF
RWrB	Output Y current value Y10 to Y1F	Output Y current value Y10 to Y1F	Output Y current value Y10 to Y1F	Output Y current value Y10 to Y1F
RWrC	Output Y ON information Y0 to YF	Output Y ON information Y0 to YF	Output Y ON information Y0 to YF	Output Y ON information Y0 to YF
RWrD	Output Y ON information Y10 to Y1F	Output Y ON information Y10 to Y1F	Output Y ON information Y10 to Y1F	Output Y ON information Y10 to Y1F
RWrE	Output Y OFF information Y0 to YF	Output Y OFF information Y0 to YF	Output Y OFF information Y0 to YF	Output Y OFF information Y0 to YF
RWrF	Output Y OFF information Y10 to Y1F	Output Y OFF information Y10 to Y1F	Output Y OFF information Y10 to Y1F	Output Y OFF information Y10 to Y1F
RWr10 to RWr8F	Use prohibited	Use prohibited	Use prohibited	Use prohibited

*1 The area is used for the system.

■Remote register (RWw)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	Synchronous X/Y control mode	Synchronization cycle timing control mode	Set time synchronization control mode
RWw0	Module operation area	Module operation area	Module operation area	Module operation area
RWw1	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw2	Function selection setting area	Function selection setting area	Function selection setting area	Function selection setting area
RWw3	Use prohibited	Use prohibited	Use prohibited[1]	Use prohibited[1]
RWw4	Use prohibited	Use prohibited	Use prohibited	ON/OFF selection flag Y0 to YF
RWw5	Use prohibited	Use prohibited	Use prohibited	ON/OFF selection flag Y10 to Y1F
RWw6 to RWwB	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWwC	Output Y ON information clear request Y0 to YF	Output Y ON information clear request Y0 to YF	Output Y ON information clear request Y0 to YF	Output Y ON information clear request Y0 to YF
RWwD	Output Y ON information clear request Y10 to Y1F	Output Y ON information clear request Y10 to Y1F	Output Y ON information clear request Y10 to Y1F	Output Y ON information clear request Y10 to Y1F
RWwE	Output Y OFF information clear request Y0 to YF	Output Y OFF information clear request Y0 to YF	Output Y OFF information clear request Y0 to YF	Output Y OFF information clear request Y0 to YF
RWwF	Output Y OFF information clear request Y10 to Y1F	Output Y OFF information clear request Y10 to Y1F	Output Y OFF information clear request Y10 to Y1F	Output Y OFF information clear request Y10 to Y1F
RWw10, RWw11	Use prohibited	Use prohibited	Synchronization output timing setting Y0 OFF to ON	Output time setting Y0
RWw12, RWw13	Use prohibited	Use prohibited	Synchronization output timing setting Y0 ON to OFF	
⋮	⋮			

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	**Synchronous X/Y control mode**	**Synchronization cycle timing control mode**	**Set time synchronization control mode**
RWw8C, RWw8D	Use prohibited	Use prohibited	Synchronization output timing setting Y1F OFF to ON	Output time setting Y1F
RWw8E, RWw8F	Use prohibited	Use prohibited	Synchronization output timing setting Y1F ON to OFF	

*1   The area is used for the system.

I/O combined module (16-point module)

■Remote register (RWr)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	**Synchronous X/Y control mode**	**Synchronization cycle timing control mode**	**Set time synchronization control mode**
RWr0	Module status area	Module status area	Module status area	Module status area
RWr1	Error code	Error code	Error code	Error code
RWr2	Function selection status area	Function selection status area	Function selection status area	Function selection status area
RWr3	Use prohibited	Use prohibited[1]	Use prohibited[1]	Use prohibited[1]
RWr4	Use prohibited	Use prohibited	Use prohibited	Input ON/OFF information X0 to X7
RWr5 to RWr9	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrA	Output Y current value Y8 to YF	Output Y current value Y8 to YF	Output Y current value Y8 to YF	Output Y current value Y8 to YF
RWrB	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrC	Output Y ON information Y8 to YF	Output Y ON information Y8 to YF	Output Y ON information Y8 to YF	Output Y ON information Y8 to YF
RWrD	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrE	Output Y OFF information Y8 to YF	Output Y OFF information Y8 to YF	Output Y OFF information Y8 to YF	Output Y OFF information Y8 to YF
RWrF	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWr10, RWr11	Use prohibited	Use prohibited	Synchronization input timing information X0 OFF to ON	Input time information X0
RWr12, RWr13	Use prohibited	Use prohibited	Synchronization input timing information X0 ON to OFF	
⋮	⋮			
RWr2C, RWr2D	Use prohibited	Use prohibited	Synchronization input timing information X7 OFF to ON	Input time information X7
RWr2E, RWr2F	Use prohibited	Use prohibited	Synchronization input timing information X7 ON to OFF	
RWr30 to RWr4F	Use prohibited	Use prohibited	Use prohibited	Use prohibited

*1 The area is used for the system.

A

■Remote register (RWw)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	**Synchronous X/Y control mode**	**Synchronization cycle timing control mode**	**Set time synchronization control mode**
RWw0	Module operation area	Module operation area	Module operation area	Module operation area
RWw1	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw2	Function selection setting area	Function selection setting area	Function selection setting area	Function selection setting area
RWw3	Use prohibited	Use prohibited[1]	Use prohibited[1]	Use prohibited[1]
RWw4	Use prohibited	Use prohibited	Use prohibited	ON/OFF selection flag X0 to X7, Y8 to YF
RWw5 to RWwB	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWwC	Output Y ON information clear request Y8 to YF	Output Y ON information clear request Y8 to YF	Output Y ON information clear request Y8 to YF	Output Y ON information clear request Y8 to YF
RWwD	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWwE	Output Y OFF information clear request Y8 to YF	Output Y OFF information clear request Y8 to YF	Output Y OFF information clear request Y8 to YF	Output Y OFF information clear request Y8 to YF
RWwF to RWw2F	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw30, RWw31	Use prohibited	Use prohibited	Synchronization output timing setting Y8 OFF to ON	Output time setting Y8
RWw32, RWw33	Use prohibited	Use prohibited	Synchronization output timing setting Y8 ON to OFF	
⋮	⋮			
RWw4C, RWw4D	Use prohibited	Use prohibited	Synchronization output timing setting YF OFF to ON	Output time setting YF
RWw4E, RWw4F	Use prohibited	Use prohibited	Synchronization output timing setting YF ON to OFF	

*1   The area is used for the system.

I/O combined module (32-point module)

■Remote register (RWr)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	**Synchronous X/Y control mode**	**Synchronization cycle timing control mode**	**Set time synchronization control mode**
RWr0	Module status area	Module status area	Module status area	Module status area
RWr1	Error code	Error code	Error code	Error code
RWr2	Function selection status area	Function selection status area	Function selection status area	Function selection status area
RWr3	Use prohibited	Use prohibited	Use prohibited[*1]	Use prohibited[*1]
RWr4	Use prohibited	Use prohibited	Use prohibited	Input ON/OFF information X0 to XF
RWr5 to RWrA	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrB	Output Y current value Y10 to Y1F	Output Y current value Y10 to Y1F	Output Y current value Y10 to Y1F	Output Y current value Y10 to Y1F
RWrC	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrD	Output Y ON information Y10 to Y1F	Output Y ON information Y10 to Y1F	Output Y ON information Y10 to Y1F	Output Y ON information Y10 to Y1F
RWrE	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWrF	Output Y OFF information Y10 to Y1F	Output Y OFF information Y10 to Y1F	Output Y OFF information Y10 to Y1F	Output Y OFF information Y10 to Y1F
RWr10, RWr11	Use prohibited	Use prohibited	Synchronization input timing information X0 OFF to ON	Input time information X0
RWr12, RWr13	Use prohibited	Use prohibited	Synchronization input timing information X0 ON to OFF	
⋮	⋮			
RWr4C, RWr4D	Use prohibited	Use prohibited	Synchronization input timing information XF OFF to ON	Input time information XF
RWr4E, RWr4F	Use prohibited	Use prohibited	Synchronization input timing information XF ON to OFF	
RWr50 to RWw8F	Use prohibited	Use prohibited	Use prohibited	Use prohibited

*1   The area is used for the system.

A

■Remote register (RWw)

Device number	Name			
	CC-Link IE TSN Network synchronous communication function			
	Not used	**Synchronous X/Y control mode**	**Synchronization cycle timing control mode**	**Set time synchronization control mode**
RWw0	Module operation area	Module operation area	Module operation area	Module operation area
RWw1	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw2	Function selection setting area	Function selection setting area	Function selection setting area	Function selection setting area
RWw3	Use prohibited	Use prohibited	Use prohibited[*1]	Use prohibited[*1]
RWw4	Use prohibited	Use prohibited	Use prohibited	ON/OFF selection flag X0 to XF
RWw5	Use prohibited	Use prohibited	Use prohibited	ON/OFF selection flag Y10 to Y1F
RWw6 to RWwC	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWwD	Output Y ON information clear request Y10 to Y1F	Output Y ON information clear request Y10 to Y1F	Output Y ON information clear request Y10 to Y1F	Output Y ON information clear request Y10 to Y1F
RWwE	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWwF	Output Y OFF information clear request Y10 to Y1F	Output Y OFF information clear request Y10 to Y1F	Output Y OFF information clear request Y10 to Y1F	Output Y OFF information clear request Y10 to Y1F
RWw10 to RWw4F	Use prohibited	Use prohibited	Use prohibited	Use prohibited
RWw50, RWw51	Use prohibited	Use prohibited	Synchronization output timing setting Y10 OFF to ON	Output time setting Y10
RWw52, RWw53	Use prohibited	Use prohibited	Synchronization output timing setting Y10 ON to OFF	
⋮	⋮			
RWw8C, RWw8D	Use prohibited	Use prohibited	Synchronization output timing setting Y1F OFF to ON	Output time setting Y1F
RWw8E, RWw8F	Use prohibited	Use prohibited	Synchronization output timing setting Y1F ON to OFF	

*1   The area is used for the system.

Details of remote registers

Module status area

■Device number

Name	Device number
Module status area	RWr0

■Description

This area is for module status checking.

| RWr0	Name
b0 to b8	Use prohibited
b9	Operation condition setting completion flag
b10	Use prohibited
b11	Remote READY
b12 to b15	Use prohibited

■Operation condition setting completion flag (RWr0.b9)

This area is used for parameter change of the I/O module using the program.

The parameter is changed by writing parameter data to the remote buffer memory with the program, and then turning on Operation condition setting request flag (RWw0.b9).

In addition, if the I/O module is in error state, turning on Operation condition setting request flag (RWw0.b9) clears the error through the same process as where Error clear request flag (RWw0.b10) is turned on.

• For the case where data link is established at the turning on of the module power supply

- - - - - - -▶ Performed by the I/O module
──────▶ Executed by the program
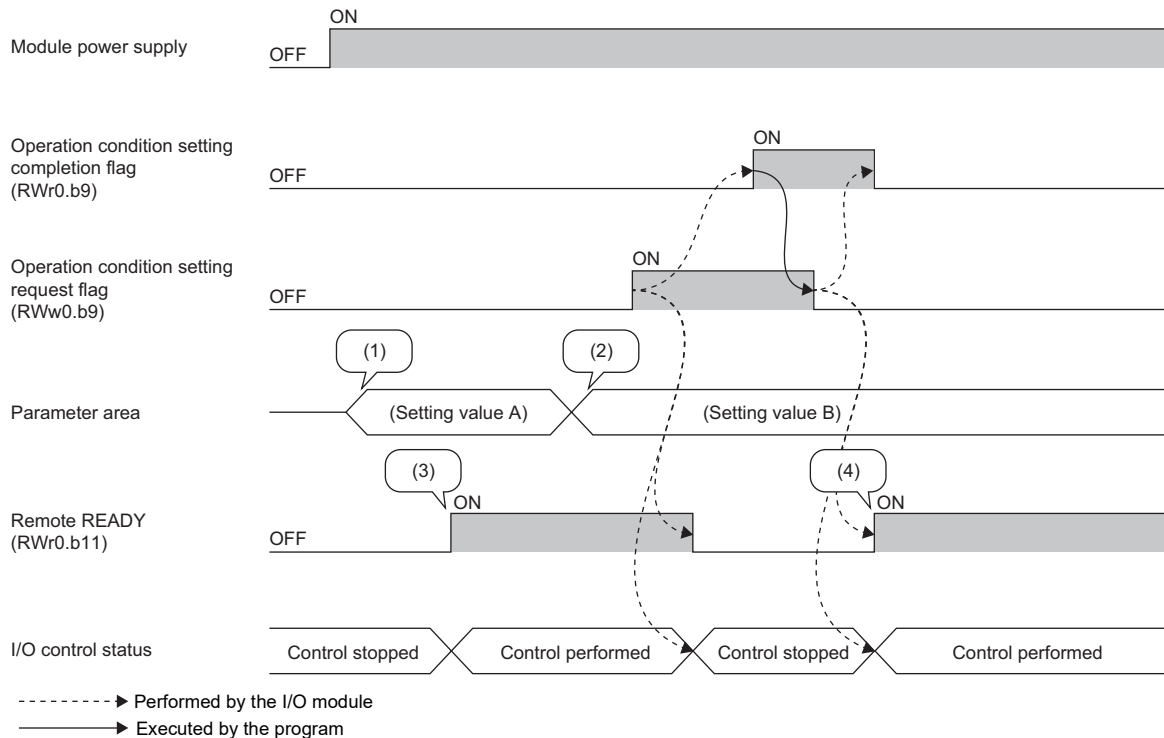
(1) The setting is read out from the combination of function setting switches or the non-volatile memory.
(2) The setting value is changed.
(3) The I/O module starts operating with the setting value A.
(4) The I/O module starts operating with the setting value B.

