MITSUBISHI ELECTRIC

Programmable Controller

Slice Remote I/O Module User's Manual

-NZ2FT-GN
-NZ2FT-BT
-NZ2FT-PN
-NZ2FT-PBV
-NZ2FT-MT
-NZ2FT-EIP

-NZ2FTS4-4DE
-NZ2FTS3-8DE
-NZ2FTS1-16DE
-NZ2FTS4-4D
-NZ2FTS3-8D
-NZ2FTS1-16D
-NZ2FTS2-4A
-NZ2FTS4-4TE
-NZ2FTS2-8TE
-NZ2FTS1-16TE
-NZ2FTS4-4T
-NZ2FTS2-8T
-NZ2FTS1-16T
-NZ2FTS3-4R
-NZ2FTS-60AD4
-NZ2FTS-60DA4
-NZ2FTS-60RD4
-NZ2FTS-60TD4
-NZ2FTS-D62P2
-NZ2FTS-D66D1
-NZ2FT-C24
-NZ2FTPDI
-NZ2FTPDO

Powered by Weidmüller

This product was jointly developed and manufactured by Mitsubishi Electric and Weidmüller Interface GmbH & Co. KG.
* Note that the warranty on this product differs from that on other programmable controller products.
(Refer to "WARRANTY" in this manual.)

COPYRIGHT

This document is protected by the law of copyright, whereby all rights established therein remain with the company Mitsubishi Electric Corporation. Reproduction of this document or parts of this document is only permissible within the limits of the legal determination of Copyright Law. Alteration or abridgement of the document is not permitted without the explicit written approval of the company Mitsubishi Electric Corporation.

PRECAUTIONS REGARDING WARRANTY AND SPECIFICATIONS

The slice remote I/O module was jointly developed and manufactured by Mitsubishi Electric and Weidmüller Interface GmbH & Co.KG. Note that there are some precautions regarding warranty and specifications of this product.

• Warranty

Item	Slice remote I/O module	Other programmable controller products (e.g. MELSEC iQ-R series)
Gratis warranty term	24 months from the delivery or 36 months from the production date	36 months from the delivery or 42 months from the production date
Repair term after discontinuation of production	Not applicable*1	Applicable (7 years from the discontinuation of production)

*1 Please note that this product cannot be repaired. Therefore, free replacement is arranged for the failure of our responsibility during the warranty period.

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

- When a communication failure occurs in the network, data in the master module are held. Check the signals indicating the data link status of each station and configure an interlock circuit in the program to ensure that the entire system will operate safely.
- 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.

[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.
- The main switch, the switches of the subsequent circuits, the cable cross sections and the fuse protection have to be configured according to IEC 61010. The current demand must be calculated separately for each slave station.
- In the case of modules without fused external devices, all cables to the connected devices must be fused corresponding to their conductor cross-section (DIN VDE 0298 Part 4).
- To meet UL-specifications in accordance with UL 248-14, a UL-certified automatic fuse (e.g. ABB Type S201-B16) or a 10A fuse with a medium time-lag (e.g. ESKA Part No.522.227) must be used.
- All connections of the slave stations are protected against voltage pulses and overcurrent in accordance with IEC 61131-2, Zone B. The operator has to decide whether additional overvoltage protection according to IEC 62305 is required. Voltages that exceed ±30V may cause the destruction of couplers and I/O modules.

[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.
- According to IEC 61340-5-1 and IEC 61340-5-2, ensure that the static electricity is discharged from the human body before handling the module or connection cables. Failure to do so may cause the module to fail or malfunction.
- Note, during insulation test, that the test voltage between 24V and 24G must not exceed 28.8V within one channel. In addition, test voltages for all other connection points must not exceed 500V.

[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.
- Do not use the shield for equipotential bonding. Doing so can cause a serious accident.

[Precautions for using NZ2FTS2-4A]

- Be sure to supply all I/O cables from the same power source.

[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.
- Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.
- 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.

[Wiring Precautions]

⚠CAUTION

- For the cable with connector, hold the connector part of the cable. 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.
- To achieve specification according to UL 248-14, use a UL-approved Type-B automatic circuit breaker (e.g. ABB Type S201-B16) or a fuse with a maximum of 10A protection (e.g. ESKA Part No.522.227). If an improperly rated circuit protection is used, equipment may become damaged.
- Do not use auxiliary power supplies as well as signal inputs and outputs for supplying power to slave stations. Doing so may cause a failure due to an overcurrent.
- If the power supply and ambient temperature exceed 8A and 55℃, use 1.5㎟ wire for the power supply wiring. Failure to do so may cause a failure.

[Precautions for using NZ2FTS-60DA4]

- Terminals S 0-, S 1-, S 2-, and S 3- are connected to the supply potential (24G). Configure a circuit so that no compensation current will flow through the module. Failure to do so may cause a failure of the module.

[Precautions for using NZ2FTS2-4A]

- Ensure that the input frequency does not exceed 65Hz and the switching frequency does not exceed 15Hz. Failure to do so may cause a failure of the module.
- Be sure to install a slow fuse up to 4A at the input. Failure to do so may cause a failure of the module.
- When using the module in an environment where there is a risk of explosion, observe the following precautions.
  (1) Install the module in an environment without condensation, corrosives or conductive dust.
  (2) If the switching voltage or input voltage exceeds 63V, prepare a transient protection device that limits the peak voltage to 500V or less during transitions.

[Precautions for using NZ2FTS3-4R]

- When using the module in an environment where there is a risk of explosion, observe the following precautions.
  (1) Install the module in an environment without condensation, corrosives or conductive dust.
  (2) If the switching voltage or input voltage exceeds 63V, prepare a transient protection device that limits the peak voltage to 500V or less during transitions.
  (3) Be sure that the temperature does not exceed the temperature class T4 limit, because the relay may wear out. Contact resistance that exceeds 110mΩ results in a failure.
  (4) Use only resistive loads.

[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 or retightening the terminal block screws or connector screws. Failure to do so may cause the module to fail or malfunction.
- During commissioning, check that the system components do not start up unintentionally. Failure to do so may cause a serious accident.
- If the machine or system might be put into a dangerous state as a result of the removal of an electronic unit part, do not replace a unit before the machine or system is disconnected from the power. Pulling or inserting of an electronic unit part might bring the inputs and outputs of all other modules temporarily into an undefined condition.
- If the machine or system might be put into a dangerous state as a result of the removal of a connector, do not replace a connector before the machine or system is disconnected from the power. Doing so may cause malfunction of the machine or system.
- Remove connectors only while they are load current free. Failure to do so may cause a fire.

[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.
- 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 module more than 50 times (IEC 61131-2/ JIS B 3502 compliant). Exceeding the limit may cause malfunction.
- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
- For the coupler and extension power supply modules, always disconnect the terminals either simultaneously or in the correct order (disconnect the 24V terminal (red) first before disconnecting the 24G terminal (blue). Failure to do so may cause a failure due to an overcurrent.

[Disposal Precautions]

⚠CAUTION

- This product is subject to WEEE (EU Directive 2012/19/EU), which regulates the collection and recycling of electrical and electronic equipment. Ensure that the disassembled products are properly disposed of.

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 slice remote I/O module.
This manual describes the specifications, procedures before operation, system configuration, parameter settings, functions, and troubleshooting of the relevant products listed below.
Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the couplers and I/O modules to handle the product correctly.
When applying the program and circuit examples provided in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.
Please make sure that the end users read this manual.

Relevant products

NZ2FT-GN, NZ2FT-BT, NZ2FT-PN, NZ2FT-PBV, NZ2FT-MT, NZ2FT-EIP, NZ2FTS4-4DE, NZ2FTS3-8DE, NZ2FTS1-16DE, NZ2FTS4-4D, NZ2FTS3-8D, NZ2FTS1-16D, NZ2FTS2-4A, NZ2FTS4-4TE, NZ2FTS2-8TE, NZ2FTS1-16TE, NZ2FTS4-4T, NZ2FTS2-8T, NZ2FTS1-16T, NZ2FTS3-4R, NZ2FTS-60AD4, NZ2FTS-60DA4, NZ2FTS-60RD4, NZ2FTS-60TD4, NZ2FTS-D62P2, NZ2FTS-D66D1, NZ2FT-C24, NZ2FTPDI, NZ2FTPDO

CONTENTS

COPYRIGHT 1
PRECAUTIONS REGARDING WARRANTY AND SPECIFICATIONS 1
SAFETY PRECAUTIONS 2
CONDITIONS OF USE FOR THE PRODUCT 8
INTRODUCTION 9
RELEVANT MANUALS 20
TERMS 22
GENERIC TERMS AND ABBREVIATIONS 23

PART 1 SYSTEM CONFIGURATION AND WEB SERVER

CHAPTER 1 PRODUCT LINEUP 26

1.1 Coupler 26
1.2 I/O Module 26
Digital input module 26
Digital output module 26
Analog input module 26
Analog output module 26
Temperature input module 27
High-speed counter module 27
Absolute encoder module 27
Serial communication module 27
Extension power supply module 27

CHAPTER 2 OVERVIEW OF NZ2FT SYSTEM 28

2.1 Coupler and I/O Modules 29
2.2 General Specifications 30
2.3 Power Supply 31
Power supply derating 31
Calculation of current consumption 32
Calculation of power loss 34
2.4 End Bracket and End Plate 35

CHAPTER 3 INSTALLATION AND WIRING 36

3.1 Installation Environment and Installation Position of Module 36
Installation environment 36
3.2 Installation 38
Installation procedure of modules 38
Removal procedure of modules 40
3.3 Wiring Products 41
Power cable and I/O cable 41
USB cable 41
Wiring products for coupler that use the Ethernet cable 41
Wiring products for NZ2FT-BT 42
Wiring products for NZ2FT-PBV 42
Wiring products for NZ2FTS2-4A 42
Wiring products for NZ2FT-C24 42

3.4 **Wiring** . . . 43
Connection diagram . . . 43
Connector part . . . 44
Wiring of power cable and I/O cable . . . 45
Wiring of network cable . . . 46
3.5 **Module Replacement** . . . 49
Coupler . . . 49
I/O module . . . 51
Hot swap . . . 53

CHAPTER 4 WEB SERVER 59

4.1 **Connection with a Personal Computer** . . . 60
Via USB port . . . 60
Via Ethernet port . . . 62
Startup window . . . 63
Login/Logout . . . 64
HTTPS setting . . . 67
4.2 **Window Layout** . . . 69
"Overview" . . . 70
"Component view" . . . 71
"Process data" . . . 72
Changing the language . . . 73
4.3 **Functions to Set on the Web Server** . . . 74
Parameter setting . . . 74
Module parameter function . . . 75
Force mode . . . 76
I/O value setting for Hot swap . . . 79
Saving/loading parameter files . . . 80
Tag name function . . . 83
Saving/Loading customisation files . . . 84
I&M data function . . . 85
Resetting the coupler . . . 85
Initialization of the coupler . . . 86
Firmware update . . . 87
Acquisition of the service file . . . 88
4.4 **Troubleshooting** . . . 89
Troubleshooting by symptom . . . 89

CHAPTER 5 MAINTENANCE AND INSPECTION 91

PART 2 COUPLER

CHAPTER 6 OVERVIEW OF COUPLER 94

6.1 **Coupler Common Part Names** . . . 94

CHAPTER 7 NZ2FT-GN 96

7.1 **CC-Link IE TSN Configuration** . . . 96
Corresponding master module and software package . . . 96
Profiles . . . 96
7.2 **Part Names** . . . 97