■Remote READY (RWr0.b11)

This area is used to check whether the I/O module can perform I/O control or not using the program.

Status of Remote READY	Operating status of the module
Off	I/O control stopped
On	I/O control performed

This flag turns off when any of the following conditions is satisfied.

- Operation condition setting request flag (RWw0.b9) is on.
- A moderate error or major error has occurred.
- The parameters have been changed through the device station parameter processing of the engineering tool.

Error code

■Device number

Name	Device number
Error code	RWr1

■Description

The error code is stored. (☞ Page 239 Error Code List)

> **Point**
>
> When multiple errors have occurred, these errors are stored in the error code (RWr1) in the following priority.
> - When the error type differs, they are stored in the order of major error > moderate error > minor error.
> - When the error type is the same, the error that occurred later is stored.

■Method for clearing an error

The method for clearing an error depends on the error type.

Error type	Clearing an error
Major error	The error cannot be cleared.
Moderate error	Eliminate the error cause, and power off and on the I/O module. Or, turn on and off Error clear request flag (RWw0.b10).
Minor error	Eliminate the error cause, and power off and on the I/O module. Or, turn on and off Error clear request flag (RWw0.b10).

Function selection status area

■Device number

Name	Device number
Function selection status area	RWr2

■Description

The setting status of the function is shown.

Function selection status area			
RWr2	**Input module**	**Output module**	**I/O combined module**
b0 to b2	Input response setting status	Use prohibited	Input response setting status
b3	Use prohibited	Output HOLD/CLEAR setting status	Output HOLD/CLEAR setting status
b4, b5	CC-Link IE TSN Network synchronous communication setting status	CC-Link IE TSN Network synchronous communication setting status	CC-Link IE TSN Network synchronous communication setting status
b6, b7	Use prohibited	Use prohibited	Use prohibited
b8	Communication speed setting status	Communication speed setting status	Communication speed setting status
b9	Use prohibited	External power supply monitor status	External power supply monitor status
b10	Parameter operating status	Parameter operating status	Parameter operating status
b11	CC-Link IE TSN Class setting status	CC-Link IE TSN Class setting status	CC-Link IE TSN Class setting status
b12 to b15	Use prohibited	Use prohibited	Use prohibited

■Input response setting status (RWr2.b0 to RWr2.b2)

The setting status of the input response setting function is shown.

Value in RWr2.b2	Value in RWr2.b1	Value in RWr2.b0	Setting status
Off	Off	Off	1ms
Off	Off	On	0ms
Off	On	Off	0.2ms
Off	On	On	1.5ms
On	Off	Off	5ms
On	Off	On	10ms
On	On	Off	20ms
On	On	On	70ms

■Output HOLD/CLEAR setting status (RWr2.b3)

The setting status of the output HOLD/CLEAR setting function is shown.

Value for RWr2.b3	Setting status
Off	CLEAR
On	HOLD

■CC-Link IE TSN Network synchronous communication setting status (RWr2.b4, RWr2.b5)

The setting status of the CC-Link IE TSN Network synchronous communication function is shown.

Value in RWr2.b5	Value in RWr2.b4	Setting status
Off	Off	Asynchronous
Off	On	Synchronous (synchronous X/Y control mode)
On	Off	Synchronous (synchronization cycle timing control mode)
On	On	Synchronous (set time synchronization control mode)

■Communication speed setting status (RWr2.b8)

The setting status of the communication speed is shown.

Value for RWr2.b8	Setting status
Off	1Gbps
On	100Mbps

A

■External power supply monitor status (RWr2.b9)

The setting status of the external power supply monitoring function is shown.

Value for RWr2.b9	Setting status
Off	Disable
On	Enable

■Parameter operating status (RWr2.b10)

The parameter used for the I/O module operation is shown.

Value in RWr2.b10	Setting status
Off	The module is operating with the parameter set by the function setting switches.
On	The module is operating with the parameter saved in the non-volatile memory in the I/O module.

■CC-Link IE TSN Class setting status (RWr2.b11)

The setting status of the CC-Link IE TSN Class is shown.

Value in RWr2.b11	CC-Link IE TSN Class setting status	
	Engineering tool	Function setting switches
Off	CC-Link IE TSN Class B	CC-Link IE TSN Class B
On	CC-Link IE TSN Class A	CC-Link IE TSN Class A

Input ON/OFF information

■Device number

Name	Device number
Input ON/OFF information	RWr4, RWr5

■Description

When the set time synchronization control mode is used, this area stores a value indicating the input change (whether rising edge or falling edge) that has been detected at the timing of a value stored in Input time information X□ (RWr10 to RWr8F). The value in this area is invalid until a value other than 0 (initial value) has been stored in Input time information X□ (RWr10 to RWr8F) after the I/O module starts.

■Input ON/OFF information X0 to XF (RWr4)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
XF	XE	XD	XC	XB	XA	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

Off: Falling edge (ON→OFF)
On: Rising edge (OFF→ON)

■Input ON/OFF information X10 to X1F (RWr5)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
X1F	X1E	X1D	X1C	X1B	X1A	X19	X18	X17	X16	X15	X14	X13	X12	X11	X10

Off: Falling edge (ON→OFF)
On: Rising edge (OFF→ON)

Output Y current value

■Device number

Name	Device number
Output Y current value	RWrA, RWrB

■Description

- Actual on/off status of output Y can be checked by using Output Y current value Y□ (RWrA, RWrB).
- Output Y current value Y□ (RWrA, RWrB) can always be used while a data link is established.
- The amount of time delay from when Output Y current value Y□ (RWrA, RWrB) changes until the external output accordingly changes is no more than the maximum output response time.

> **Point**
>
> When the synchronization output timing setting control or the output time setting control (CC-Link IE TSN Network synchronous communication function) is used, the on/off status of output Y can be checked by using Output Y current value Y□ (RWrA, RWrB).

■Output Y current value Y0 to YF (RWrA)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
YF	YE	YD	YC	YB	YA	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

Off: Output Y is off.
On: Output Y is on.

■Output Y current value Y10 to Y1F (RWrB)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Y1F	Y1E	Y1D	Y1C	Y1B	Y1A	Y19	Y18	Y17	Y16	Y15	Y14	Y13	Y12	Y11	Y10

Off: Output Y is off.
On: Output Y is on.

A

Output Y ON information

■Device number

Name	Device number
Output Y ON information	RWrC, RWrD

■Description

Whether output Y has been turned on or not can be checked with Output Y ON information Y□ (RWrC, RWrD).

> **Point**
>
> When the synchronization output timing setting control or the output time setting control (CC-Link IE TSN Network synchronous communication function) is used, whether output Y has been turned on or not can be checked with Output Y ON information Y□ (RWrC, RWrD).

■Output Y ON information Y0 to YF (RWrC)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
YF	YE	YD	YC	YB	YA	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

Off: Output Y has never been turned on.
On: Output Y has been turned on.

■Output Y ON information Y10 to Y1F (RWrD)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Y1F	Y1E	Y1D	Y1C	Y1B	Y1A	Y19	Y18	Y17	Y16	Y15	Y14	Y13	Y12	Y11	Y10

Off: Output Y has never been turned on.
On: Output Y has been turned on.

Output Y ON information Y□ (RWrC, RWrD) can be cleared using Output Y ON information clear request Y□ (RWwC, RWwD).

- - - - - - - - ▶ Performed by I/O module
────────▶ Executed by the program
(1) Remains on even after Y0 turns off.
(2) Turns off when the clear request turns on.
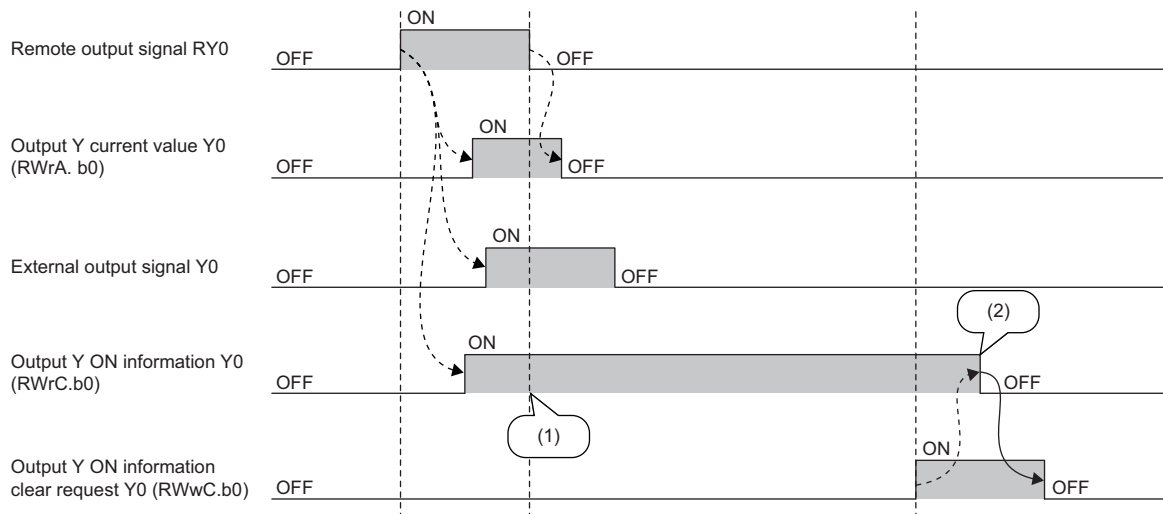
> **Point**
>
> While Output Y ON information clear request is turned on, regardless of the remote output signal status, output Y ON information continues to be cleared.

Output Y OFF information

■Device number

Name	Device number
Output Y OFF information	RWrE, RWrF

■Description

Whether output Y has been turned off or not can be checked with Output Y OFF information Y□ (RWrE, RWrF).

> **Point**
>
> When the synchronization output timing setting control or the output time setting control (CC-Link IE TSN Network synchronous communication function) is used, whether output Y has been turned off or not can be checked with Output Y OFF information Y□ (RWrE, RWrF).

■Output Y OFF information Y0 to YF (RWrE)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
YF	YE	YD	YC	YB	YA	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

Off: Output Y has never been turned off.
On: Output Y has been turned off.

■Output Y OFF information Y10 to Y1F (RWrF)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Y1F	Y1E	Y1D	Y1C	Y1B	Y1A	Y19	Y18	Y17	Y16	Y15	Y14	Y13	Y12	Y11	Y10

Off: Output Y has never been turned off.
On: Output Y has been turned off.

Output Y OFF information Y□ (RWrE, RWrF) can be cleared using Output Y OFF information clear request Y□ (RWwE, RWwF).

-------► Performed by I/O module
————► Executed by the program
(1) Remains on even after Y0 turns on.
(2) Turns off when the clear request turns on.
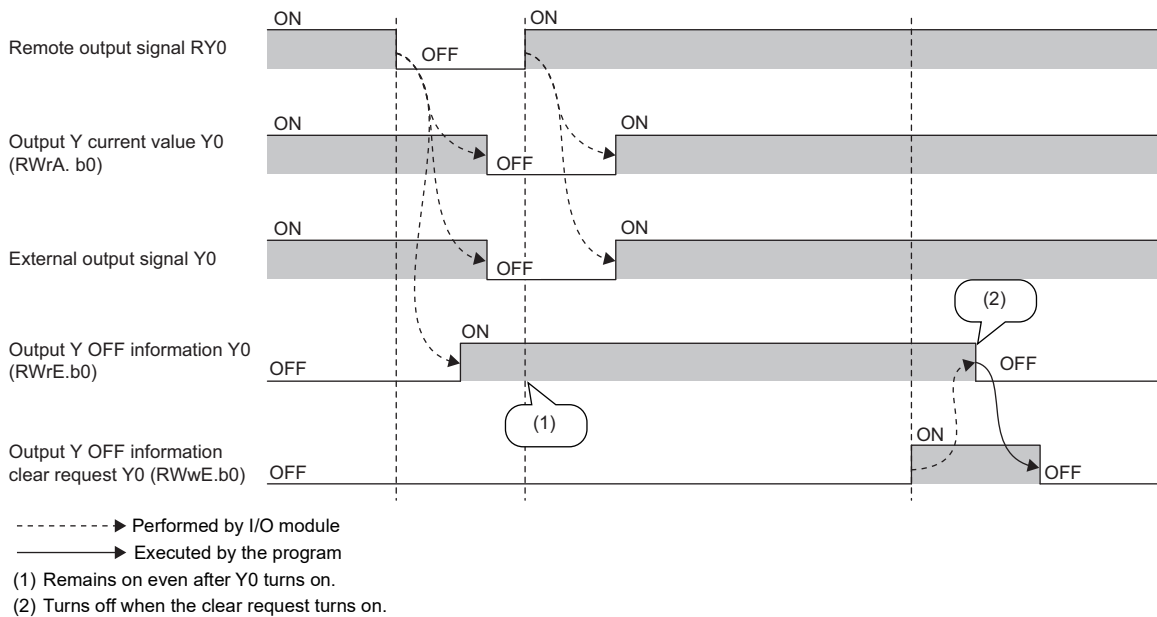
> **Point**
>
> While Output Y OFF information clear request is turned on, regardless of the remote output signal status, output Y OFF information continues to be cleared.

A

Synchronization input timing information

■Device number

Name	Device number
Synchronization input timing information X□	RWr10 to RWr8F

■Description

When the synchronization cycle timing control mode is used, the input timing relative to the synchronization cycle start timing is stored.

The time when the input has changed from OFF to ON, or from ON to OFF in one synchronization cycle is stored.

■Stored value

The stored value indicates the amount of time (unit: ns) that has passed from the synchronization cycle start timing to the input change.

The following table lists the stored values.

Stored value	Description
0 to 4294967294 (00000000H to FFFFFFFEH)	Shows that the input has changed at the timing of stored value.
4294967295 (FFFFFFFFH)	Shows that the input has not changed within the synchronization cycle.

Input time information

■Device number

Name	Device number
Input time information X□	RWr10 to RWr8F

■Description

When the set time synchronization control mode is used, this area stores the time (unit: ns) when the input has changed.

The detection time of input change (either rising edge or falling edge) is stored here. Select which detection time is to be stored by setting ON/OFF selection flag (RWw4, RWw5).

A value in Input time information X□ (RWr10 to RWr8F) is updated only once in one synchronization cycle.

■Stored value

When the input has changed multiple times in one synchronization cycle, the time of first change is stored.

The following table lists the stored values.

Stored value	Description
0 (minimum value)	Shows that no input change has been detected after data link establishment of I/O module.
4294967295999999992 (maximum value)	—

Module operation area

■Device number

Name	Device number
Module operation area	RWw0

■Description

This area is intended for module operation.

RWw0	Name
b0 to b8	Use prohibited
b9	Operation condition setting request flag
b10	Error clear request flag
b11 to b15	Use prohibited

■Operation condition setting request flag (RWw0.b9)

This area is used for parameter change of the I/O module using the program.

For operation of Operation condition setting request flag (RWw0.b9), refer to the following.

■Error clear request flag (RWw0.b10)

Turning on Error clear request flag (RWw0.b10) after eliminating the cause of the error changes the error code (RWr1) to 0.

Some error cannot be cleared with Error clear request flag (RWw0.b10) depending on its details.

• Operation in the event of a minor error

------▶ Performed by I/O module

——▶ Executed by the program
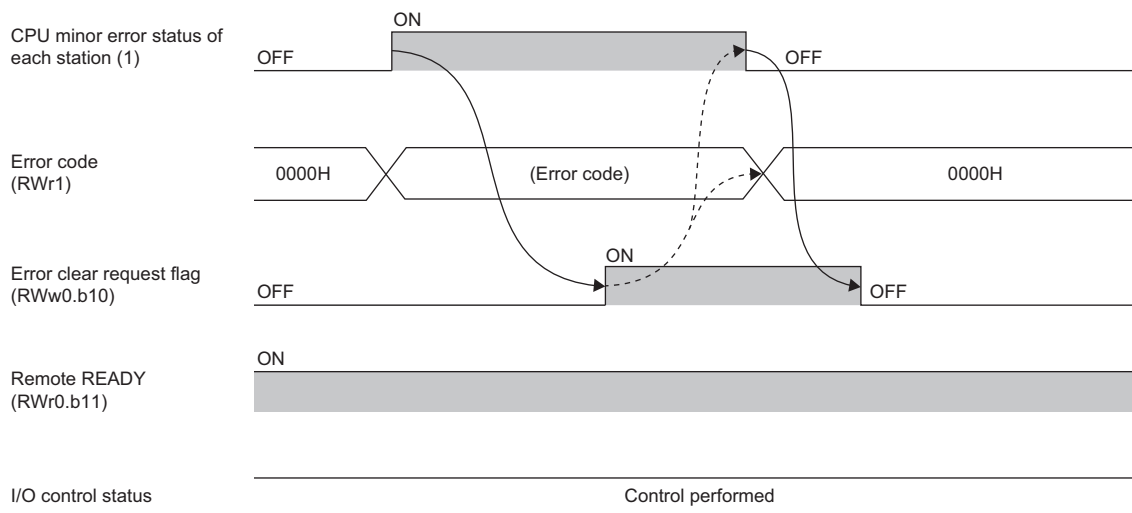
(1) Use the bit for the target station in SW0110 to SW0117 (individual station CPU minor error status) of the master station.

• Operation in the event of a moderate error

- - - - - - - ▶ Performed by I/O module

───────▶ Executed by the program

(1) Use the bit for the target station in SW0100 to SW0107 (individual station CPU moderate error status) of the master station.
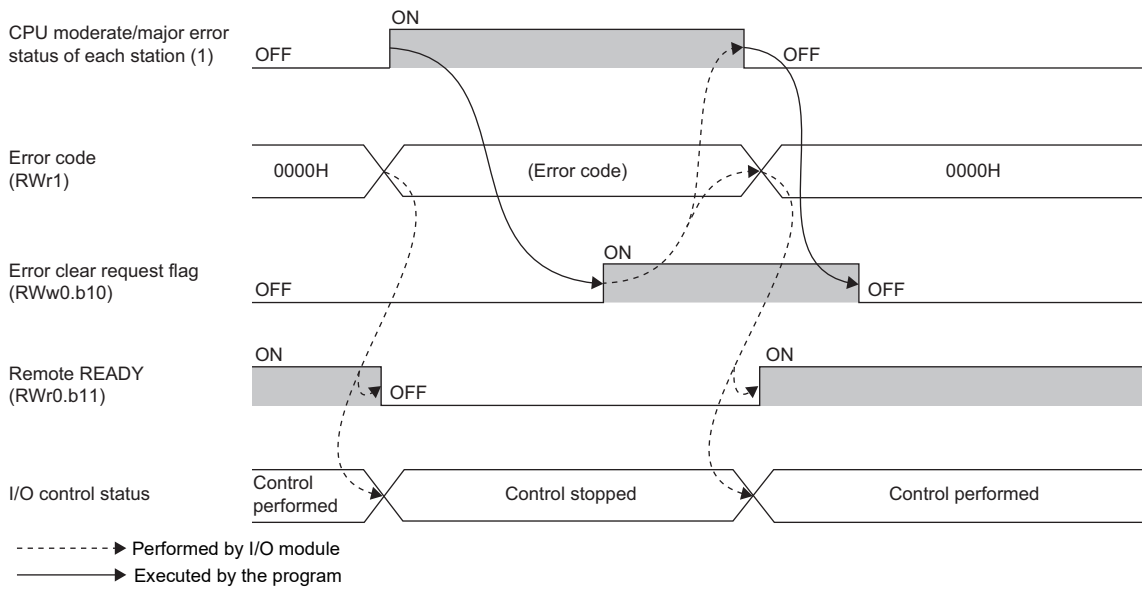
Function selection setting area

■Device number

Name	Device number
Function selection setting area	RWw2

■Description

Whether to enable or disable the function is set.

Function selection setting area			
RWw2	**Input module**	**Output module**	**I/O combined module**
b0 to b8	Use prohibited	Use prohibited	Use prohibited
b9		External power supply monitor request	External power supply monitor request
b10 to b15		Use prohibited	Use prohibited

■External power supply monitor request (RWw2.b9)

Whether to enable or disable the external power supply monitoring function is set.

Value for RWw2.b9	Setting
Off	Disable
On	Enable

ON/OFF selection flag

■Device number

Name	Device number
ON/OFF selection flag	RWw4, RWw5

■Description

This area is used for the set time synchronization control mode of the CC-Link IE TSN Network synchronous communication function. (☞ Page 177 Set time synchronization control mode)

When the input time acquisition control is used, set which input change (rising edge or falling edge) is to be detected in this area.

- Off (0): The I/O module detects the falling edge (ON→OFF) of X□.
- On (1): The I/O module detects the rising edge (OFF→ON) of X□.

When the output time setting control is used, set which operation (turning off the output or turning on the output) is to be performed at a preset time.

- Off (0): The output turns off at the time set in Output time setting Y□ (RWw10 to RWw8F).
- On (1): The output turns on at the time set in Output time setting Y□ (RWw10 to RWw8F).

ON/OFF selection flag						
Device number	I/O module (16-point module)			I/O module (32-point module)		
	Input module	Output module	I/O combined module	Input module	Output module	I/O combined module
RWw4.b0	X0	Y0	X0	X0	Y0	X0
RWw4.b1	X1	Y1	X1	X1	Y1	X1
RWw4.b2	X2	Y2	X2	X2	Y2	X2
RWw4.b3	X3	Y3	X3	X3	Y3	X3
RWw4.b4	X4	Y4	X4	X4	Y4	X4
RWw4.b5	X5	Y5	X5	X5	Y5	X5
RWw4.b6	X6	Y6	X6	X6	Y6	X6
RWw4.b7	X7	Y7	X7	X7	Y7	X7
RWw4.b8	X8	Y8	Y8	X8	Y8	X8
RWw4.b9	X9	Y9	Y9	X9	Y9	X9
RWw4.b10	XA	YA	YA	XA	YA	XA
RWw4.b11	XB	YB	YB	XB	YB	XB
RWw4.b12	XC	YC	YC	XC	YC	XC
RWw4.b13	XD	YD	YD	XD	YD	XD
RWw4.b14	XE	YE	YE	XE	YE	XE
RWw4.b15	XF	YF	YF	XF	YF	XF
RWw5.b0	—	—	—	X10	Y10	Y10
RWw5.b1	—	—	—	X11	Y11	Y11
RWw5.b2	—	—	—	X12	Y12	Y12
RWw5.b3	—	—	—	X13	Y13	Y13
RWw5.b4	—	—	—	X14	Y14	Y14
RWw5.b5	—	—	—	X15	Y15	Y15
RWw5.b6	—	—	—	X16	Y16	Y16
RWw5.b7	—	—	—	X17	Y17	Y17
RWw5.b8	—	—	—	X18	Y18	Y18
RWw5.b9	—	—	—	X19	Y19	Y19
RWw5.b10	—	—	—	X1A	Y1A	Y1A
RWw5.b11	—	—	—	X1B	Y1B	Y1B
RWw5.b12	—	—	—	X1C	Y1C	Y1C
RWw5.b13	—	—	—	X1D	Y1D	Y1D
RWw5.b14	—	—	—	X1E	Y1E	Y1E
RWw5.b15	—	—	—	X1F	Y1F	Y1F

Output Y ON information clear request

■Device number

Name	Device number
Output Y ON information clear request	RWwC, RWwD

■Description

This remote register is used to clear Output Y ON information Y□ (RWrC, RWrD). (☞ Page 197 Output ON information)

■Output Y ON information clear request Y0 to YF (RWwC)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
YF	YE	YD	YC	YB	YA	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

Off: Output Y ON information is not cleared.

On: Output Y ON information is cleared.

■Output Y ON information clear request Y10 to Y1F (RWwD)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Y1F	Y1E	Y1D	Y1C	Y1B	Y1A	Y19	Y18	Y17	Y16	Y15	Y14	Y13	Y12	Y11	Y10

Off: Output Y ON information is not cleared.

On: Output Y ON information is cleared.

A

Output Y OFF information clear request

■Device number

Name	Device number
Output Y OFF information clear request	RWwE, RWwF

■Description

This remote register is used to clear Output Y OFF information Y□ (RWrE, RWrF). (☞ Page 197 Output OFF information)

■Output Y OFF information clear request Y0 to YF (RWwE)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
YF	YE	YD	YC	YB	YA	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

Off: Output Y OFF information is not cleared.

On: Output Y OFF information is cleared.

■Output Y OFF information clear request Y10 to Y1F (RWwF)

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Y1F	Y1E	Y1D	Y1C	Y1B	Y1A	Y19	Y18	Y17	Y16	Y15	Y14	Y13	Y12	Y11	Y10

Off: Output Y OFF information is not cleared.