IP address setting switch . . . 98
7.3 Performance Specifications . . . 99
Block diagram . . . 99
7.4 Functions . . . 100
Function list . . . 100
Cyclic transmission . . . 101
Communications using the SLMP . . . 101
IP address duplication detection . . . 102
Output value setting for fieldbus error . . . 103
Checking warning output (Process alarm) . . . 105
7.5 Procedures Before Operation . . . 106
7.6 Parameter Setting . . . 107
Master station setting . . . 107
NZ2FT-GN and I/O module setting . . . 109
Parameter list . . . 112
7.7 Access to Process Data . . . 113
Data configuration . . . 113
Allocation of master station CPU module to device . . . 115
7.8 Program Example . . . 117
Precautions for programming . . . 117
Example using the NZ2FTS-60AD4 . . . 118
7.9 Troubleshooting . . . 123
Checking with LEDs . . . 123
CC-Link IE TSN/CC-Link IE Field diagnostics . . . 126
Confirmation by status information (Status word) . . . 128
Troubleshooting by symptom . . . 129
Error code . . . 129

CHAPTER 8 NZ2FT-BT 131

8.1 CC-Link Configuration . . . 131
Corresponding master module and software package . . . 131
Profiles . . . 131
8.2 Part Names . . . 132
Rotary switch . . . 133
Connector . . . 134
8.3 Performance Specifications . . . 135
Block diagram . . . 135
8.4 Functions . . . 136
Function list . . . 136
Transmission speed auto-tracking . . . 137
Output value setting for fieldbus error . . . 138
Checking warning output (Process alarm) . . . 140
8.5 Procedures Before Operation . . . 142
8.6 Parameter Setting . . . 143
Master station setting . . . 143
NZ2FT-BT and I/O module setting . . . 144
Parameter list . . . 145
8.7 Access to Process Data . . . 147
Data configuration . . . 147
Allocation of master station CPU module to device . . . 149

Concept of data length . . . 151
Number of I/O modules that can be mounted per station . . . 152
8.8 Program Example . . . 154
Precautions for programming . . . 154
Example using the NZ2FTS-60AD4 . . . 155
Example using the NZ2FTS-60RD4 . . . 159
8.9 Troubleshooting . . . 162
Checking with LEDs . . . 162
CC-Link diagnostics . . . 165
Confirmation by status information (Status word) . . . 166
Troubleshooting by symptom . . . 167

CHAPTER 9 NZ2FT-PN 168

9.1 PROFINET Configuration . . . 168
Corresponding master module and software package . . . 168
GSDML file . . . 168
9.2 Part Names . . . 169
9.3 Performance Specifications . . . 170
Block diagram . . . 170
9.4 Functions . . . 171
Function list . . . 171
Output value setting for fieldbus error . . . 173
Option handling . . . 174
Acyclic communication - Implicit read data record . . . 190
Acyclic communication - Explicit write data record . . . 192
Acyclic communication - Explicit read data record . . . 193
Alarm request . . . 194
Alarm ACK . . . 196
Alarm log acquisition . . . 198
9.5 Procedures Before Operation . . . 199
9.6 Parameter Setting . . . 200
GX Works3 setting . . . 200
GX Configurator-PN setting procedure . . . 200
Parameter list . . . 209
9.7 Access to Process Data . . . 211
Data configuration . . . 211
Assignment of the RJ71PN92 to the buffer memory . . . 212
9.8 Program Example . . . 214
Precautions for programming . . . 214
Example using the NZ2FTS-60AD4 . . . 214
9.9 Troubleshooting . . . 220
Checking with LEDs . . . 220
Confirmation by status information (Status word) . . . 223
Troubleshooting by symptom . . . 225

CHAPTER 10 NZ2FT-PBV 226

10.1 PROFIBUS-DP configuration . . . 226
Corresponding master module and software package . . . 226
GSD file . . . 226
10.2 Part Names . . . 227

Rotary switch . . . 228
PROFIBUS interface . . . 229
10.3 Performance Specifications . . . 230
Block diagram . . . 230
10.4 Functions . . . 231
Function list . . . 231
DP alarm mode switching . . . 232
Output value setting for fieldbus error . . . 233
Checking warning output (Process alarm) . . . 234
10.5 Procedures Before Operation . . . 237
10.6 Parameter Setting . . . 238
RJ71PB91V and QJ71PB92V setting . . . 238
Parameter list . . . 241
10.7 Access to Process Data . . . 242
Data width used by the I/O module . . . 242
10.8 Program Example of NZ2FT-PBV . . . 246
Precautions for programming . . . 246
Example using the NZ2FTS-60AD4 . . . 246
Example using the NZ2FTS-60RD4 . . . 249
10.9 Troubleshooting . . . 253
Checking with LEDs . . . 253
Confirmation by status information (Standard/Extended Diagnosis) . . . 255
Troubleshooting by symptom . . . 262

CHAPTER 11 NZ2FT-MT 263

11.1 MODBUS/TCP Configuration . . . 263
Corresponding master module and software package . . . 263
11.2 Part Names . . . 264
11.3 Performance Specifications . . . 265
Block diagram . . . 265
11.4 Functions . . . 266
Function list . . . 266
Additional TCP port function . . . 268
Status Modbus watchdog function . . . 268
Modbus automatic communication timeout monitoring . . . 269
Writing access in multi-client operation . . . 269
Check reference list before data exchange . . . 270
Modbus Dual LAN Mode . . . 291
Output value setting for fieldbus error . . . 292
Checking warning output (Process alarm) . . . 294
11.5 Procedures Before Operation . . . 298
11.6 Parameter Settings . . . 299
Settings on the master station (RJ71EN71) . . . 299
Settings on the master station (QJ71MT91) . . . 302
Slave station setting . . . 303
Parameter list . . . 304
11.7 MODBUS Standard Functions and MODBUS Devices . . . 307
MODBUS standard function . . . 307
Bit address . . . 309
Register address . . . 309

Response message when completed with an error. . . . 320
11.8 Access to Process Data . . . 322
Data width used by the I/O module . . . 323
Allocation of master station (RJ71EN71) CPU module to device . . . 324
Assignment of the master station (QJ71MT91) to the buffer memory . . . 331
11.9 Program Example of NZ2FT-MT . . . 337
Precautions for programming . . . 337
Example using the NZ2FTS-60AD4 (master module: RJ71EN71) . . . 338
Example using the NZ2FTS-60RD4 (master module: RJ71EN71) . . . 342
Example using the NZ2FTS-60AD4 (master module: QJ71MT91) . . . 346
Example using the NZ2FTS-60RD4 (master module: QJ71MT91) . . . 351
11.10 Troubleshooting . . . 357
Checking with LEDs . . . 357
Confirmation by status information (Coupler status) . . . 360
Troubleshooting by symptom . . . 362

CHAPTER 12 NZ2FT-EIP 363

12.1 EtherNet/IP Configuration. . . . 363
Corresponding master module and software package . . . 363
EDS file . . . 363
12.2 Part Names. . . . 364
12.3 Performance Specifications . . . 366
Block diagram . . . 366
12.4 Functions . . . 367
Function list . . . 367
Output value setting for fieldbus error . . . 369
Checking warning output (Process alarm). . . . 370
CIP object list. . . . 372
12.5 Procedures Before Operation . . . 387
12.6 Parameter Setting . . . 388
EtherNet/IP network interface module. . . . 388
Slave station setting . . . 390
Parameter list . . . 390
12.7 Access to Process Data . . . 392
Data width used by the I/O module . . . 392
12.8 Program Example of NZ2FT-EIP. . . . 395
Precautions for programming . . . 395
Example using the NZ2FTS-60AD4 . . . 395
Example using the NZ2FTS-60RD4 . . . 401
12.9 Troubleshooting . . . 407
Checking with LEDs . . . 407
Confirmation by status information (Status word) . . . 410
Troubleshooting by symptom . . . 412

PART 3 I/O MODULE

CHAPTER 13 OVERVIEW OF I/O MODULES 414

13.1 I/O Module Common Part Names. . . . 414

CONTENTS

CHAPTER 14 DIGITAL INPUT MODULE 416
14.1 NZ2FTS4-4DE. 416
Part names 416
Performance specifications 417
Input delay function and parameter setting 419
Process data 420
Troubleshooting 420
14.2 NZ2FTS3-8DE. 421
Part names 421
Performance specifications 422
Input delay function and parameter setting 424
Process data 425
Troubleshooting 425
14.3 NZ2FTS1-16DE. 426
Part names 426
Performance specifications 427
Parameter setting 428
Process data 429
Troubleshooting 429
14.4 NZ2FTS4-4D 430
Part names 430
Performance specifications 431
Input delay function and parameter setting 432
Process data 433
Troubleshooting 433
14.5 NZ2FTS3-8D 434
Part names 434
Performance specifications 435
Input delay function and parameter setting 436
Process data 437
Troubleshooting 437
14.6 NZ2FTS1-16D 438
Part names 438
Performance specifications 439
Parameter setting 440
Process data 440
Troubleshooting 440
14.7 NZ2FTS2-4A 441
Part names 441
Performance specifications 443
Parameter setting 443
Process data 444
Troubleshooting 444
14.8 Troubleshooting for Digital Input Modules 445
Checking with LEDs 445
Troubleshooting by symptom 445
CHAPTER 15 DIGITAL OUTPUT MODULE 446
15.1 NZ2FTS4-4TE 446
Part names 446

Performance specifications . . . 448
Substitute value setting function and parameter setting . . . 449
Process data . . . 449
Troubleshooting . . . 449
15.2 NZ2FTS2-8TE . . . 450
Part names . . . 450
Performance specifications . . . 452
Substitute value setting function and parameter setting . . . 453
Process data . . . 453
Troubleshooting . . . 453
15.3 NZ2FTS1-16TE . . . 454
Part names . . . 454
Performance specifications . . . 456
Parameter setting . . . 457
Process data . . . 457
Troubleshooting . . . 457
15.4 NZ2FTS4-4T . . . 458
Part names . . . 458
Performance specifications . . . 460
Substitute value setting function and parameter setting . . . 461
Process data . . . 461
Troubleshooting . . . 461
15.5 NZ2FTS2-8T . . . 462
Part names . . . 462
Performance specifications . . . 464
Substitute value setting function and parameter setting . . . 465
Process data . . . 465
Troubleshooting . . . 465
15.6 NZ2FTS1-16T . . . 466
Part names . . . 466
Performance specifications . . . 468
Parameter setting . . . 469
Process data . . . 469
Troubleshooting . . . 469
15.7 NZ2FTS3-4R . . . 470
Part names . . . 470
Performance specifications . . . 472
Substitute value setting function and parameter setting . . . 473
Process data . . . 473
Troubleshooting . . . 473
15.8 Troubleshooting for Digital Output Modules . . . 474
Checking with LEDs . . . 474
Troubleshooting by symptom . . . 474

CHAPTER 16 ANALOG INPUT MODULE 475

16.1 NZ2FTS-60AD4 . . . 475
Part names . . . 475
Performance specifications . . . 477
Functions . . . 482
Parameter settings . . . 484

Process data . . . 484
Troubleshooting . . . 485

CHAPTER 17 ANALOG OUTPUT MODULE 487

17.1 NZ2FTS-60DA4 . . . 487
Part names . . . 487
Performance specifications . . . 489
Functions . . . 495
Parameter settings . . . 496
Process data . . . 496
Troubleshooting . . . 497

CHAPTER 18 TEMPERATURE INPUT MODULE 498

18.1 NZ2FTS-60RD4 . . . 498
Part names . . . 498
Performance specifications . . . 500
Functions . . . 503
Parameter settings . . . 505
Process data . . . 506
Warning data (Process alarm data) . . . 506
Troubleshooting . . . 507
18.2 NZ2FTS-60TD4 . . . 509
Part names . . . 509
Performance specifications . . . 511
Functions . . . 514
Parameter settings . . . 517
Process data . . . 518
Warning data (Process alarm data) . . . 518
Troubleshooting . . . 519

CHAPTER 19 HIGH-SPEED COUNTER MODULE 521

19.1 NZ2FTS-D62P2 . . . 521
Part names . . . 521
Performance specifications . . . 523
Functions . . . 524
Parameter settings . . . 544
Process data . . . 545
Warning data (Process alarm data) . . . 547
Troubleshooting . . . 548