On: Output Y OFF information is cleared.

Synchronization output timing setting

■Device number

Name	Device number
Synchronization output timing setting Y□	RWw10 to RWw8F

■Description

When the synchronization cycle timing control mode is used, set the output timing relative to the synchronization cycle start timing.

Set the timing to change the output from OFF to ON, or from ON to OFF in one synchronization cycle.

If the values set in Synchronization output timing setting Y□ OFF to ON (RWw10, RWw11, ... , RWw8C, RWw8D) and Synchronization output timing setting Y□ ON to OFF (RWw12, RWw13, ... , RWw8E, RWw8F) are the same for one output, the output does not change.

■Setting value

Set the time (unit: ns) taken from the synchronization cycle start timing to the output change.

The following table lists the setting values.

Setting value	Description
0 to 4294967294 (00000000H to FFFFFFFEH)	The output changes at preset timing.
4294967295 (FFFFFFFFH)	The output does not change.

Output time setting

■Device number

Name	Device number
Output time setting Y0 to Y1F	RWw10 to RWw8F

■Description

When the set time synchronization control mode is used, set the time (unit: ns) to change the output here.

Set the time to turn on or turn off the output.

When the current time matches the set time, the output changes according to the setting of ON/OFF selection flag (RWw4, RWw5).

The output cannot be turned on or off multiple times in one synchronization cycle. Whether the output has actually turned on or off can be checked by using Output Y current value, after the set time has elapsed. For which operation (turning on or turning off) is to be performed at the set time, set it by using ON/OFF selection flag.

Calculate the setting value by adding a desired time (unit: ns) to the input change time (network clock) acquired from the input module.

Ex.

Using the input module and the output module combined (set time synchronization control mode)
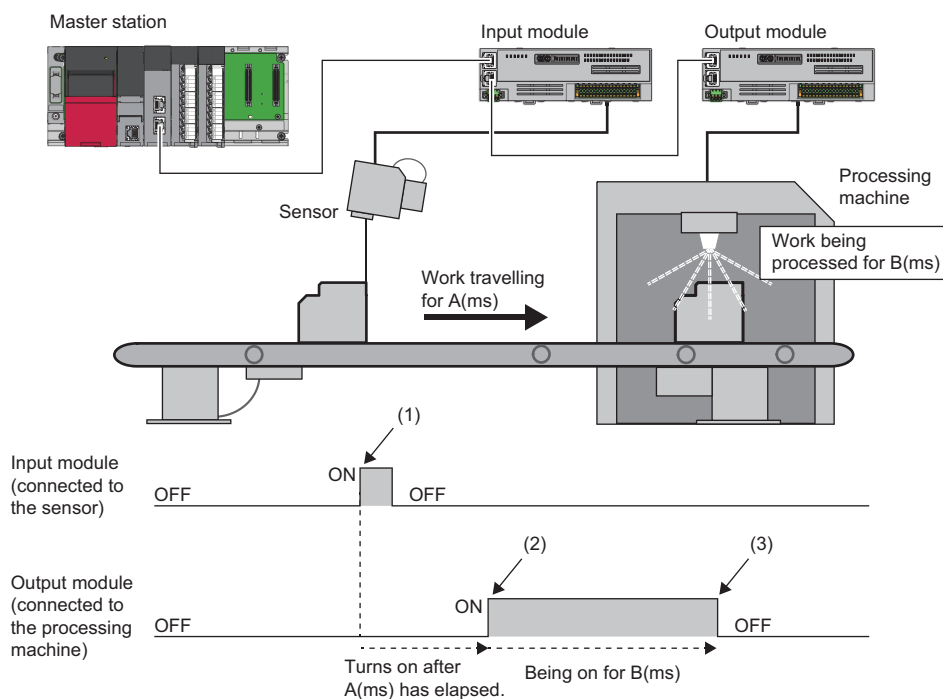
Calculate a value to be set in Output time setting Y☐ (RWw10 to RWw8F) by using the following formula.

- Value to be set in Output time setting Y☐ (RWw10 to RWw8F), to turn on the output at the timing of (2) = The time of (1) detected by the input module (value in Input time information X☐ (RWr10 to RWr8F)) + A × 1000000
- Value to be set in Output time setting Y☐ (RWw10 to RWw8F), to turn off the output at the timing of (3) = The time of (1) detected by the input module (value in Input time information X☐ (RWr10 to RWr8F)) + (A + B) × 1000000

■Setting value

The following table lists the setting values.

Setting value	Description
0 (minimum value)	The output does not change.
4294967295999999992 (maximum value)	—

Appendix 3 Remote Buffer Memory

This section describes the remote buffer memory.

The remote buffer memory consists of addresses for the parameter area and module control data area.

For the remote buffer memory, default values are set at the power-on.

Data can be read or written from/to remote buffer memory areas by using SLMP commands or dedicated instructions.

For SLMP commands, refer to the following.

☞ Page 205 SLMP Communication Function

An access to the use prohibited areas by using dedicated instructions of the master module or SLMP commands results in the following.

Read/Write method	Operation
Dedicated instruction	The dedicated instruction is completed with an error, and 4041H is stored in the REMFR/REMTO instruction execution status of the link special register of the master station.
SLMP command	An abnormal response is returned, with C05CH stored in the end code of that message.

> *Restriction* 🖑
>
> • For a single I/O module, do not execute multiple dedicated instructions at the same time. If multiple dedicated instructions are executed at the same time, the I/O module may be unable to receive the dedicated instructions, and the dedicated instructions may time out.
> • Do not read or write data from/to any "Use prohibited" remote buffer memory areas. Doing so may result in an accident due to an incorrect output or malfunction.

List of remote buffer memory areas

This section lists the remote buffer memory areas of the I/O module.

The remote buffer memory areas of the I/O module are assigned as shown below.

○: Access permitted, ×: Access not permitted

Remote buffer memory address		Area name	Target	Access method		
Decimal	Hexadecimal			CC-Link IE TSN configuration of the engineering tool	Dedicated instruction of the master module[1]	SLMP command
0, 1	0000H, 0001H	Parameter area	Parameter data	○	○	○
2 to 4	0002H to 0004H		Use prohibited	—	—	—
5	0005H		Parameter data	○	○	○
6 to 255	0006 to 00FFH		Use prohibited	—	—	—
256 to 4095	0100H to 0FFFH	Use prohibited		—	—	—
4096 to 4101	1000H to 1005H	Module control data area	Use prohibited	—	—	—
4102, 4103	1006H, 1007H		Module control data	×	○	○
4104 to 4351	1008H to 10FFH		Use prohibited	—	—	—
4352 to 4294967295	1100H to FFFFFFFFH	Use prohibited		—	—	—

*1 For the REMFR, REMFRD, REMFRIP, REMFRDIP, REMTO, REMTOD, REMTOIP, and REMTODIP instructions, refer to the following.
📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Application)

Parameter area

This area is used to perform the parameter read or the parameter write with the program.

The parameters also can be set with the function setting switches or the parameter setting window of the engineering tool.

The parameter data set by these methods is written to this area of the remote buffer memory.

Point

Parameter data is not enabled simply by having it written to the parameter area. To enable the parameter data, turning on of Operation condition setting request flag (RWw0.b9) is required. The parameter data is written to the non-volatile memory at the timing of turning on this flag (RWw0.b9) by a user.

■Parameter data

○: Applicable, ×: Not applicable

Address		Name	Default value[3]	Read	Write
Decimal	Hexadecimal				
0	0000H	Input response time setting[1]	0002H[4]	○	○
1	0001H	Output HOLD/CLEAR setting[2]	0000H	○	○
2 to 4	0002H to 0004H	Use prohibited	—	—	—
5	0005H	CC-Link IE TSN Network synchronous communication setting	0000H	○	○
6 to 255	0006H to 00FFH	Use prohibited	—	—	—

*1 This area cannot be used for the output module.
*2 This area cannot be used for the input module.
*3 This value is a factory default.
*4 For the NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN12A42-16DT, and NZ2GN12A42-16DTE, the default value is 0005H.

Module control data area

■Module control data

○: Applicable, ×: Not applicable

Address		Name	Default value[1]	Read	Write
Decimal	Hexadecimal				
4096 to 4101	1000H to 1005H	Use prohibited	—	—	—
4102	1006H	Parameter clear command	0000H	○	○
4103	1007H	Parameter clear completion	0000H	○	×
4104 to 4351	1008H to 10FFH	Use prohibited	—	—	—

*1 This is the value for when the module power supply is turned off and on or at the remote reset.

Details of remote buffer memory

This section describes the details of remote buffer memory areas of the I/O module.

Input response time setting

■Address

Name	Address
Input response time setting	0000H

■Description

Set the input response time in this area.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0 (fixed)													Setting value		

Input response time	Setting value
0ms	0H
0.2ms	1H
1ms	2H
1.5ms	3H
5ms	4H
10ms	5H
20ms	6H
70ms	7H

A value set in b3 to b15 is ignored.

To enable a set parameter, refer to the following.

■Default value

The default value is 1ms (2H).

For the NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN12A42-16DT, and NZ2GN12A42-16DTE, the default value is 10ms (5H).

Output HOLD/CLEAR setting

■Address

Name	Address
Output HOLD/CLEAR setting	0001H

■Description

Set whether to hold or clear the last status of each output for when the I/O module is disconnected or the CPU module is in STOP status.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0 (fixed)															Setting value

Output HOLD/CLEAR setting	Setting value
CLEAR	0H
HOLD	1H

A value set in b1 to b15 is ignored.

To enable a set parameter, refer to the following.

■Default value

The default value is CLEAR (0H).

CC-Link IE TSN Network synchronous communication setting

■Address

Name	Address
CC-Link IE TSN Network synchronous communication setting	0005H

■Description

Set an operation mode of the CC-Link IE TSN Network synchronous communication function.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0 (fixed)														Setting value	

Operation mode of the CC-Link IE TSN Network synchronous communication function	Setting value
Synchronous X/Y control mode	0H
Synchronization cycle timing control mode	1H
Set time synchronization control mode	2H

A value set in b2 to b15 is ignored.

If a value not listed in the above table is set, it is ignored.

When the CC-Link IE TSN Class setting is CC-Link IE TSN Class B, if the CC-Link IE TSN Network synchronous communication setting is changed after the I/O module has started data link, a minor error (error code: 0263H) occurs.

To operate the I/O module with a value after the change, turn off and on the power supply of the I/O module or perform remote reset.

When the CC-Link IE TSN Class setting is CC-Link IE TSN Class A, the I/O module ignores the CC-Link IE TSN Network synchronous communication setting.

■Default value

The default value is Synchronous X/Y control mode (0H).

Parameter clear command

■Address

Name	Address
Parameter clear command	1006H

■Description

This area is used to clear parameters saved in the non-volatile memory in the I/O module.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0 (fixed)															0: Not commanded 1: Commanded

■Operation of the parameter clear

Parameters saved in the non-volatile memory in the I/O module are cleared by turning on Parameter clear command.

Parameter clear command
(address: 1006H.b0)

Processing of the I/O module

Parameter clear completion
(address: 1007H.b0)

Read out data and check it periodically using the REMFR instruction.

REMTO
instruction

REMFR
instruction

- - - - - - - ▶ Performed by the I/O module
──────────▶ Executed by the program

(1) Parameter clear processing
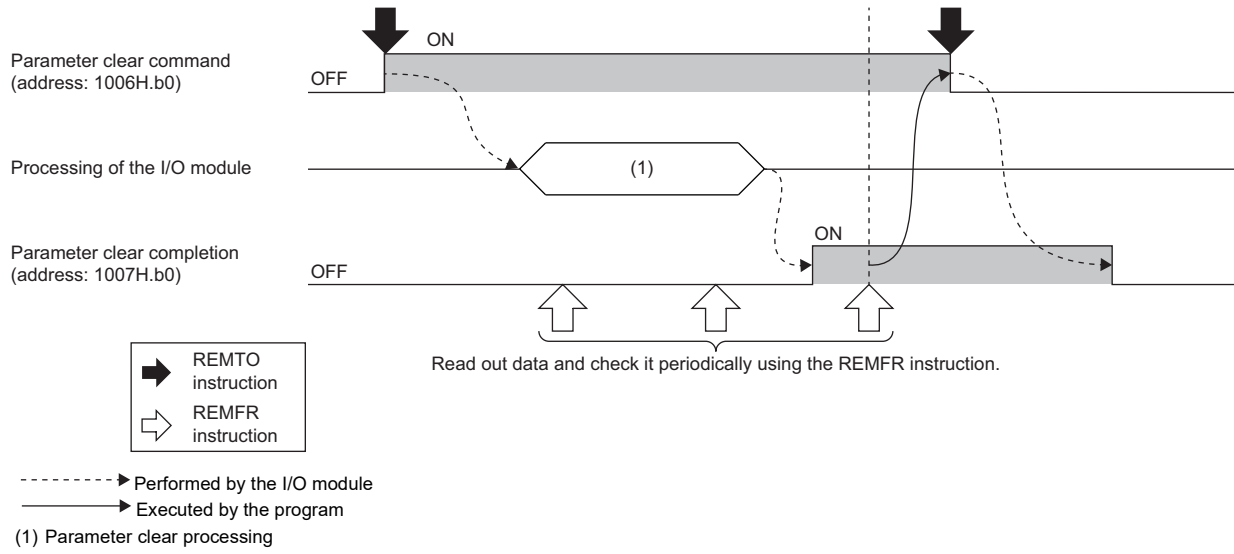
When the power supply of the I/O module is turned off and on, or remote reset is performed with any parameter not stored in the non-volatile memory in the I/O module, the I/O module operates with the parameter set by the function setting switches.