CHAPTER 20 ABSOLUTE ENCODER MODULE 550

20.1 NZ2FTS-D66D1 . . . 550
Part names . . . 550
Performance specifications . . . 552
Functions . . . 553
Parameter settings . . . 555
Process data . . . 556
Troubleshooting . . . 557

CHAPTER 21 SERIAL COMMUNICATION MODULE 558

21.1 NZ2FT-C24 . . . 558
Part names . . . 558
Performance specifications . . . 561
Functions . . . 562
Parameter settings . . . 574
Process data . . . 575
Troubleshooting . . . 576

CHAPTER 22 EXTENSION POWER SUPPLY MODULE 579

22.1 NZ2FTPDI . . . 579
Part names . . . 579
Performance specifications . . . 580
22.2 NZ2FTPDO . . . 582
Part names . . . 582
Performance specifications . . . 583

APPENDICES 585

Appendix 1 EMC and Low Voltage Directives . . . 585
Requirements for EMC Directive compliance . . . 585
Requirements for Low Voltage Directive compliance . . . 587
Appendix 2 Checking Serial Number and Firmware Version . . . 588
Checking the rating plate . . . 588
Checking with the Web server . . . 589
Appendix 3 External Dimensions . . . 590
Appendix 4 Module ID . . . 591
Module ID list . . . 591
Appendix 5 Open Source Software License . . . 592

INDEX 594

REVISIONS . . . 596
WARRANTY . . . 597
TRADEMARKS . . . 598

RELEVANT MANUALS

Manual name [manual number]	Description	Available form
Slice Remote I/O Module User's Manual [SH-082115ENG] (this manual)	Specifications, procedures before operation, system configuration, wiring, functions, programming, and troubleshooting of the slice remote I/O module	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 CC-Link System Master/Local Module User's Manual (Startup) [SH-081269ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of the CC-Link system master/local module	Print book e-Manual PDF
MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application) [SH-081270ENG]	Functions, parameter settings, programming, troubleshooting, I/O signals, and buffer memory of the CC-Link system master/local module	Print book e-Manual PDF
GX Works3 Operating Manual [SH-081215ENG]	System configuration, parameter settings, and online operations of GX Works3	e-Manual PDF
MELSEC-Q CC-Link System Master/Local Module User's Manual [SH-080394E]	Specifications, procedures before operation, system configuration, wiring, parameter settings, functions, communication examples, troubleshooting, I/O signals, and buffer memory of the CC-Link system master/local module	Print book e-Manual PDF
GX Works2 Version 1 Operating Manual (Common) [SH-080779ENG]	Functions common to simple projects and structured projects, such as the system configuration, parameter settings, and how to operate online functions of GX Works2	Print book e-Manual PDF
MELSEC iQ-F FX5 User's Manual (CC-Link) [SH-081793ENG]	CC-Link system master intelligent device module	e-Manual PDF
MELSEC iQ-R PROFINET IO Controller Module User's Manual (Startup) [SH-081679ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of the PROFINET IO controller module	Print book e-Manual PDF
MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application) [SH-081680ENG]	Functions, parameter settings, operation methods of GX Configurator-PN, programming, troubleshooting, I/O signals, and buffer memory of the PROFINET IO controller module	Print book e-Manual PDF
MELSEC iQ-R PROFIBUS-DP Module User's Manual (Startup) [SH-081855ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of the PROFIBUS-DP module	Print book e-Manual PDF
MELSEC iQ-R PROFIBUS-DP Module User's Manual (Application) [SH-081857ENG]	Functions, parameter settings, PROFIBUS Configuration Tool, programming, troubleshooting, I/O signals, and buffer memory of the PROFIBUS-DP module	Print book e-Manual PDF
PROFIBUS-DP Master Module User's Manual (Details) [SH-080572ENG]	Overview, system configuration, specifications, functions, procedures before operation, programming, and dedicated instructions of the QJ71PB92V	Print book e-Manual PDF
GX Configurator-DP Version7 Operating Manual [SH-080579ENG]	Overview, installation method, window operations of GX Configurator-DP Version 7	Print book
MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup) [SH-081256ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of Ethernet, CC-Link IE Controller Network, and CC-Link IE Field Network	Print book e-Manual PDF
MELSEC iQ-R Ethernet User's Manual (Application) [SH-081257ENG]	Functions, parameter settings, programming, troubleshooting, I/O signals, and buffer memory of Ethernet	Print book e-Manual PDF
MODBUS/TCP Interface Module User's Manual (Details) [SH-080446ENG]	Overview, system configuration, specifications, functions, procedures before operation, parameter settings, programming, and troubleshooting of the QJ71MT91	Print book e-Manual PDF
MELSEC iQ-R EtherNet/IP Network Interface Module User's Manual (Startup) [SH-081913ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of the EtherNet/IP network interface module	Print book e-Manual PDF

Manual name [manual number]	Description	Available form
MELSEC iQ-R EtherNet/IP Network Interface Module User's Manual (Application) [SH-081915ENG]	Functions, parameter settings, operation methods of EtherNet/IP Configuration Tool for RJ71EIP91, programming, troubleshooting, I/O signals, and buffer memory of the EtherNet/IP network interface 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
Buffer memory	A memory in an intelligent function module, where data (such as setting values and monitoring values) exchanged with a CPU module are stored
CC-Link	A high-speed field network that can handle control and information at the same time
CC-Link IE TSN	An integrated network that includes the CC-Link IE Field Network and SSCNET III/H Network
Cyclic transmission	A function by which data are periodically exchanged among stations on the network
Dedicated instruction	An instruction that simplifies programming for using functions of intelligent function modules
Device	A memory of a CPU module to store data. Devices such as X, Y, M, D, and others are provided depending on the intended use.
EtherNet/IP Configuration Tool for RJ71EIP91	It is a tool used to set the EtherNet/IP network configuration.
GX Configurator-DP	A tool to set PROFIBUS-DP communication parameters and slave parameters of the MELSEC-Q series and write them to the master station
GX Configurator-PN	A tool to set PROFINET communication parameters and slave parameters and write them to the master
GX Works2	The product name of the software package for the MELSEC programmable controllers
GX Works3	
Master station	A station that manages the entire network. Cyclic transmission send ranges for each station are assigned in the only one master station in a network. This station can perform cyclic transmission and transient transmission with all stations.
Process data	Process data. An area that stores I/O data of the I/O module,
PROFIBUS Configuration Tool	A tool to set PROFIBUS-DP communication parameters and slave parameters of the MELSEC iQ-R series and write them to the master station
Profiles	A file such as module or device identification information. If necessary, register it in GX Works3 or GX Works2, and enable parameter settings and monitors according to the registered module or device.
PROFINET	An industrial Ethernet protocol offered by PROFIBUS & PROFINET International
Remote station	A station that performs cyclic transmission in units of bits and words with the master station in the CC-Link IE TSN network. This station can perform transient transmission.
SLMP	SeamLess Message Protocol. A protocol that enables seamless communication between Ethernet and CC-Link and CC-Link IE networks.
SNMP	Simple Network Management Protocol. A protocol for network monitoring and network management.
Status word	Status information. Stores the operating status of the coupler.
Transient transmission	Communications excluding the cyclic transmission. A function by which data are non-periodically exchanged among nodes (stations) on the network

GENERIC TERMS AND ABBREVIATIONS

Generic term/abbreviation	Description
Analog module	A generic term for the NZ2FTS-60AD4 and NZ2FTS-60DA4
Coupler	A generic term for the NZ2FT-GN, NZ2FT-BT, NZ2FT-PBV, NZ2FT-PN, NZ2FT-MT, NZ2FT-EIP
Data link	A generic term for cyclic transmission and transient transmission
Digital I/O module	A generic term for the digital input module and digital output module
Digital input module	A generic term for the NZ2FTS4-4DE, NZ2FTS3-8DE, NZ2FTS1-16DE, NZ2FTS4-4D, NZ2FTS3-8D, NZ2FTS1-16D, NZ2FTS2-4A
Digital output module	A generic term for the NZ2FTS4-4TE, NZ2FTS2-8TE, NZ2FTS1-16TE, NZ2FTS4-4T, NZ2FTS2-8T, NZ2FTS1-16T, NZ2FTS3-4R
ECPRTCL instruction	A generic term for the dedicated instructions GP.ECPRTCL and SP.ECPRTCL used in the program that use the RJ71EN71 as the master station of the NZ2FT-MT
Extension power supply module	A generic term for the NZ2FTPDI and NZ2FTPDO
I/O module	A generic term for the digital I/O module, analog module, high-speed counter module, absolute encoder module, and extension power supply module
MBREQ instruction	A generic term for the dedicated instructions Z.MBREQ and ZP.MBREQ used in the program that use the QJ71MT91 as the master station of the NZ2FT-MT
MBRW instruction	A generic term for the dedicated instructions Z.MBRW and ZP.MBRW used in the program that use the QJ71MT91 as the master station of the NZ2FT-MT
NZ2FT system	An abbreviation for a slave station configured using a coupler and I/O modules
RWr	An abbreviation for a remote register. Word data input from a slave station to the master station.
RWw	An abbreviation for a remote register. Word data output from the master station to a slave station
RX	An abbreviation for remote input. Bit data input from a slave station to the master station.
RY	An abbreviation for remote output. Bit data output from the master station to a slave station.
Software package	A generic term for engineering tools (GX Works3, GX Works2) and tools dedicated to each network, all of which are used to set each master module
Temperature input module	A generic term for the NZ2FTS-60RD4 and NZ2FTS-60TD4

MEMO

PART 1 SYSTEM CONFIGURATION AND WEB SERVER

This part consists of the following chapters.

1 PRODUCT LINEUP

2 OVERVIEW OF NZ2FT SYSTEM

3 INSTALLATION AND WIRING

4 WEB SERVER

5 MAINTENANCE AND INSPECTION

1 PRODUCT LINEUP

The NZ2FT system consists of a coupler for communications with a master station and I/O modules for connection with external devices. For the contents common to the NZ2FT system, refer to chapters 2 to 5.

1.1 Coupler

For the contents of each coupler, refer to the following.

Item	Model	Reference
CC-Link IE TSN compatible coupler	NZ2FT-GN	Page 96 NZ2FT-GN
CC-Link compatible coupler	NZ2FT-BT	Page 131 NZ2FT-BT
PROFINET compatible coupler	NZ2FT-PN	Page 168 NZ2FT-PN
PROFIBUS-DP compatible coupler	NZ2FT-PBV	Page 226 NZ2FT-PBV
MODBUS/TCP coupler	NZ2FT-MT	Page 263 NZ2FT-MT
EtherNet/IP coupler	NZ2FT-EIP	Page 363 NZ2FT-EIP

1.2 I/O Module

For the contents of each I/O module, refer to the following.