■Default value

The default value is Not commanded (0).

> **Point**
>
> Although the parameters saved in the non-volatile memory in the I/O module are cleared by turning on Parameter clear command, the following values are not changed with the parameter clear.
> - Parameters used for the operating module
> - Values stored in the remote buffer memory parameter area
> - Values stored in Parameter operating status, Function selection status area of the remote register

Parameter clear completion

■Address

Name	Address
Parameter clear completion	1007H

■Description

This area indicates whether the parameters stored in the I/O module is cleared or not.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0 (fixed)															0: Not performed 1: Completed

■Operation of the parameter clear

Since the parameter clear execution causes a moderate error (error code: 0109H), turn off and on the power supply of the I/O module or perform remote reset after the completion of parameter clear.

For operation of the parameter clear, refer to the following.

☞ Page 277 Parameter clear command

■Default value

The default value is Not performed (0).

A

Appendix 4 IP Address Setting Function Using the Engineering Tool

An IP address can be set for I/O module using the engineering tool.

To set an IP address using the engineering tool, set the IP address/station number setting switches to 0. When an IP address is set while those switches are set to a value other than 0, IP address change disable error 1 (error code: 0230H) occurs and the IP address will not be set.

> **Point**
>
> The set IP address is saved in the non-volatile memory.

Supported version

Before using the IP address setting function using the engineering tool, check the following.

- I/O module (☞ Page 295 Added and Changed Functions)
- Master module (📖 User's manual for the master station used)
- Engineering tool: Version 1.100E or later

Setting method

Operating procedure

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

☞ [Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Basic Settings] ⇨ [Network Configuration Settings]
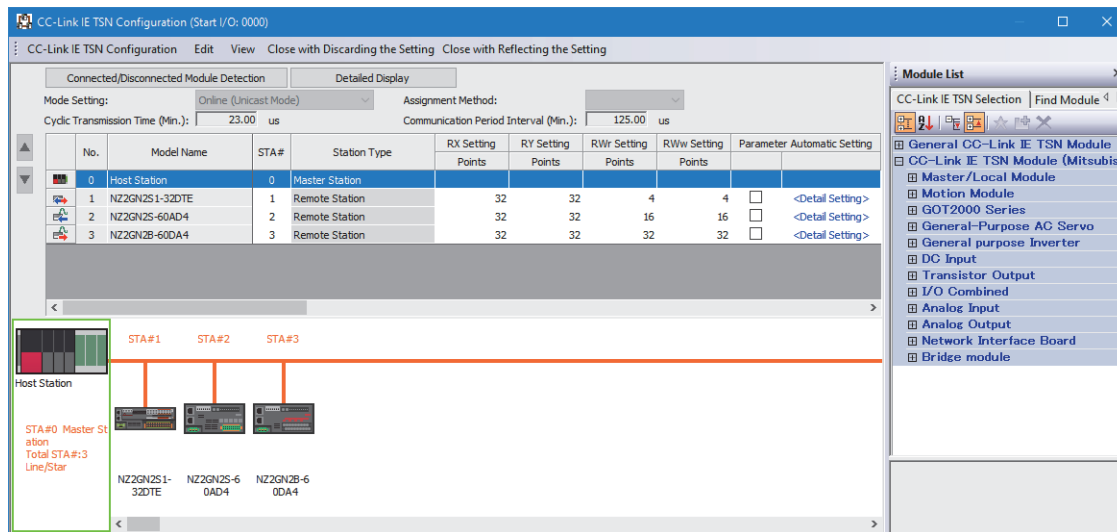
2. Display the "IP Address Setting" window.

☜ [CC-Link IE TSN Configuration] ⇨ [Online] ⇨ [IP Address Setting]
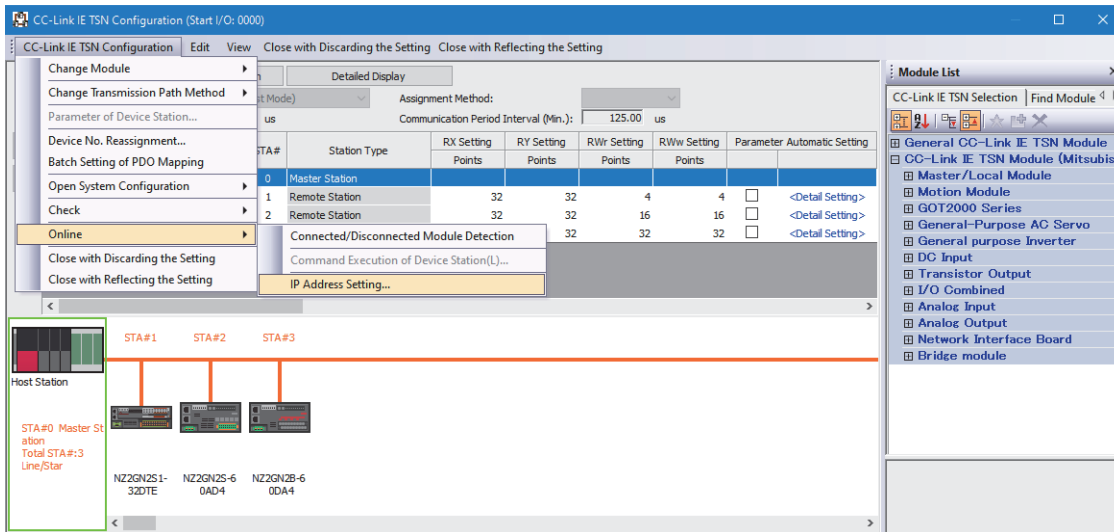
3. Click the [Real Machine Information Detection] button.

The information on the actual device connected to the master station is obtained.
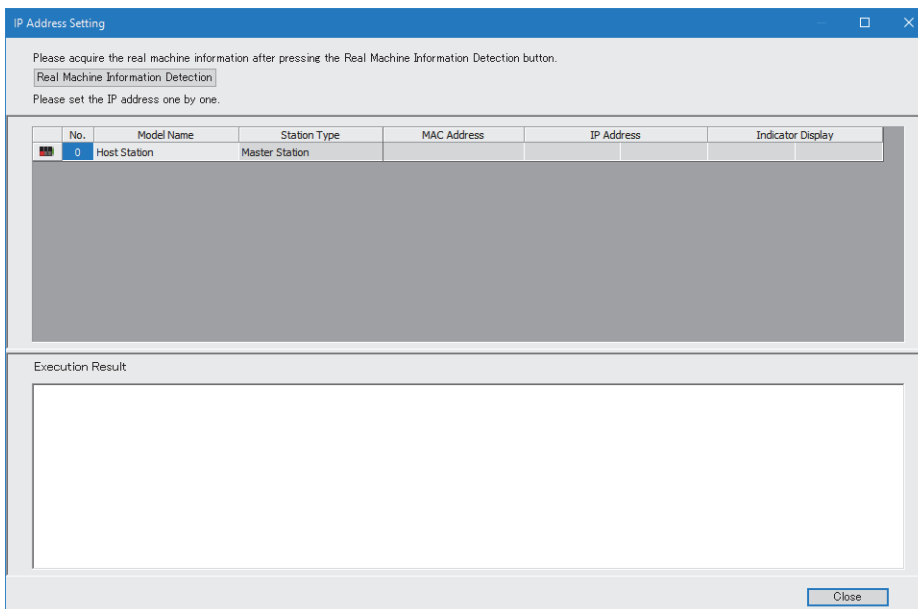
Point

When a duplicated IP address is used for the I/O module and master station, the I/O module with a duplicated IP address is not displayed on the list. For the master station, set an IP address that is different from the I/O module.

---

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

5. Follow the displayed message and click the [OK] button.

6. Click the [Start] button in "Indicator Display" for the I/O module for which to set an IP address.

No.	Model Name	Station Type	MAC Address	IP Address	Indicator Display	
0	Host Station	Master Station		192.168.3.253		
1	NZ2GN2S1-32DTE	Remote Station		192.168.3.7	Setting	Start	Stop
2	NZ2GN2S-60AD4	Remote Station		192.168.3.55	Setting	Start	Stop
3	NZ2GN2B-60DA4	Remote Station		192.168.3.40	Setting	Start	Stop
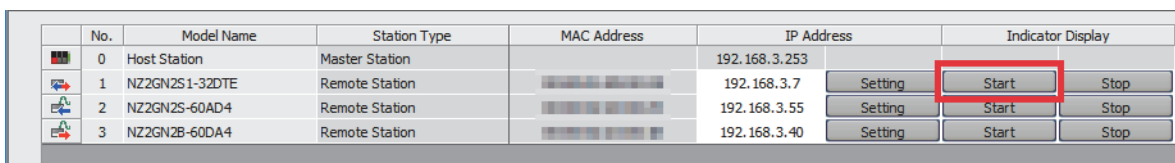
7. Follow the displayed message and click the [Yes] button.

8. When indicator display has successfully started, the RUN LED of the I/O module flashes. The execution results are displayed at the bottom of the window.

9. Enter the IP address to set in "IP Address" and click the [Setting] button.

	No.	Model Name	Station Type	MAC Address	IP Address		Indicator Display	
	0	Host Station	Master Station		192.168.3.253			
	1	NZ2GN2S1-32DTE	Remote Station		192.168.3.7	Setting	Start	Stop
	2	NZ2GN2S-60AD4	Remote Station		192.168.3.55	Setting	Start	Stop
	3	NZ2GN2B-60DA4	Remote Station		192.168.3.40	Setting	Start	Stop

10. Follow the displayed message and click the [Yes] button.

11. IP address setting is completed. The execution results are displayed at the bottom of the window.

12. Click the [Stop] button in "Indicator Display" for the I/O module whose IP address has been changed.

	No.	Model Name	Station Type	MAC Address	IP Address		Indicator Display	
	0	Host Station	Master Station		192.168.3.253			
	1	NZ2GN2S1-32DTE	Remote Station		192.168.3.7	Setting	Start	Stop
	2	NZ2GN2S-60AD4	Remote Station		192.168.3.55	Setting	Start	Stop
	3	NZ2GN2B-60DA4	Remote Station		192.168.3.40	Setting	Start	Stop

13. Follow the displayed message and click the [Yes] button.

14. When indicator display has successfully stopped, the RUN LED of the target I/O module stops flashing. The execution results are displayed at the bottom of the window.

15. To perform the process multiple times, perform the procedure from steps 6 to 14.

16. Power off the system.

> **Point**
>
> • Steps 6 to 8 and steps 12 to 14 are for visually checking the I/O module for which to set an IP address. These steps can be skipped if the checking process is not required.
> • When the IP address is set or indicator display is performed, the following error message may be displayed. An error code (1) is indicated with the last four digits. For details on error codes, refer to the following.
> 📖 User's manual for the master station to be used
> 📄 Page 239 Error Code List
>
> **MELSOFT GX Works3** ✕
>
> ℹ Error occurred during the IP Address Setting is processing at communication between PLC CPU and the connected module.
>
> The following reasons may be responsible.
> - The target module is a module for the version that does not support IP Address Setting
> - Communication timeout
> - Other processing is being executed
> - The target module is not connected
> - IP address cannot be set because the hardware switch of the target module takes priority.
>
> Please check that the target module is not restricted by the IP address setting according to the hardware switch etc.
> Please check if there is any problem with PLC CPU and network of communication route.
> Please execute IP Address Setting again after ending other processing when it is executing.
>
> Please refer to the master station and target module Operating Manuals for error details.
>
> <0x2c09d0011>
> (1)
>
> [OK]

Precautions

- When a value out of the range for the IP address is set, an IP address setting error (error code: D011H) occurs and the IP address will not be set. (☞ Page 120 Setting range)
- When an IP address is set for the I/O module using the engineering tool, the IP address is saved in the non-volatile memory and is reflected to the operation. However, if the I/O module has started to communicate with the master station, IP address change not reflected (error code: 0232H) may occur. When the error occurs, the IP address is saved in the non-volatile memory but the change in the IP address is not reflected to the operation. To reflect the change in the IP address to operation, power off and on the I/O module or perform remote reset.
- For the I/O module whose IP address has been set using the engineering tool, keep the IP address/station number setting switches at 0. If the IP address/station number setting switches are set to 1 to 254 and the data link with the master station is started after the IP address is set using the engineering tool, the IP address set using the engineering tool will be overwritten.
- Indicator display cannot be performed (started or stopped) for the I/O module on which firmware update has started. When indicator display is performed, an indicator display disable error (error code: 0280H) occurs.
- The IP address cannot be set for the I/O module on which firmware update has started. If IP address setting is performed, IP address change disable error 2 (error code: 0231H) occurs.
- If indicator display has been started, be sure to stop indicator display or power off and on the I/O module. The RUN LED of the I/O module keeps flashing until indicator display is stopped or the I/O module is powered off and on.

A

Appendix 5 CC-Link IE TSN Processing Time

Processing time of the I/O module

■Input reflection processing time of device station (input)

The input reflection processing time of the device station (input) = Input response time[1] + Internal processing time

  *1 If the input response time is "0ms", use 0.16ms for calculation.

■Output reflection processing time of device station (output)

The output reflection processing time of the device station (output) = Output response time + Internal processing time

For details on output response time, refer to the following.

■Internal processing time

Calculate the above by referring to the internal processing time of the I/O module listed below.

Model	Internal processing time	
	For input	For output
NZ2GN2S1-16D, NZ2GN2S1-32D, NZ2GN2B1-16D, NZ2GN2B1-32D, NZ2GNCF1-32D, NZ2GNCE3-32D, NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN2S1-16T, NZ2GN2S1-32T, NZ2GN2B1-16T, NZ2GN2B1-32T, NZ2GNCF1-32T, NZ2GN12A2-16T, NZ2GN2S1-16TE, NZ2GN2S1-32TE, NZ2GN2B1-16TE, NZ2GN2B1-32TE, NZ2GN12A2-16TE, NZ2GN2S1-32DT, NZ2GN2B1-32DT, NZ2GNCE3-32DT, NZ2GN2S1-32DTE, NZ2GN2B1-32DTE	0ms	0ms
NZ2GN12A42-16DT, NZ2GN12A42-16DTE	0ms	0.1ms

Appendix 6 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 specifies that "products placed on the market must be so constructed that they do not cause excessive electromagnetic interference (emissions) and are not unduly affected by electromagnetic interference (immunity)".

This section summarizes the precautions on compliance with the EMC Directive of the machinery constructed with the module.

These precautions are based on the requirements and the standards of the regulation, however, it does not guarantee that the entire machinery constructed according to the descriptions will comply with abovementioned directives.

The method and judgment for complying with the EMC Directive must be determined by the person who constructs the entire machinery.

EMC Directive related standards

■Emission requirements

Specifications	Test item	Test details	Standard value
EN61131-2: 2007	CISPR16-2-3 Radiated emission[2]	Radio waves from the product are measured.	• 30M-230MHz QP: 40dBμV/m (10m in measurement range)[1] • 230M-1000MHz QP: 47dBμV/m (10m in measurement range)
	CISPR16-2-1, CISPR16-1-2 Conducted emission[2]	Noise from the product to the power line is measured.	• 150k-500kHz QP: 79dB, Mean: 66dB[1] • 500k-30MHz QP: 73dB, Mean: 60dB

*1 QP: Quasi-peak value, Mean: Average value

*2 The module is an open type device (a device designed to be housed in other equipment) and must be installed inside a conductive control panel. Except for the waterproof I/O module, the tests are conducted with the module installed in a control panel. (The I/O module (waterproof module) is tested outside the control panel.)

■Immunity requirements

Specifications	Test item	Test details	Standard value
EN61131-2: 2007	EN61000-4-2 Electrostatic discharge immunity[1]	Static electricity is applied to the cabinet of the equipment.	• 8kV Air discharge • 4kV Contact discharge
	EN61000-4-3 Radiated, radio- frequency, electromagnetic field immunity[1]	Electric fields are radiated to the product.	80% AM modulation@1kHz • 80M-1000MHz: 10V/m • 1.4G-2.0GHz: 3V/m • 2.0G-2.7GHz: 1V/m
	EN61000-4-4 Electrical fast transient/ burst immunity[1]	Burst noise is applied to the power line and signal line.	• AC/DC main power, I/O power, AC I/O (unshielded): 2kV • DC I/O, analog, communication: 1kV
	EN61000-4-5 Surge immunity[1]	A lightning surge is applied to the power line and signal line.	• AC power line, AC I/O power, AC I/O (unshielded): 2kV CM, 1kV DM • DC power line, DC I/O power: 0.5kV CM, DM • DC I/O, AC I/O (shielded), analog[2], communication: 1kV CM
	EN61000-4-6 Conducted RF immunity[1]	High frequency noise is applied to the power line and signal line.	0.15M-80MHz, 80% AM modulation @1kHz, 10Vrms
	EN61000-4-8 Power-frequency magnetic field immunity[1]	The product is installed in an inductive magnetic field.	50Hz/60Hz, 30A/m
	EN61000-4-11 Voltage dips and interruption immunity[1]	A momentary power failure is caused to the power supply voltage.	• Apply at 0%, 0.5 cycles and zero-cross point • 0%, 250/300 cycles (50/60Hz) • 40%, 10/12 cycles (50/60Hz) • 70%, 25/30 cycles (50/60Hz)

[1] The module is an open type device (a device designed to be housed in other equipment) and must be installed inside a conductive control panel. Except for the waterproof I/O module, the tests are conducted with the module installed in a control panel. (The I/O module (waterproof module) is tested outside the control panel.)

[2] The accuracy of an analog-digital converter module may temporarily vary within ±10%.

Installation in a control panel

The module is open type devices and must be installed inside a control panel.

This ensures safety as well as effective shielding of programmable controller-generated electromagnetic noise.

■Control panel

• Use a conductive control panel.
• When securing the top or bottom plate using bolts, cover the grounding part on the control panel so that the part will not be painted.
• To ensure electrical contact between the inner plate and control panel, take measures such as covering the bolts so that conductivity can be ensured in the largest possible area.
• Ground the control panel with a thick ground cable so that low impedance can be ensured even at high frequencies.
• Holes in the control panel must be 10cm diameter or less. If the holes are larger than 10cm in diameter, radio waves may leak. In addition, because radio waves leak through a clearance between the control panel and its door, reduce the clearance as much as possible. The leakage of radio waves can be suppressed by the direct application of an EMI gasket on the paint surface.

Our tests have been carried out on a control panel having the damping characteristics of 37dB (max.) and 30dB (mean) (measured by 3m method, 30 to 300MHz).

■Wiring of power cables and ground cables

Near the power supply part, provide a ground point to the control panel. Ground the FG terminal with the thickest and shortest possible ground cable (30cm or shorter).

Cables

Use shielded cables for the cables which are connected to the module and run out from the control panel. If a shielded cable is not used or not grounded correctly, the noise immunity will not meet the specified value.

■Network cable

A shielded cable is used for the network cable. Strip a part of the jacket as shown below and ground the exposed shield in the largest possible area.
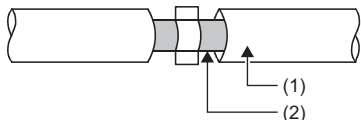
(1) Network cable
(2) Shield

■Grounding the cable clamp

Use shielded cables for external wiring and ground the shields of the external wiring cables to the control panel with the AD75CK-type cable clamp (Mitsubishi). (Ground the shield section 20 to 30cm away from the module.)
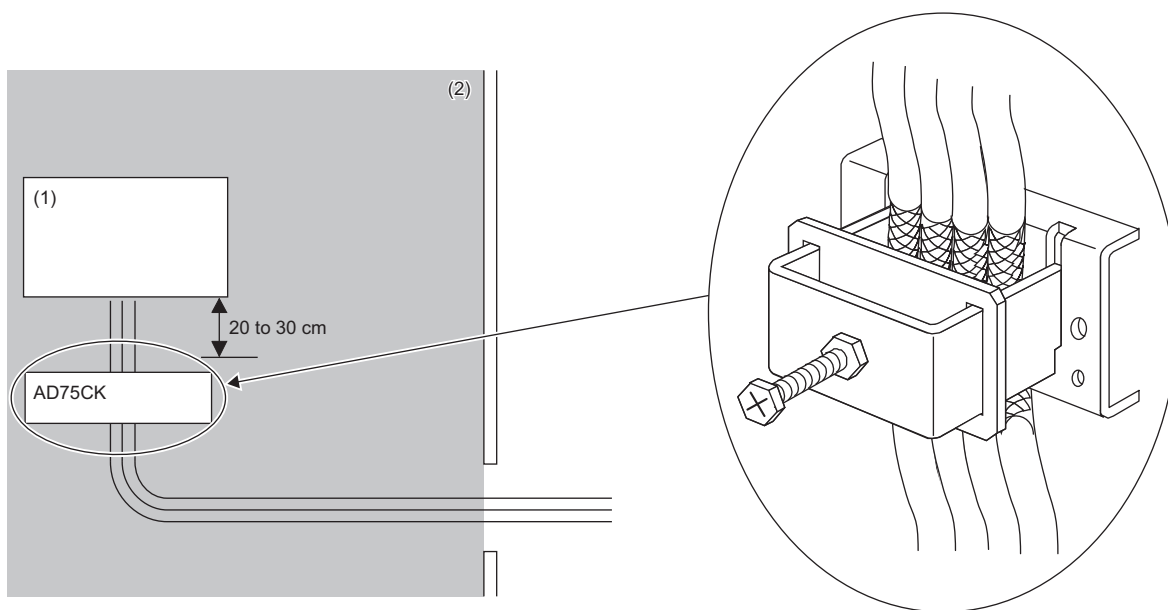
(1) Module
(2) Inside the control panel

For detail on AD75CK, refer to the following.
📖 AD75CK-type Cable Clamping Instruction Manual

External power supply

- Use a CE-marked product for an external power supply and always ground the FG terminal. (External power supply used for the tests conducted by Mitsubishi: TDK-Lambda DRJ100-24-1)
- Use a power cable of 10m or shorter when connecting it to the module power supply terminal.
- Use a power cable of 30m or shorter when connecting it to the external power supply for output part.
- Use a power cable of 3m or shorter when connecting it to the noise filter from the external power supply for output part.

A

40-pin connector

When wiring the 40-pin connector, take the following measures to reduce noise.

■Wiring example (when shielded cables are used)

The following figure shows an example of noise-reducing measures for wiring (when A6CON1 is used).
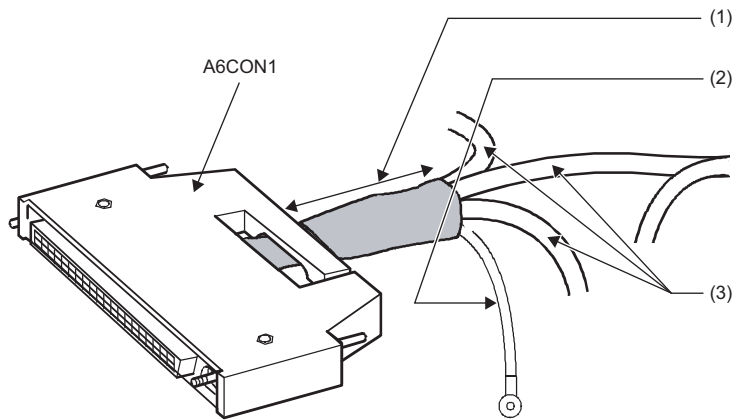
(1) Keep the distance between the connector and shielded cables as short as possible.

(2) Use an FG wire of 2mm^2 or thicker and as short as possible to ground it to the control panel. (Ground the FG wire on the module side (at the closest possible point to the module.))

(3) Use shielded cables.

■Processing example of shielded cables
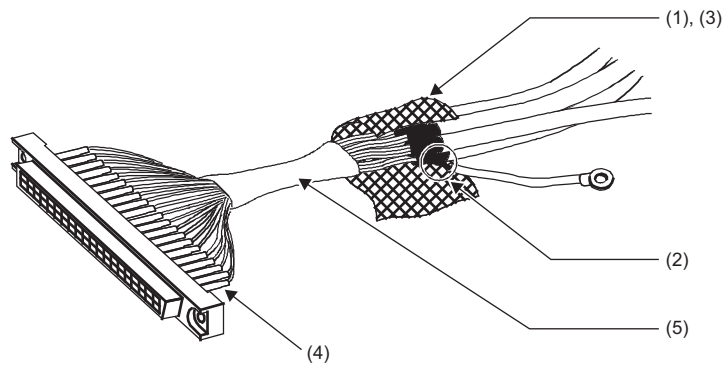
(1) Strip the jacket of each shielded cable.

(2) Choose one shielded cable, and solder its shield to the FG wire.

(3) Bind shields of shielded cables together with a conductive tape.