Digital input module

Item	Model	Reference
Digital input module Input 4 points, 24VDC negative common input, 4-wire	NZ2FTS4-4DE	Page 416 NZ2FTS4-4DE
Digital input module Input 8 points, 24VDC negative common input, 3-wire	NZ2FTS3-8DE	Page 421 NZ2FTS3-8DE
Digital input module Input 16 points, 24VDC negative common input, 1-wire	NZ2FTS1-16DE	Page 426 NZ2FTS1-16DE
Digital input module Input 4 points, 24VDC positive common input, 4-wire	NZ2FTS4-4D	Page 430 NZ2FTS4-4D
Digital input module Input 8 points, 24VDC positive common input, 3-wire	NZ2FTS3-8D	Page 434 NZ2FTS3-8D
Digital input module Input 16 points, 24VDC positive common input, 1-wire	NZ2FTS1-16D	Page 438 NZ2FTS1-16D
Digital input module AC input 4 points, AC input 110V to 230V, 2-wire	NZ2FTS2-4A	Page 441 NZ2FTS2-4A

Digital output module

Item	Model	Reference
Digital output module Output 4 points, 24VDC (0.5A) transistor output (source type) 4-wire	NZ2FTS4-4TE	Page 446 NZ2FTS4-4TE
Digital output module Output 8 points, 24VDC (0.5A) transistor output (source type) 2-wire	NZ2FTS2-8TE	Page 450 NZ2FTS2-8TE
Digital output module Output 16 points, 24VDC (0.5A) transistor output (source type) 1-wire	NZ2FTS1-16TE	Page 454 NZ2FTS1-16TE
Digital output module Output 4 points, 24VDC (0.5A) transistor output (sink type) 4-wire	NZ2FTS4-4T	Page 458 NZ2FTS4-4T
Digital output module Output 8 points, 24VDC (0.5A) transistor output (sink type) 2-wire	NZ2FTS2-8T	Page 462 NZ2FTS2-8T
Digital output module Output 16 points, 24VDC (0.5A) transistor output (sink type) 1-wire	NZ2FTS1-16T	Page 466 NZ2FTS1-16T
Digital output module Output 4 points: contact output 255VAC/24VDC 6A 3-wire	NZ2FTS3-4R	Page 470 NZ2FTS3-4R

Analog input module

Item	Model	Reference
4ch analog input module	NZ2FTS-60AD4	Page 475 NZ2FTS-60AD4

Analog output module

Item	Model	Reference
4ch analog output module	NZ2FTS-60DA4	Page 487 NZ2FTS-60DA4

Temperature input module

Item	Model	Reference
4ch analog temperature input module (RTD)	NZ2FTS-60RD4	Page 498 NZ2FTS-60RD4
4ch analog temperature input module (thermocouple)	NZ2FTS-60TD4	Page 509 NZ2FTS-60TD4

High-speed counter module

Item	Model	Reference
2ch counter input module	NZ2FTS-D62P2	Page 521 NZ2FTS-D62P2

Absolute encoder module

Item	Model	Reference
1ch absolute encoder module	NZ2FTS-D66D1	Page 550 NZ2FTS-D66D1

Serial communication module

Item	Model	Reference
Serial communication module	NZ2FT-C24	Page 558 NZ2FT-C24

Extension power supply module

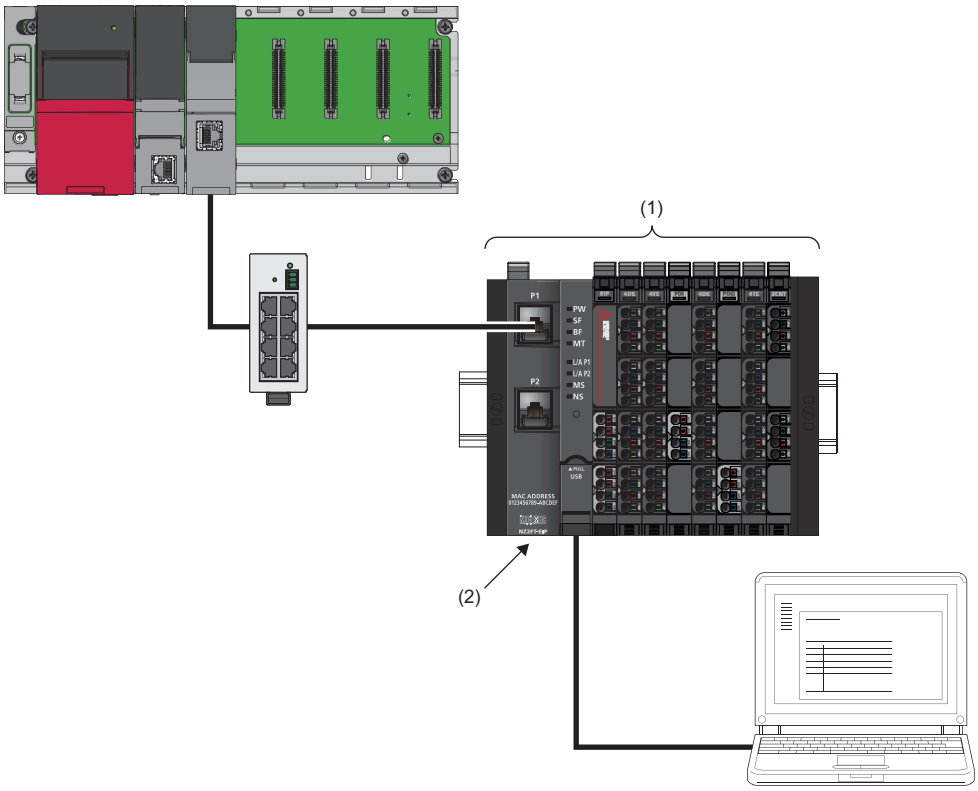
Item	Model	Reference
Extension power supply input module	NZ2FTPDI	Page 579 NZ2FTPDI
Extension power supply output module	NZ2FTPDO	Page 582 NZ2FTPDO

2 OVERVIEW OF NZ2FT SYSTEM

This chapter describes the system configuration of the NZ2FT system.

Ex.

When the coupler (2) of the NZ2FT system (1) is the NZ2FT-EIP

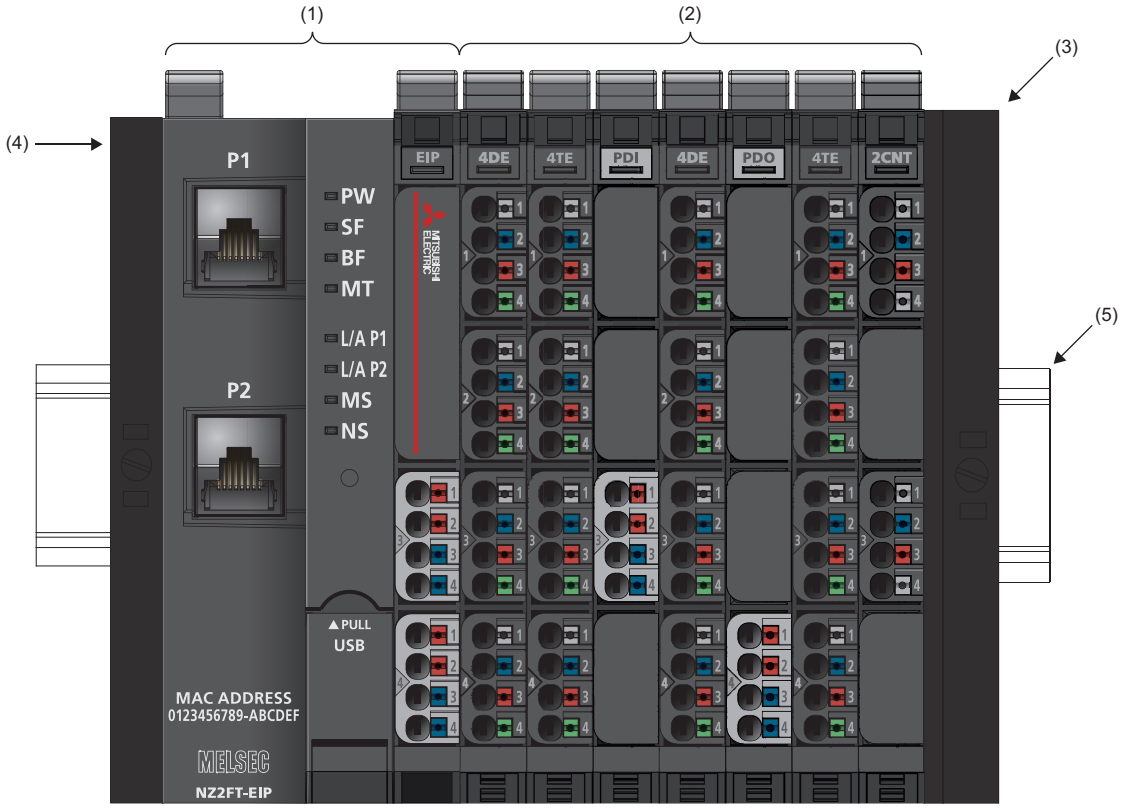


The NZ2FT system acts as a slave station and communicates with the corresponding master station at regular intervals for input/output data and at arbitrary timing.

By connecting a personal computer via the USB port or Ethernet port on the coupler, parameters can be set and the status can be monitored for the NZ2FT system that is directly connected. (☞ Page 59 WEB SERVER)

2.1 Coupler and I/O Modules

The NZ2FT system consists of a coupler for communications with a master station and I/O modules for connection with external devices. The system can be connected to various networks by changing the coupler.



No.	Name	Description
(1)	Coupler	Communicates with the master station. Power is supplied to the system and I/O modules by supplying power to the coupler.
(2)	I/O module	Connects external devices. Up to 64 devices can be connected. (The number of the connectable I/O modules depends on the restriction of the fieldbus to be used. The extension power supply module is not included in 64 modules.)
(3)	End plate	Fixes the NZ2FT system to a DIN rail on the I/O module side.
(4)	End bracket	Fixes the NZ2FT system to a DIN rail on the coupler side.
(5)	DIN rail	Installs the NZ2FT system. (☞ Page 38 Installation)

2.2 General Specifications

Item	Specifications		
Operating ambient temperature	Coupler	For horizontal installation	• -20 to 60℃ (when 2 × 8A is supplied) • -20 to 55℃ (when 2 × 10A is supplied)
		For vertical installation	• -20 to 55℃ (when 2 × 6A is supplied) • -20 to 50℃ (when 2 × 8A is supplied)
	I/O module	-20 to 60℃	
Storage ambient temperature	-40 to 85℃		
Operating ambient humidity	Coupler	10 to 95%RH, non-condensing	
	I/O module	5 to 95%RH, non-condensing	
Storage ambient humidity	Coupler	10 to 95%RH, non-condensing	
	I/O module	5 to 95%RH, non-condensing	
Vibration resistance	Compliant with JIS C 60068-2-6 and IEC 60068-2-6 • 5 to 8.4Hz: Half amplitude 3.5mm • 8.4 to 150Hz: Acceleration 1g		
Shock resistance	Compliant with JIS C 60068-2-27 and IEC 60068-2-27 (15g over 11ms, sine half-wave pulse)		
Operating atmosphere	No corrosive gas or flammable gas		
Operating altitude*1	0 to 2000m		
Storage altitude	0 to 3000m		
Installation location	Inside a control panel*2		
Overvoltage category*3	Ⅱ or lower		
Pollution degree*4	2 or less		
Equipment class	Class I		

*1 Do not use or store the coupler and I/O modules under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction. To use the modules under high 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 the premises.
Category Ⅱ applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for equipment with a rated voltage of 300V or less is 2500V.

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

Point

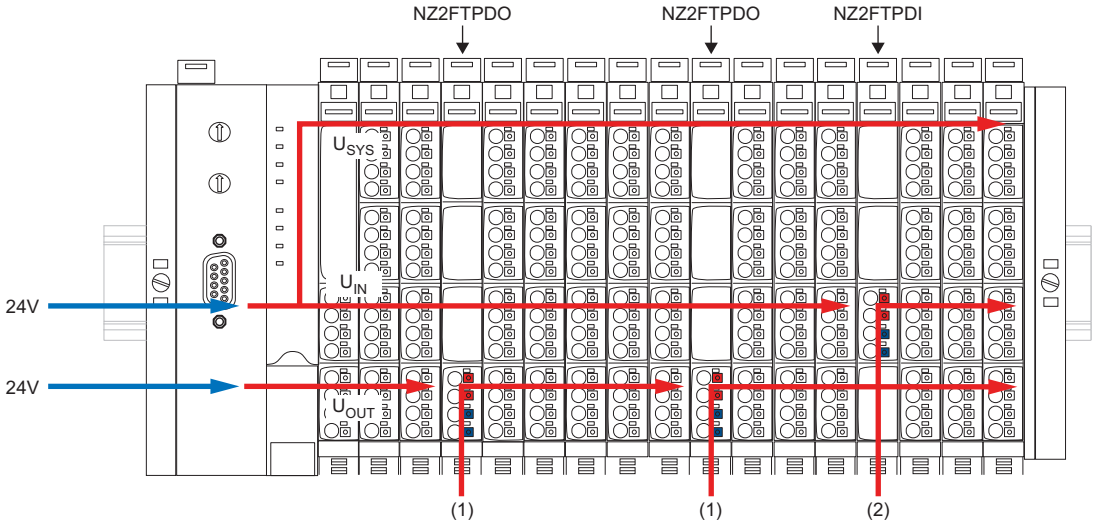
To compliant with EMC Directive, refer to the following.