(4) Cover connector pins with heat-shrinkable insulation tubes to protect signal wires. If signal wires are uncovered, they may be affected by static electricity, resulting in malfunction of the module.

(5) Cover the shields with an insulating tape.

Others

■Ferrite core

A ferrite core has the effect of reducing radiated noise in the 30MHz to 100MHz band.

It is recommended to attach ferrite cores if shielded cables coming out of the control panel do not provide sufficient shielding effects.

Note that the ferrite cores must be attached at the position closest to the cable hole inside the control panel. If attached at an improper position, the ferrite core will not produce any effect.

For Ethernet cables as well as terminals that are connected to the module power supply of the I/O module and the external power supply, attach a ferrite core 4cm away from the I/O module.

The ferrite core has the effect of reducing externally conducted noise as well.

For an input module and an I/O combined module, attach a ferrite core to the cable of the power supply of the connection target device.

(Ferrite core used for the tests conducted by Mitsubishi: TOKIN Corporation ESD-SR-250, TDK Corporation ZCAT3035-1330)

Ex.

Ferrite core attachment example
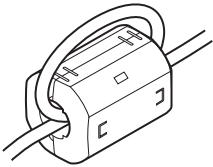
When using the I/O module (waterproof module) with the shielded cables not grounded on the module side, attach a ferrite core to signal wires to prevent the noise induced to the cables from affecting a load connected to the module.

(Ferrite core used for the tests conducted by Mitsubishi: KITAGAWA INDUSTRIES CO.,LTD. MRFC-13)

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■**Noise filter (power supply line filter)**

A noise filter is a component which has an effect on conducted noise. Attaching the filter can suppress more noise. (The noise filter has the effect of reducing conducted noise of 10MHz or less.)

Connect a noise filter to the external power supply of the I/O module. Use a noise filter with the damping characteristics equivalent to those of RSEN-2006 (manufactured by TDK-Lambda Corporation). Note that a noise filter is not required if the module is used in Zone A defined in EN61131-2.

The precautions for attaching a noise filter are described below.

• Do not bundle the cables on the input side and output side of the noise filter. If bundled, the output side noise will be induced into the input side cables from which the noise was filtered.
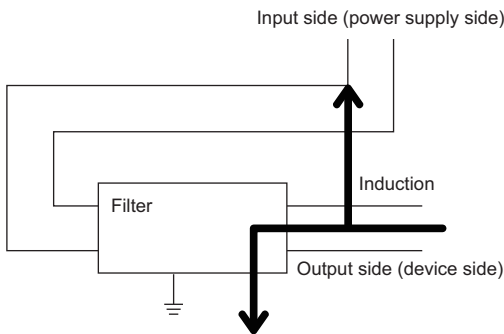
• Problem example
Noise is induced when the input and output cables are bundled.
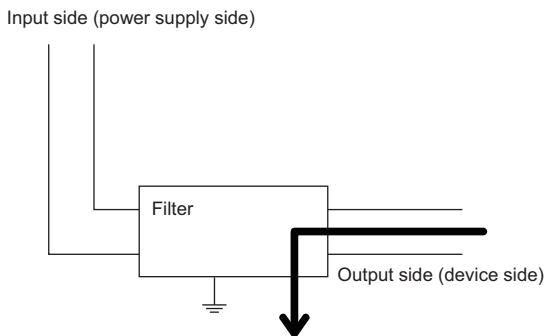
• Example of improvement
Install the input and output cables separately.

• Ground the noise filter grounding terminal to the control panel with the shortest cable possible (approx. 10cm).

Requirements to compliance with the Low Voltage Directive

The module operates at the rated voltage of 24VDC.

The Low Voltage Directive is not applied to the modules that operate at the rated voltage of less than 50VAC and 75VDC.

Appendix 7 How to Check Production Information and Firmware Version

Checking the production information

The production information of I/O module can be checked with the following.
- Rating plate
- CC-Link IE TSN/CC-Link IE Field Diagnostics

Checking on the rating plate

■I/O module (except for waterproof module)
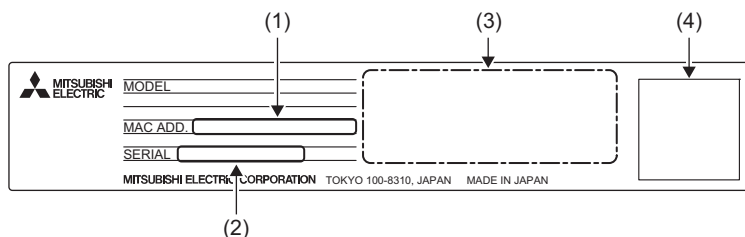
(1) MAC address
(2) Production information
(3) Relevant standard symbol
(4) QR code

■I/O module (waterproof module)
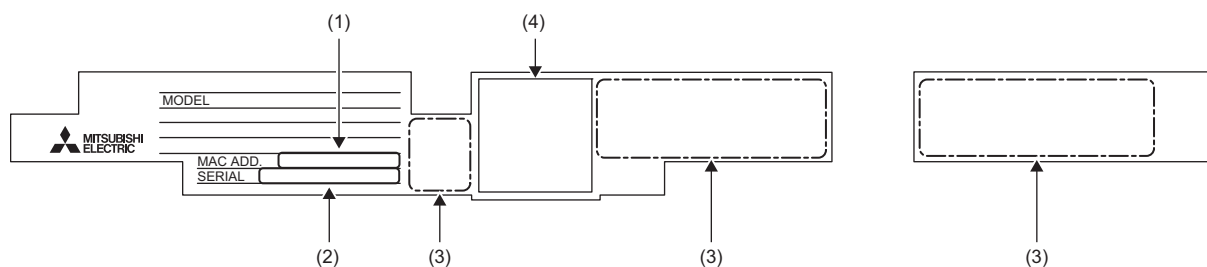
(1) MAC address
(2) Production information
(3) Relevant standard symbol
(4) QR code

Checking by using CC-Link IE TSN/CC-Link IE Field diagnostics

■Checking by each I/O module

The production information of each I/O module can be checked by following the procedure below.

Operating procedure

1. Connect the engineering tool to the CPU module.

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

👆 [Diagnostics] ⇨ [CC-Link IE TSN/CC-Link IE Field Diagnostics]

3. Right-click on the device station of which the production information is displayed, and select "Production Information".

4. The production information appears.
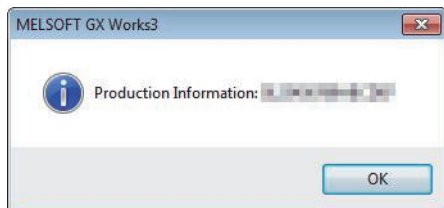
■Checking with the "Station Information List" window

For how to check the production information, refer to the following.

☞ Page 215 Checking station information

Checking the firmware version

Check the firmware version of an I/O module with the following.
- "Station Information List" window of CC-Link IE TSN/CC-Link IE Field Diagnostics
- CC-Link IE TSN Firmware Update Tool

> **Point**
>
> For an I/O module on which a firmware update has not been performed yet, the firmware version can be checked with the production information. (The first two digits of production information show the firmware version.) (☞ Page 291 Checking the production information)

Checking with the "Station Information List" window

For how to check the firmware version, refer to the following.
☞ Page 215 Checking station information

Checking with the CC-Link IE TSN Firmware Update Tool

For how to check the firmware version, refer to the "Help" of CC-Link IE TSN Firmware Update Tool.

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Appendix 8 Software Licenses and Copyright

This section describes the licenses and copyrights to the 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.

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Appendix 9 Added and Changed Functions

The functions added to or changed in the I/O module are shown.

Added functions

The following tables show the functions that were added to the I/O module and the versions supporting these functions.

■For the NZ2GN2S1-32D/32T/32TE/32DT/32DTE and NZ2GN2B1-32D/32T/32TE/32DT/32DTE

| Details of addition	Firmware version	Profile version	Reference
Communication speed setting function	"02" or later	"01" or later	☞ Page 196 Communication Speed Setting Function
CC-Link IE TSN Network synchronous communication function • Synchronous X/Y control mode	"03" or later	"02" or later	☞ Page 169 CC-Link IE TSN Network Synchronous Communication Function
Ring topology	"03" or later	—*1	☞ Page 154 Network topology setting
"Station Information List" window display	"03" or later	—*1	☞ Page 215 Checking station information
CC-Link IE TSN Network synchronous communication function • Synchronization cycle timing control mode • Set time synchronization control mode	"05" or later	"03" or later	☞ Page 169 CC-Link IE TSN Network Synchronous Communication Function
Parameter settings • Parameter automatic setting • Parameter processing of a device station	"06" or later	"04" or later	☞ Page 157 Module Parameter Setting
Command execution of a device station • Parameter clear request	"06" or later	"04" or later	☞ Page 164 How to clear parameters
CC-Link IE TSN Class setting function	"08" or later	"05" or later	☞ Page 194 CC-Link IE TSN Class Setting Function
IP address setting function using the engineering tool	"09" or later	"06" or later	☞ Page 280 IP Address Setting Function Using the Engineering Tool

*1 The function can be used regardless of the version.

■For the NZ2GN2S1-16D/16T/16TE and NZ2GN2B1-16D/16T/16TE

Details of addition	Firmware version	Profile version	Reference
Parameter settings • Parameter automatic setting • Parameter processing of a device station	"06" or later	"01" or later	☞ Page 157 Module Parameter Setting
Command execution of a device station • Parameter clear request	"06" or later	"01" or later	☞ Page 164 How to clear parameters
CC-Link IE TSN Class setting function	"08" or later	"02" or later	☞ Page 194 CC-Link IE TSN Class Setting Function
IP address setting function using the engineering tool	"09" or later	"03" or later	☞ Page 280 IP Address Setting Function Using the Engineering Tool

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■For the NZ2GNCE3-32D/32DT and NZ2GNCF1-32D/32T

Details of addition	Firmware version	Profile version	Reference
Communication speed setting function	"02" or later	"00" or later	☞ Page 196 Communication Speed Setting Function
CC-Link IE TSN Network synchronous communication function • Synchronous X/Y control mode	"03" or later	"00" or later	☞ Page 169 CC-Link IE TSN Network Synchronous Communication Function
Ring topology	"03" or later	—*1	☞ Page 154 Network topology setting
"Station Information List" window display	"03" or later	—*1	☞ Page 215 Checking station information
CC-Link IE TSN Network synchronous communication function • Synchronization cycle timing control mode • Set time synchronization control mode	"05" or later	"01" or later	☞ Page 169 CC-Link IE TSN Network Synchronous Communication Function
Parameter settings • Parameter automatic setting • Parameter processing of a device station	"06" or later	"02" or later	☞ Page 157 Module Parameter Setting
Command execution of a device station • Parameter clear request	"06" or later	"02" or later	☞ Page 164 How to clear parameters
CC-Link IE TSN Class setting function	"08" or later	"03" or later	☞ Page 194 CC-Link IE TSN Class Setting Function
IP address setting function using the engineering tool	"09" or later	"04" or later	☞ Page 280 IP Address Setting Function Using the Engineering Tool

*1 The function can be used regardless of the version.

■For the NZ2GN12A4-16D/16DE, NZ2GN12A2-16T/16TE, and NZ2GN12A42-16DT/16DTE

Details of addition	Firmware version	Profile version	Reference
Parameter settings • Parameter automatic setting • Parameter processing of a device station	"06" or later	"01" or later	☞ Page 157 Module Parameter Setting
Command execution of a device station • Parameter clear request	"06" or later	"01" or later	☞ Page 164 How to clear parameters
CC-Link IE TSN Class setting function	"08" or later	"02" or later	☞ Page 194 CC-Link IE TSN Class Setting Function
IP address setting function using the engineering tool	"09" or later	"03" or later	☞ Page 280 IP Address Setting Function Using the Engineering Tool

Function changes

The following table shows the functions that were changed in the I/O module and the versions supporting these functions.

Details of change	Firmware version	Reference
Setting values of the communication cycle interval setting	"02" or later	☞ Page 153 Communication cycle interval setting
Setting values of the communication cycle interval setting	"03" or later	☞ Page 153 Communication cycle interval setting
Operation in multicast mode	"03" or later	☞ Page 154 Communication mode

Appendix 10 External Dimensions

Spring clamp terminal block type
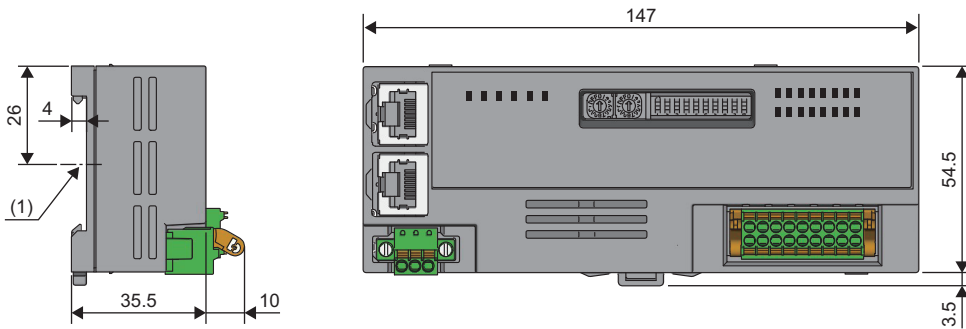
■16-point module

(1) Center of DIN rail

(Unit: mm)
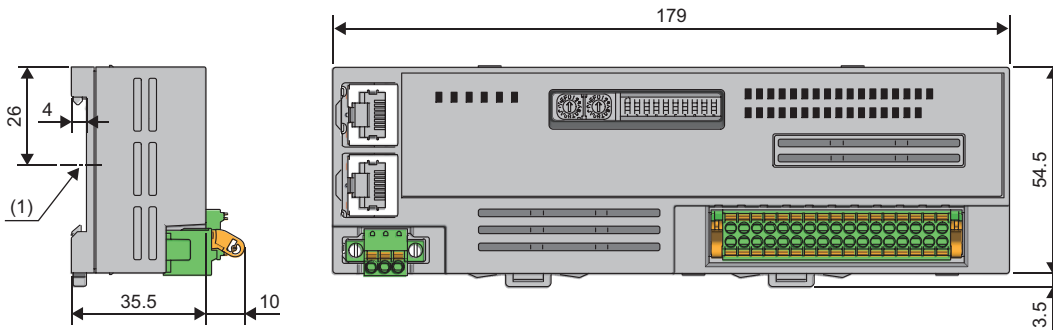
■32-point module

(1) Center of DIN rail
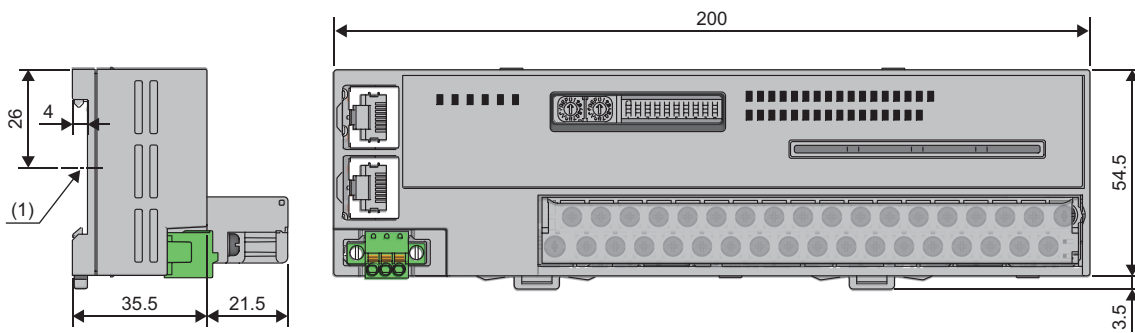
(Unit: mm)

A

Screw terminal block type

■16-point module

147

54.5
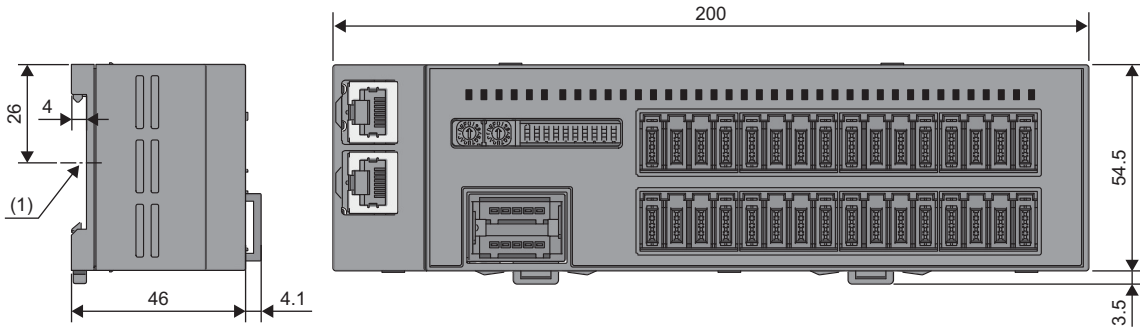
26
4

(1)

35.5   21.5

3.5

(1) Center of DIN rail

(Unit: mm)

■32-point module

200

54.5

26
4

(1)

35.5   21.5

3.5
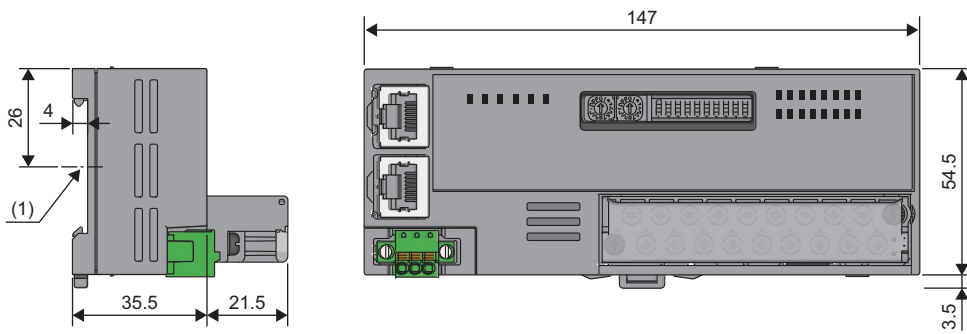
(1) Center of DIN rail

(Unit: mm)

40-pin connector type

179

54.5

26
4

(1)

35.5   3.4

3.5
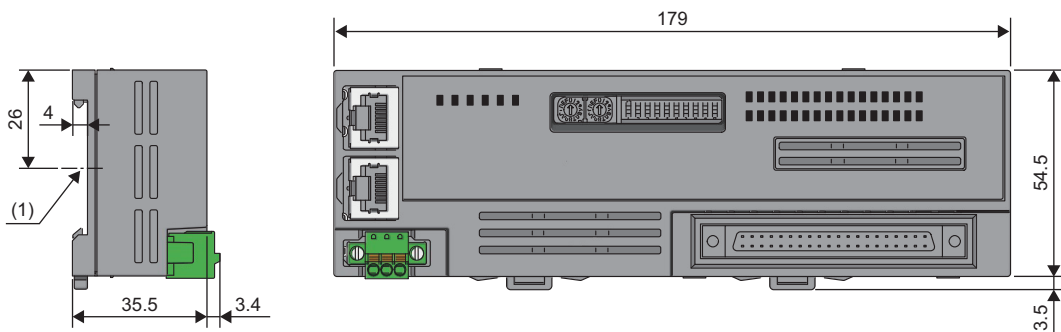
(1) Center of DIN rail

(Unit: mm)

Sensor connector (e-CON) type

(1) Center of DIN rail

(Unit: mm)

Waterproof/dustproof connector type
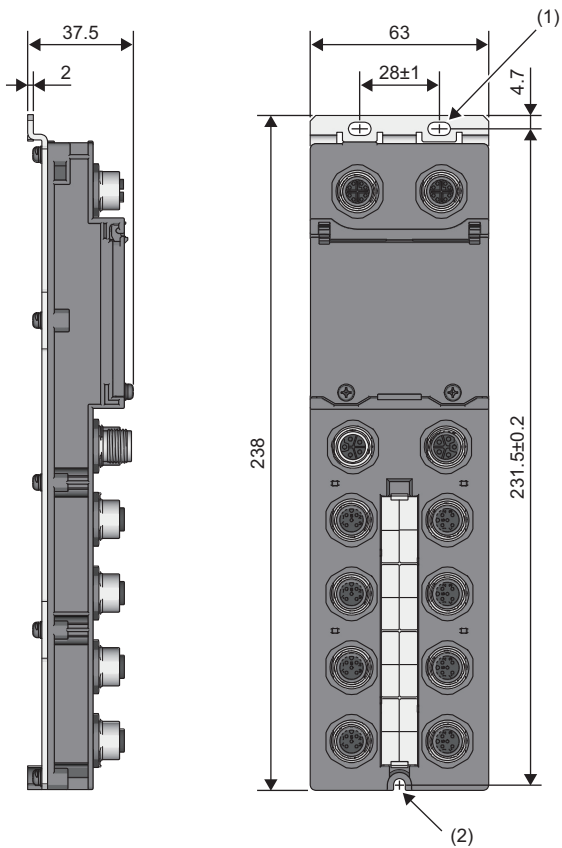
(1) 2-4.5 × 8 slotted hole (M4 mounting screw)
(2) M4 mounting screw

(Unit: mm)

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MEMO

REVISIONS

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

Revision date	*Manual number	Revision
May 2019	SH(NA)-082135ENG-A	First edition
November 2019	SH(NA)-082135ENG-B	■Added functions Communication cycle interval setting, communication speed setting function, firmware update function ■Added or modified parts Cover, INTRODUCTION, RELEVANT MANUALS, GENERIC TERMS AND ABBREVIATIONS, Chapter 2, Section 3.2, 3.3, 3.4, Chapter 4, Section 5.1, 6.2, 6.6, 7.1, 8.2, 8.3, 8.8, 9.2, 11.1, 11.2, 11.3, 11.4, 11.7, Appendix 1, 2, 3, 5, 6
May 2020	SH(NA)-082135ENG-C	■Added models NZ2GNCF1-32D, NZ2GNCE3-32D, NZ2GNCF1-32T, NZ2GNCE3-32DT ■Added function CC-Link IE TSN Network synchronous communication function ■Added or modified parts SAFETY PRECAUTIONS, INTRODUCTION, RELEVANT MANUALS, TERMS, Section 1.1, Chapter 2, Section 3.2, 3.3, 3.4, Chapter 4, 5, Section 5.1, 6.2, 6.3, 6.6, 6.7, 6.8, 7.1, 8.2, 8.3, 8.4, 8.9, 9.1, Chapter 10, Section 11.1, 11.2, 11.4, 11.6, 11.7, Appendix 1, 2, 4, 5, 6, 7
July 2020	SH(NA)-082135ENG-D	■Added or modified parts SAFETY PRECAUTIONS, CONDITIONS OF USE FOR THE PRODUCT
April 2021	SH(NA)-082135ENG-E	■Added models NZ2GN2S1-16D, NZ2GN2B1-16D, NZ2GN2S1-16T, NZ2GN2B1-16T, NZ2GN2S1-16TE, NZ2GN2B1-16TE, NZ2GN12A4-16D, NZ2GN12A4-16DE, NZ2GN12A2-16T, NZ2GN12A2-16TE, NZ2GN12A42-16DT, NZ2GN12A42-16DTE ■Added functions Synchronization cycle timing control mode, set time synchronization control mode (CC-Link IE TSN Network synchronous communication function) ■Added or modified parts SAFETY PRECAUTIONS, INTRODUCTION, RELEVANT MANUALS, TERMS, GENERIC TERMS AND ABBREVIATIONS, Section 1.1, Chapter 2, Section 3.1, 3.2, 3.3, Chapter 4, Section 5.1, 6.1, 6.2, 6.3, 6.4, 6.5, 6.7, 6.8, 6.9, 6.10, 6.11, 7.1, 8.1, 8.3, 8.9, Chapter 10, Section 11.1, 11.2, 11.4, 11.7, Appendix 1, 2, 3, 4, 5, 6, 7
July 2021	SH(NA)-082135ENG-F	■Added or modified parts Section 6.9
October 2021	SH(NA)-082135ENG-G	■Added or modified parts RELEVANT MANUALS, TERMS, Section 3.4, Chapter 4, Section 5.1, 6.2, 7.2, 8.1, 8.2, 8.3, 8.10, 11.2, 11.4, 11.7, Appendix 2, 3, 5, 7
May 2022	SH(NA)-082135ENG-H	■Added function CC-Link IE TSN Class setting function ■Added or modified parts Section 3.3, 3.4, Chapter 4, Section 6.2, 6.10. 7.1, 7.2, 8.3, 8.4, 11.2, 11.7, Appendix 2, 3, 7, INDEX
October 2023	SH(NA)-082135ENG-I	■Added or modified parts Chapter 2, Section 3.3, 5.1, 6.2, 6.5. 6.9, 8.10, 11.2, 11.4, 11.6, 11.7, Appendix 4, 8, 9

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WARRANTY

Please confirm the following product warranty details before using this product.

1. **Gratis Warranty Term and Gratis Warranty Range**

   If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

   However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

   [Gratis Warranty Term]

   The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

   [Gratis Warranty Range]

   (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

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

   1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
   2. Failure caused by unapproved modifications, etc., to the product by the user.
   3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
   4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
   5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
   6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
   7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. **Onerous repair term after discontinuation of production**

   (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

   (2) Product supply (including repair parts) is not available after production is discontinued.

3. **Overseas service**

   Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. **Exclusion of loss in opportunity and secondary loss from warranty liability**

   Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

   (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

   (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

   (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

   (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. **Changes in product specifications**

   The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

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