☞ Page 585 EMC and Low Voltage Directives

2.3 Power Supply

Power is supplied to all modules only by supplying power from the external power supply to the coupler and extension power supply module.

The NZ2FT system has the U_{OUT} circuit for supplying power to the output circuit, U_{IN} circuit for supplying power to the input circuit, and U_{SYS} circuit for the system. If the current supplied to the entire NZ2FT system is insufficient, mount an extension power supply module.



(1) When 24V power is supplied from the NZ2FTPDO, the previous U_{OUT} and subsequent U_{OUT} are separated.
(2) When 24V power is supplied from the NZ2FTPDI, the previous U_{IN} and subsequent U_{IN} are separated.

Point

When designing the power supply, consider startup peaks.

Power supply derating

The power supply is restricted according to the ambient temperature.

Item	For horizontal installation	For vertical installation
Supply power to the coupler	• 60℃: 2 × 8A • 55℃: 2 × 10A	• 55℃: 2 × 6A • 50℃: 2 × 8A
Supply power to the extension power supply module	• 60℃: 1 × 10A	• 55℃: 1 × 8A

Precautions

- To compliant with UL 248-14, use a UL-approved Type-B automatic circuit breaker (such as ABB Type S201-B16) or use a fuse with a maximum of 10A protection (such as ESKA Part No. 522.227). Using an inappropriate rated circuit protection may cause failure.
- The auxiliary power supply, input signals, and output signals cannot be used for the power supply to the slave station. Doing so may cause failure due to overcurrent.

Calculation of current consumption

The current consumption of the slave station is calculated based on the current consumption of each module and devices connected with the I/O module and the simultaneity factor g.
Calculate the total current consumption of each module and determine whether an additional extension power supply module is required for the current circuit. When the current consumption will exceed 10A, add an extension power supply module.
For the current consumption of the slave station, the input circuit and output circuit must be calculated separately. (The system voltage need not be considered.)

Item	Description
I_{SYS}	The system path for communications with I/O modules. Current is supplied from the input power supply of the coupler. It can be supplied to up to 64 I/O modules.
I_{IN}	The path for the external device connected with the input circuit (I_S). Use the NZ2FTPDI as needed. The current path to the left I/O module of the NZ2FTPDI and the new path from the right module are separated by the NZ2FTPDI.
I_{OUT}	The path for the external device connected with the output circuit (I_L). Use the NZ2FTPDO as needed. The current path to the left I/O module of the NZ2FTPDO and the new path from the right module are separated by the NZ2FTPDO.

Input circuit

The following describes how to calculate the current consumption for the input circuit.
The current consumption of the coupler must be considered, as well as the value multiplied by the current consumption of I/O modules, current consumption of external devices, and the simultaneity factor g.

Total current consumption = I_{SYS} coupler
+ (I_{SYS} + I_{IN}) + (I_S × g) I/O module 1
+ (I_{SYS} + I_{IN}) + (I_S × g) I/O module 2
+ Σ((I_{SYS} + I_{IN}) + (I_S × g)) I/O module 3 to N

- I_{SYS}: Current consumption for the system
- I_{IN}: Current consumption for input circuit
- I_S: Current consumption of connected external devices

When using the NZ2FTPDI module, calculate the current consumption of the subsequent I/O modules and the current consumption of the connected external devices.

Total current consumption = ((I_{IN} + I_S I/O module X) × g)
+ ((I_{IN} + I_S I/O module Y) × g)
+ Σ((I_{IN} + I_S) × g) I/O module N

Output circuit

The following describes how to calculate the current consumption for the output circuit.
The value multiplied by the current consumption of I/O modules, current consumption of external devices, and the simultaneity factor g must be considered.

Total current consumption = (I_{OUT} + (I_L × g)) I/O module 1
+ (I_{OUT} + (I_L × g)) I/O module 2
+ Σ(I_{OUT} + (I_L × g)) I/O module N

- I_{OUT}: Current consumption for output circuit
- I_L: Current consumption of connected external devices

Current consumption of each module

I_{SYS}: For system, I_{IN}: For input circuit, I_{OUT}: For output circuit, I_S: External device (input circuit), I_L: External device (output circuit)

Model		I_{SYS}	I_{IN}	I_{OUT}	I_S	I_L
Coupler	NZ2FT-GN	140mA	—	—	—	—
	NZ2FT-BT	85mA	—	—	—	—
	NZ2FT-PN	110mA	—	—	—	—
	NZ2FT-PBV	85mA	—	—	—	—
	NZ2FT-MT	105mA	—	—	—	—
	NZ2FT-EIP	105mA	—	—	—	—
Digital input module	NZ2FTS4-4DE	15mA	15mA*1	—	*2	—
	NZ2FTS3-8DE	15mA	25mA*1	—	*2	—
	NZ2FTS1-16DE	15mA	55mA*1	—	*2	—
	NZ2FTS4-4D	15mA	15mA*1	—	*2	—
	NZ2FTS3-8D	15mA	25mA*1	—	*2	—
	NZ2FTS1-16D	15mA	55mA*1	—	*2	—
	NZ2FTS2-4A	15mA	—	—	*2	—
Digital output module	NZ2FTS4-4TE	15mA	—	20mA	—	*2
	NZ2FTS2-8TE	15mA	—	35mA	—	*2
	NZ2FTS1-16TE	15mA	—	25mA	—	*2
	NZ2FTS4-4T	15mA	—	20mA	—	*2
	NZ2FTS2-8T	15mA	—	25mA	—	*2
	NZ2FTS1-16T	15mA	—	15mA	—	*2
	NZ2FTS3-4R	15mA	—	20mA	—	*2
Analog module	NZ2FTS-60AD4	15mA	20mA	—	*2	—
	NZ2FTS-60DA4	15mA	—	40mA	—	—
	NZ2FTS-60RD4	15mA	20mA	—	—	—
	NZ2FTS-60TD4	15mA	15mA	—	—	—
High-speed counter module	NZ2FTS-D62P2	15mA	30mA	—	—	—
Absolute encoder module	NZ2FTS-D66D1	15mA	30mA	—	—	—
Extension power supply module	NZ2FTPDI	10mA	—	—	—	—
	NZ2FTPDO	15mA	—	—	—	—

*1 All inputs are on.
*2 Refer to the manual of the connected device.

Calculation example of current consumption

The following shows a calculation example of the current consumption using the NZ2FT-PBV, 4 modules of the NZ2FTS4-4DE, 8 modules of the NZ2FTS2-8TE, and the NZ2FTPDO.

No.	Model	I_{SYS}	I_{IN}	I_{OUT}	I_S	I_L	g	Total current consumption		
								Input circuit	Output circuit	
									Coupler	Extension power supply module
—	NZ2FT-PBV	0.085A	—	—	—	—	—	0.085A	0.000A	—
1	NZ2FTS4-4DE	0.015A	0.015A	—	0.060A	—	1	0.175A	0.000A	—
2	NZ2FTS4-4DE	0.015A	0.015A	—	0.060A	—	1	0.265A	0.000A	—
3	NZ2FTS4-4DE	0.015A	0.015A	—	0.120A	—	1	0.415A	0.000A	—
4	NZ2FTS4-4DE	0.015A	0.015A	—	0.180A	—	1	0.625A	0.000A	—
5	NZ2FTS2-8TE	0.015A	—	0.035A	—	2.000A	0.5	0.640A	1.035A	—
6	NZ2FTS2-8TE	0.015A	—	0.035A	—	4.000A	0.5	0.655A	3.070A	—
7	NZ2FTS2-8TE	0.015A	—	0.035A	—	3.000A	0.5	0.670A	4.605A	—
8	NZ2FTS2-8TE	0.015A	—	0.035A	—	2.000A	0.5	0.685A	5.640A	—
9	NZ2FTS2-8TE	0.015A	—	0.035A	—	1.200A	0.5	0.700A	6.275A	—
10	NZ2FTS2-8TE	0.015A	—	0.035A	—	4.000A	0.5	0.715A	8.310A (1)	—
—	NZ2FTPDO	0.015A	—	—	—	—	—	0.730A	—	—
11	NZ2FTS2-8TE	0.015A	—	0.035A	—	4.000A	0.5	0.745A	—	2.035A
12	NZ2FTS2-8TE	0.015A	—	0.035A	—	4.000A	0.5	0.760A	—	4.070A

For the input circuit, the extension power supply module is not required because the total current consumption for 12 I/O modules is less than 10A.

For the output circuit, the total current consumption for 10 I/O modules is 8.310A (1). If the 11th I/O module is attached, 10A will be exceeded.

8.310A + (0.035A + (4.000A × 0.5)) = 10.345A

Therefore, use the NZ2FTPDO so that the current consumption does not exceed 10A.

Remaining 1.690A in the coupler is not added to supply for the NZ2FTPDO.

Calculation of power loss

Coupler

The following describes how to calculate the power loss of the coupler.

$P_{coupler} = P_0 + N \times P_{mod} + I_{in} \times \Delta U_{in} + I_{out} \times \Delta U_{out}$

- P_0: Fixed power loss in the coupler (24V × I_{SYS})
- I_{SYS}: Current consumption for the system (☞ Page 33 Current consumption of each module)
- N: Number of modules
- P_{mod}: System power loss to the module (0.02W)
- I_{in}: Current from the input circuit
- ΔU_{in}: Voltage drop across the contacts in the input circuit (0.18V)
- I_{out}: Current from the output circuit
- ΔU_{out}: Voltage drop across the contacts in the output circuit (0.18V)

Slave station

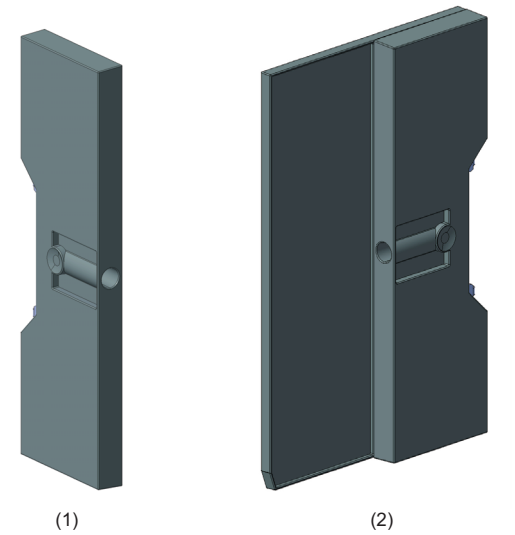
The following describes how to calculate the power loss (maximum value) of the slave station.

$P_{station} = P_{coupler} + N \times P_{module}$

- P_{module}: Power loss of I/O module (2W maximum)

2.4 End Bracket and End Plate

They are used to fix the NZ2FT system to a DIN rail. (☞ Page 38 Installation procedure of modules)



(1) (2)

(1) End bracket
(2) End plate

3 INSTALLATION AND WIRING

This chapter describes the installation environment, mounting on the DIN rail, installation of modules, and wiring.

3.1 Installation Environment and Installation Position of Module

Installation environment

Installation location

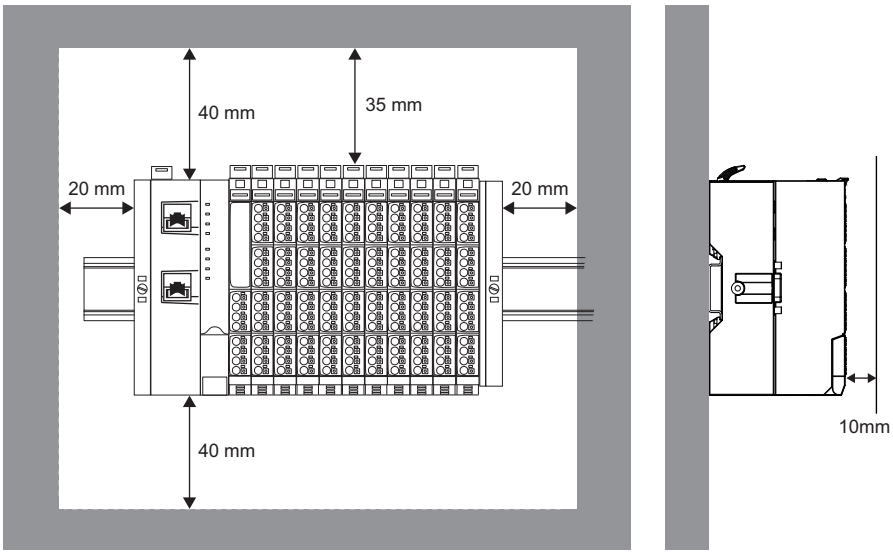
Install the module according to the installation environment shown in the general specifications. (☞ Page 30 General Specifications).

- Places where the operating ambient temperature is not within the range of general specifications
- Places where the operating ambient humidity is not within the range of general specifications
- Areas where the abrupt temperature change causes condensation
- Areas with corrosive gas or flammable gas
- Areas with much dust, iron powder or any other conductive powder, oil mist, salt, and organic solvent
- Areas subject to direct sunlight
- Areas where strong electric field or strong magnetic field is generated
- Areas where the module is affected by vibration or shock

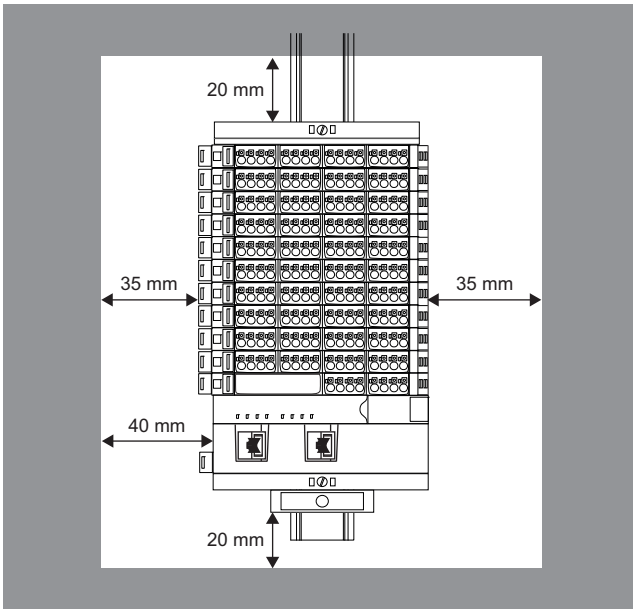
Installation position and installation orientation

When mounting a module on the control panel, observe the following distances from structures and adjacent modules to ensure good volatilization and easy module replacement.

■For horizontal installation



■For vertical installation



Precautions for installation and installation environment

- Do not touch any terminals or connectors while power is on. Doing so may lead to electric shock.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matters can cause fire, failure, or malfunction.
- Do not modify the modules. Doing so may cause failure, malfunction, injury, or fire.
- Do not touch the conductive parts of the module. Doing so can cause malfunction or failure of the module.
- Do not drop the module or apply strong shocks. Doing so may damage the module.
- Tighten the screws so that the cables are fixed in place firmly.
- Securely fix the module in place on a DIN rail. Shut off all phases of the external power supply used in the system before mounting the module to or removing it from the control panel. Failure to do so may cause the module to fail or malfunction.
- For the usage environment of the module, refer to the general specifications. Using the module in an environment other than that described in the general specifications may result in electric shock, fire, malfunction, damage, or deterioration of the product.

☞ Page 30 General Specifications

3.2 Installation

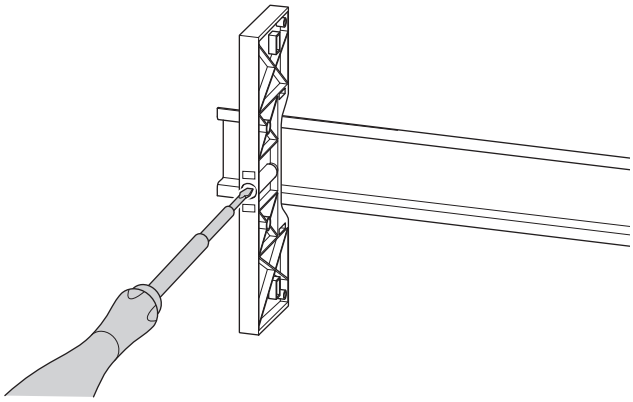
The NZ2FT system is installed to a DIN rail. Mount a DIN rail on the inner mounting plate in advance.

- Use a DIN rail made from steel or galvanized steel compliant with EN60715 standard.
- Fix the DIN rail to the inner plate every 20cm to protect it against vibration and shock.
- If the DIN rail is mounted on the grounded inner mounting plate, it need not be grounded separately.

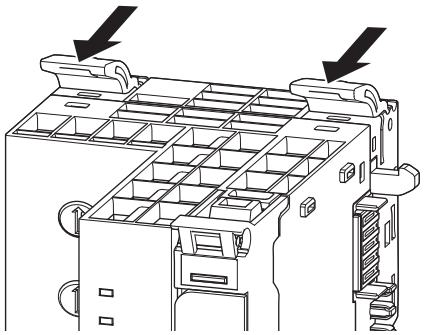
Installation procedure of modules

The following describes the procedure to mount modules on a DIN rail and converge modules.

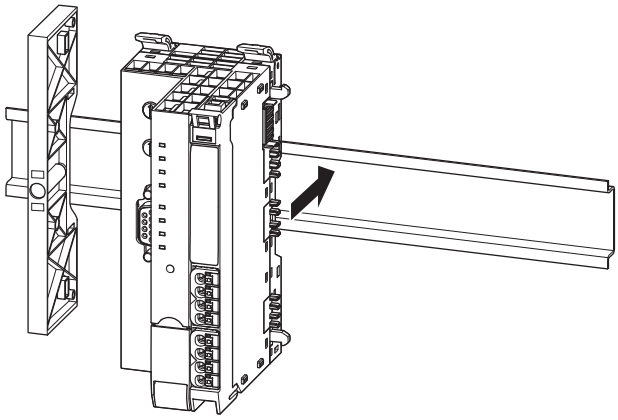
1. Attach an end bracket at the left end of the mounting position and fix it firmly with a 3mm flathead screwdriver.



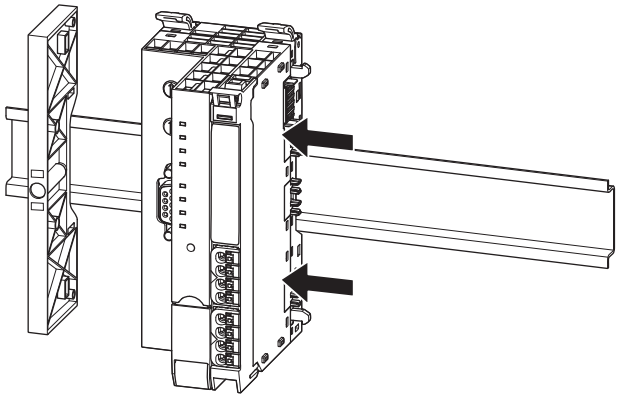
2. Push in the DIN rail fixing lever of the coupler until it clicks.



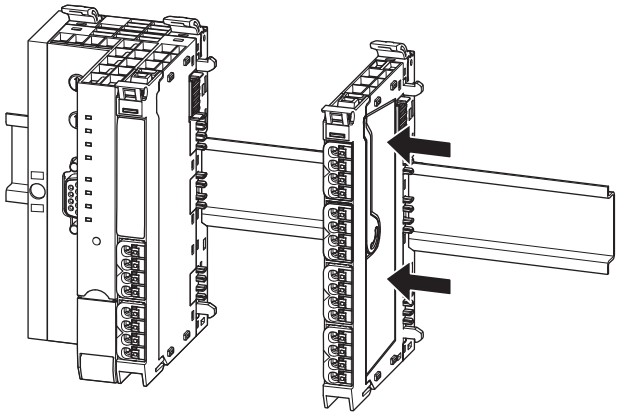
3. Mount the coupler on the DIN rail. Push in the coupler until it clicks.



4. Slide the coupler to the left until it contacts with the end bracket completely. At the same time, press the coupler to the DIN rail so that the coupler is not titled.



5. Mount the I/O module on the DIN rail and slide it to the left. Press the I/O module to the coupler until it clicks.

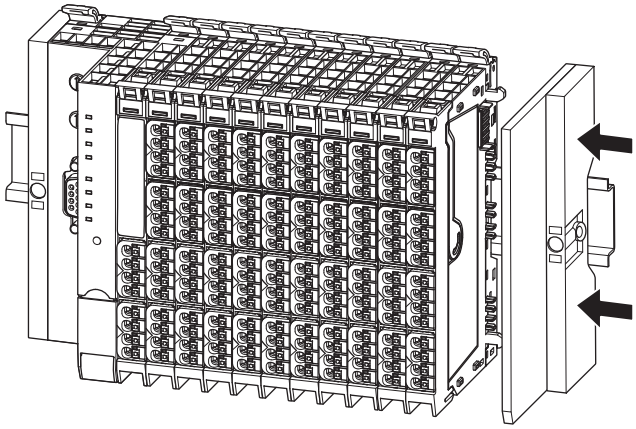


Point

The slice remote I/O module clicks when connected with the DIN rail or adjacent module correctly.

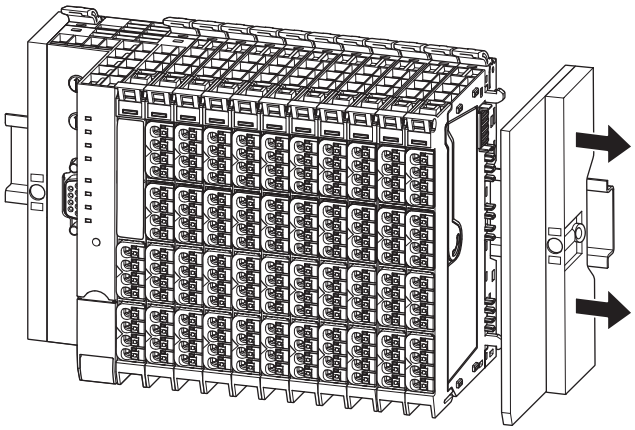
6. Mount other I/O modules in the same way.

7. Mount the end plate on the DIN rail and slide it until it contacts the last I/O module. Fix the end plate firmly with a 3mm flathead screwdriver.

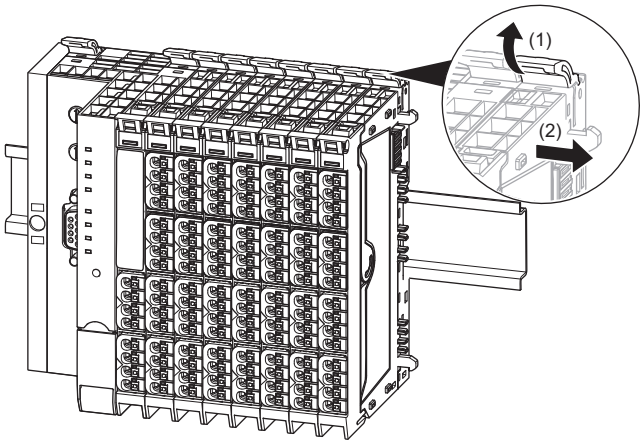


8. Check that the DIN rail fixing lever of each module is lowered. If it is not lowered, lower the DIN rail fixing lever.

Removal procedure of modules



1. Loosen the screw at the end plate on the right with a 3mm flathead screwdriver.
2. Slide the end plate to the right or remove it.



3. Lift the DIN rail fixing lever of the right end module (1) and slide the module to the right (2). After sliding the module, lower the DIN rail fixing lever.
4. Repeat procedure 3 for all modules located to the right of the module to be removed.
5. Lift the DIN rail fixing lever of the module to be removed. Slide the module to right and remove it from the DIN rail.

3.3 Wiring Products

This section describes the wiring products to be used.

Power cable and I/O cable

Use a cable that meets the following specifications for wiring.

Available device	Wire diameter	Type	Material	Peeling length
All modules	0.14 to 1.5mm² (26 to 16 AWG)	• Solid wire • Stranded wire	Copper wire	10mm ± 1mm (12mm ± 1mm for the bar solderless terminal with an insulation sleeve)

Bar solderless terminal

External dimensions of the bar solderless terminal must conform to IEC 60947-1.

The following table lists the recommended bar solderless terminals.

Manufacturer	Wire diameter	Weidmüller order No.	
		Weidmüller colour code	DIN colour code
Weidmüller Interface GmbH & Co.KG	0.14mm² (26 AWG)	9028240000	—
	0.25mm² (24 AWG)	9025760000	—
	0.34mm² (22 AWG)	9025770000	—
	0.50mm² (20 AWG)	9025870000	9019020000
	0.75mm² (18 AWG)	9025860000	9019050000
	1.00mm² (17 AWG)	9025950000	9019100000
	1.50mm² (16 AWG)	0635100000	9019130000

The following table lists the crimping tools supported by the recommended bar solderless terminals.

Manufacturer	Wire diameter	Model	Weidmüller order No.
Weidmüller Interface GmbH & Co.KG	0.25mm² to 1.5mm² (24 to 16 AWG)	PZ 6/5 ZERT	9017900000
	0.14mm² to 0.75mm² (26 to 18 AWG)	PZ 1.5 ZERT	9017310000

USB cable

Use the USB cables that meet the following standard for wiring.

Available device	Name	Connector	Standard
Coupler	Micro USB cable	Micro-B connector	Micro USB Micro-B

- Use the USB cables within 2m
- Do not use the USB extension cables.

Wiring products for coupler that use the Ethernet cable

Use a product that meets the following standards for wiring.

Available device	Name	Connector	Standard
NZ2FT-GN	Ethernet cable	RJ45 jack	Category 5e or higher, straight cable • IEEE802.3 1000base-T • ANSI/TIA/EIA-568-B (Category 5e)
• NZ2FT-PN • NZ2FT-MT • NZ2FT-EIP	Ethernet cable	RJ45 jack	Category 5 or higher, straight cable • IEEE802.3 1000base-T • ANSI/TIA/EIA-568-A (Category 5)
NZ2FT-GN	CC-Link Partner Association Certified CC-Link IE TSN Compatible Switching HUB (CC-Link Association https://www.cc-link.org/)		
• NZ2FT-PN • NZ2FT-MT • NZ2FT-EIP	Switching hub	RJ45 jack	Compliant with 10M/100M

Wiring products for NZ2FT-BT

Use a product that meets the following standards for wiring.

Network type	Name	Connector	Standard
CC-Link	Ver.1.10-compatible CC-Link dedicated cable	Socket for 5-pole PCB plug-in connector (screw connection)	Shielded twisted pair cable CC-Link Partner Association website: http://www.cc-link.org/
	Terminating resistor	—	If the NZ2FT-BT is the terminal station, a terminating resistor (110Ω) is necessary.

Wiring products for NZ2FT-PBV

Use a product that meets the following standards for wiring.

Network type	Name	Connector	Standard
PROFIBUS-DP	PROFIBUS cable	D-Sub9 pin connector Screw size: #4-40 UNC	Shielded twisted pair cable Compliant with the open network PROFIBUS standardized by the international standard IEC 61158

Wiring products for NZ2FTS2-4A

Install a 4A slow fuse.

Wiring products for NZ2FT-C24

Connection with RS-232

Use a shielded cable that meets the following standards.

Available device	Name	Connector	Standard
NZ2FT-C24	Cable	• NZ2FT-C24 side: Spring clamp terminal block • External device side: Connector compatible with external devices	LIYCY 0.14mm² or 0.34mm² Recommended: Weidmüller PAC-UNIVD9M-F-1M5, Order No. 1350400015

The following table shows the maximum cable length when connecting via RS-232.

Cable capacitance	Maximum cable length
≤2500pF	15m, shielded
55pF/m	45m

Connection with RS-485 or RS-422

Use a shielded cable that meets the following standards.

Available device	Name	Connector	Standard
NZ2FT-C24	Cable	• NZ2FT-C24 side: Spring clamp terminal block • External device side: Connector compatible with external devices	Twisted pair cable (U/UTP, Type Cat-3 or J-2YY-2x2x0,6) Recommended: LiYCY or LiYY 0.25mm²

- The following table shows the maximum cable length when connecting via RS-485 or RS-422.

Transmission speed	Maximum cable length
≤19200kbps	1200m, shielded
28800kbps	850m
38400kbps	500m
57600kbps	250m
115200kbps	200m

- Terminate both ends of the cable.
- For RS-485, use a single-core pair for the communication line. There are no restrictions on COM. Ground the other wires.
- For RS-422, connect the transmission (TXD+/TXD-) communication lines and the reception (RXD+/RXD-) communication lines in pairs. There are no restrictions on COM. Ground the other wires.

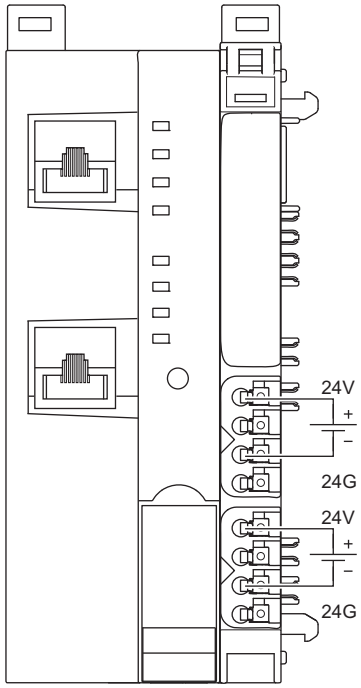
3.4 Wiring

This section describes wiring of the power cable, I/O cable, and network cable and precautions.

Connection diagram

The power line wiring is common to all couplers.

Ex.

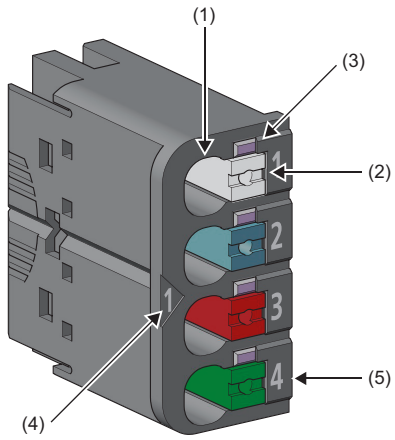


Wiring precautions

- When the power supply exceeds 8A and the ambient temperature exceeds 55℃, wire the power supply with cables of 1.5㎟. Incorrect wiring may cause failure.
- Under a severe noise environment, install a noise filter with a damping characteristic equivalent to the RSKN-2020 (manufactured by TDK-Lambda Corporation) between the external power supply and the coupler power supply.

Connector part

The connector in the coupler refers to a power supply connector, and the connector in the I/O module refers to a power cable or I/O cable connector.



No.	Name	Description
(1)	Wire insertion opening	Insert a cable. For the available cables and bar solderless terminals, refer to the following. ☞ Page 41 Wiring Products
(2)	Open/close button	Push the button to remove the cable. The color of the open/close button indicates the following. • White: DC signal • Blue: 24G • Red: 24V • Green: FG
(3)	Channel status LED	The operating status of each channel of the module
(4)	Connector number	The number of the connector
(5)	Wire insertion opening number	The number of the wire insertion opening or LED

Each channel status LED is specified by a combination of the connector number and wire insertion opening number.

Ex.

When the connector number is 1 and the wire insertion opening number is 4, the LED is specified as "Channel status LED 1.4".

Point

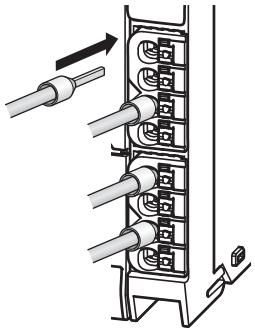
Harness connection can be performed by removing the connector. (☞ Page 52 Connector replacement)

Wiring of power cable and I/O cable

The following describes how to connect and disconnect the power cable and I/O cable.

Wiring procedure

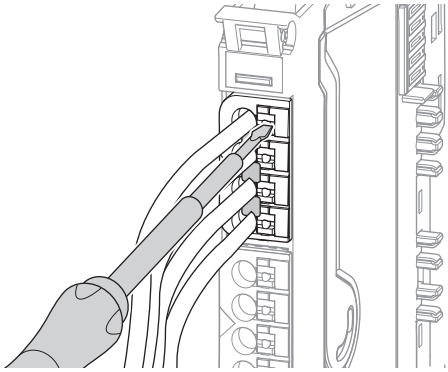
■Connection



1. Check that the external power supply is not on.
2. Insert the bar solderless terminals into the wire insertion openings.
3. After the wiring is finished, pull the bar solderless terminal lightly to check that it is clamped securely.

■Removal

While pushing the open/close button, pull out the bar solderless terminal.



■Fuse installation

A fuse is required for wiring the NZ2FTS2-4A.

Install a 4A slow fuse between the power supply on the live side and the switch.

Wiring of network cable

This section describes how to connect and disconnect the network cable.

Ethernet cable

■Connection

1. Power off the module.
2. Push the Ethernet cable into the coupler until it clicks. Pay attention to the orientation.
3. Power on the module.
4. Power on the external device.
5. Check that the P1 LINK LED or P2 LINK LED on the port to which the Ethernet cable is connected are on.

The names of the LINK LEDs on each coupler are as follows.

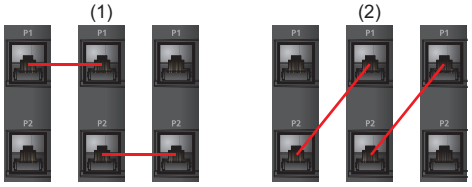
Model	LINK LED name
NZ2FT-GN	LINK P1 LINK P2
NZ2FT-PN	LINK1 LINK2
NZ2FT-MT NZ2FT-EIP	L/A P1 L/A P2

The time taken for the LINK LED to turn on after connection of the Ethernet cable may vary, but normally it lights up in a few seconds. However, if link-up processing is repeated due to a condition of device on the line, a longer time may be needed. If the LINK LED does not turn on, refer to the troubleshooting, and take corrective actions.

Point

Both P1 and P2 can be used.

- When only one connector is used in star topology, either P1 or P2 can be connected.
- When both connectors are used in line topology and ring topology, connecting P1 to P1 and P2 to P2 (1) and connecting P1 to P2 (2) are possible.



■Removal

Power off the module, and pull out the Ethernet cable while pressing the latch down.

■Wiring precautions

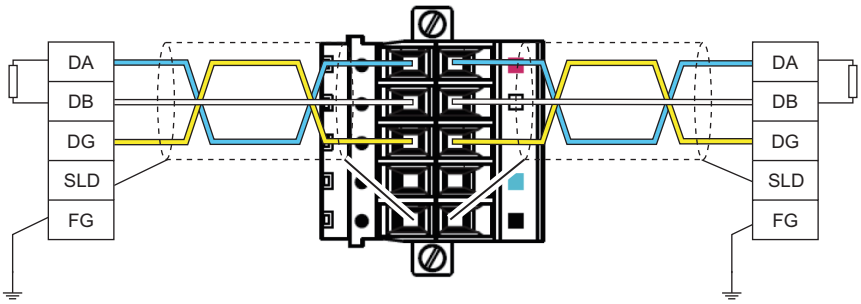
- Do not touch the core of P1 or P2 of the Ethernet cable. In addition, prevent dirt or dust from adhering to the core. Adhesion of oil from your hand, dirt, or dust to the core can increase transmission loss, causing data link to fail.
- Check the Ethernet cable for disconnection, short-circuit, and problems with P1 or P2 connection.
- Do not use Ethernet cables with broken latches. Doing so may cause the cable to unplug or malfunction.
- In a severe noise environment, attach a ferrite core to the Ethernet cable. In a more severe noise environment, attach two identical ferrite cores.

Recommended ferrite core: E04SR401938 (SEIWA ELECTRIC MFG. CO.,LTD.), E04SR482648 (SEIWA ELECTRIC MFG. CO.,LTD.)

CC-Link cable

■Connection

1. Power off the module.
2. Pay attention to the terminal arrangement and insert the CC-Link dedicated cable into the connector insertion port, and tighten the screw (M2.5 screw) within the tightening torque range of 0.4 to 0.5Nm. (If the NZ2FT-BT is located at the end of the CC-Link system, connect a terminating resistor between DA and DB.)



3. Attach the connector to the NZ2FT-BT and tighten the screws (M2.5 screws) within the tightening torque range of 0.4 to 0.5Nm.
4. Power on the module.
5. Power on the external device.

■Removal

Turn off the module, loosen the screw, and then pull out the CC-Link dedicated cable.

■Wiring precautions

- Do not install the I/O cables or CC-Link dedicated 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.
- Securely connect each cable. If they are not connected correctly, poor contact may cause malfunction.
- Tighten the screws so that the cables and terminal blocks are fixed in place firmly. Poor tightening can cause drop or malfunction. However, note that overtightening may damage the screw and/or the NZ2FT-BT, resulting in drop or malfunction.
- When disconnecting the network cable from the NZ2FT-BT, grip the terminal block. Do not pull the cable. Pulling the cable may result in malfunction or damage to the NZ2FT-BT or cable.

PROFIBUS cable

■Connection

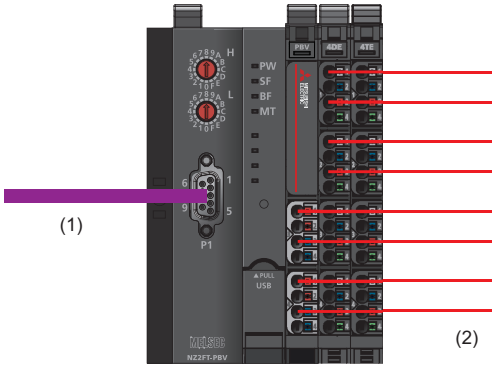
1. Power off the module.
2. Push the PROFIBUS cable connector into the PROFIBUS interface. Pay attention to the orientation of the connector.
3. Firmly fix the connector in place with a screw.
4. Power on the module.
5. Power on the external device.

■Removal

Turn off the module, loosen the screw, and then pull out the PROFIBUS cable connector.

■Wiring precautions

Keep the PROFIBUS cable (1) as far away as possible from the power cable of the NZ2FT-PBV (2) and I/O cable of the I/O module (2).



Do not install the I/O cables or PROFIBUS 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.

3.5 Module Replacement

Coupler

This section describes the procedure for replacing the coupler.

NZ2FT-GN replacement procedure

1. Saving parameters

Save the current parameters from the Web server. (☞ Page 80 Saving/loading parameter files)

2. Power-off

Turn off the NZ2FT-GN.

3. Removal

Remove the NZ2FT-GN to be replaced from the DIN rail. (☞ Page 38 Installation)

4. Connection

Mount the NZ2FT-GN on the DIN rail, and converge it with the I/O module by reversing the removal procedure.

5. IP address setting

Set the IP address of the NZ2FT-GN. (☞ Page 98 IP address setting switch)

6. Ethernet cable connection

Connect the Ethernet cable to the replaced NZ2FT-GN. (☞ Page 46 Ethernet cable)

7. Loading parameters

Load the parameters saved in procedure 1 from the file.

8. Restarting control

Check the operation, and restart the control.

NZ2FT-BT replacement procedure

1. Saving parameters

Save the current parameters to the file from the Web server. (☞ Page 80 Saving/loading parameter files)

2. Power-off

Turn off the NZ2FT-BT.

3. Removal

Remove the NZ2FT-BT to be replaced from the DIN rail. (☞ Page 38 Installation)

4. Connection

Mount the NZ2FT-BT on the DIN rail, and converge it with the I/O module by reversing the removal procedure.

5. Setting the FDL address

Set the FDL address of the NZ2FT-BT. (☞ Page 133 Rotary switch)

6. CC-Link dedicated cable connection

Connect the CC-Link dedicated cable to the replaced NZ2FT-BT. (☞ Page 47 CC-Link cable)

7. Loading parameters

Load the parameters saved in procedure 1 from the file.

8. Restarting control

Check the operation, and restart the control.

NZ2FT-PN replacement procedure

Since the NZ2FT-PN receives parameters from the master station, it does not save/read parameter files.

1. Power-off

Turn off the NZ2FT-PN.

2. Removal

Remove the NZ2FT-PN to be replaced from the DIN rail. (☞ Page 38 Installation)

3. Connection

Mount the NZ2FT-PN on the DIN rail, and converge it with the I/O module by reversing the removal procedure.

4. Wiring the Ethernet cable

Wire the Ethernet cable to the replaced NZ2FT-PN. (☞ Page 46 Ethernet cable)

5. Name setting of NZ2FT-PN

If the name is set before replacement in the replaced NZ2FT-PN, the parameters before replacement are restored. (☞ Page 202 Device Name setting)

6. Restarting control

Check the operation, and restart the control.

NZ2FT-PBV replacement procedure

Since the NZ2FT-PBV receives parameters from the RJ71PB91V, it does not save/load parameter files.

1. Power-off

Turn off the NZ2FT-PBV.

2. Removal

Remove the coupler to be replaced from the DIN rail. (☞ Page 38 Installation)

3. Mounting the coupler

Mount a new coupler on the DIN rail, and converge it with the I/O module by reversing the removal procedure.

4. Setting the FDL address

Set the FDL address of the coupler. (☞ Page 228 Rotary switch)

5. Wiring the PROFIBUS cable

Connect the PROFIBUS cable to the replaced coupler. (☞ Page 47 PROFIBUS cable)

6. Restarting control

Check the operation, and restart the control.

NZ2FT-MT, NZ2FT-EIP replacement procedure

1. Saving the module parameter

Save the current parameters to the file from the Web server. (☞ Page 80 Saving/loading parameter files)

2. Power-off

Turns off the NZ2FT-MT and NZ2FT-EIP.

3. Removal

Remove the coupler to be replaced from the DIN rail. (☞ Page 38 Installation)

4. Mounting the coupler

Mount a new coupler on the DIN rail, and converge it with the I/O module by reversing the removal procedure.

5. Wiring the Ethernet cable

Connect the Ethernet cable to the replaced coupler. (☞ Page 46 Ethernet cable)

6. Restoring the module parameter

Load the parameters saved in procedure 1 from the file.

7. Restarting control

Check the operation, and restart the control.

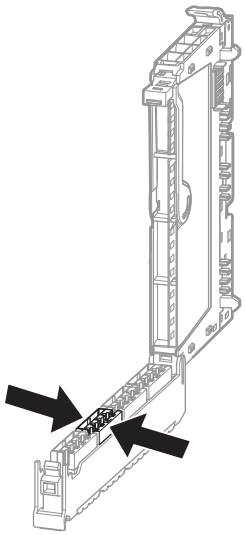
I/O module

This section describes the procedure for replacing adding, and removing I/O modules and changing the number of I/O points.

- ☞ Page 51 Replacing I/O modules
- ☞ Page 52 Adding I/O modules / Increase in the number of I/O points
- ☞ Page 52 Removing I/O modules/ Decrease in the number of I/O points
- ☞ Page 52 Connector replacement

Replacing I/O modules

1. To prevent hazardous situations, power off the I/O module before removing the module.
2. Remove the I/O module to be replaced from the DIN rail. (☞ Page 40 Removal procedure of modules)
3. Remove the connector. Pull out the connector from the connector frame while pressing the both sides of the connector.



4. Attach the connector to the new I/O module by reversing the connector removal procedure.
5. Mount a new I/O module to the DIN rail, and connect it with the coupler by reversing the I/O module removal procedure.
6. Check that there are no problems with I/O, and restart the control.

Adding I/O modules / Increase in the number of I/O points

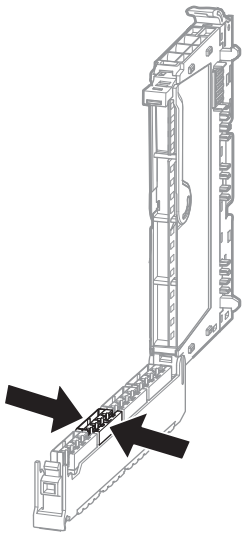
1. To prevent hazardous situations, power off the I/O module before removing the module.
2. Mount a new I/O module on the DIN rail, and converge it with the coupler.
3. Set the I/O module parameters.
4. Configure the communication setting on the master station.
5. Check that there are no problems with I/O, and restart the control.

Removing I/O modules/ Decrease in the number of I/O points

1. To prevent hazardous situations, power off the I/O module before removing the module.
2. Remove the target I/O module from the DIN rail. (☞ Page 40 Removal procedure of modules)
3. Set the I/O module parameters.
4. Configure the communication setting on the master station.
5. Check that there are no problems with I/O, and restart the control.

Connector replacement

1. Remove the connector. Pull out the connector from the connector frame while pressing the both sides of the connector.



2. Connect the I/O cables to a new connector. (☞ Page 45 Wiring of power cable and I/O cable)
3. Attach a new connector by reversing the removal procedure.

Hot swap

Hot swap is a function provided to replace I/O modules during power-on.
An I/O module that fails during operation can be replaced with the I/O module of the same model.
Only the electronic unit parts of I/O modules can be replaced.

Relevant product

Hot swap can be used only for I/O modules having the same model name (excluding the NZ2FTS2-4A and NZ2FTS3-4R).
Hot swap cannot be used for adding/removing couplers or I/O modules and with I/O modules having different number of I/O points.

Number of replaceable modules

Multiple I/O modules cannot be replaced at the same time.
When replacing multiple I/O modules, check that the SF LED on the coupler is off before replacing the next I/O module.

Warning on Hot swap

- For the NZ2FTS2-4A and NZ2FTS3-4R, do not replace the I/O modules by hot swap because high voltage is applied to the plug-in unit. Before replacing the NZ2FTS2-4A and NZ2FTS3-4R, stop the operation of the system, and shut off all phases of the external power supply and the power supply to the plug-in unit.
- Hot swap can be performed with the coupler turned on, but do not touch the terminals of the base unit or the electronic unit part while they are on. Doing so may lead to electric shock.
- To prevent electric shock and malfunction of the operating I/O modules, provide switches or similar methods for separately disconnecting the external power supply of the I/O module to which Hot swap is performed and the power supply of the external device.
- During hot swap, the input/output of the I/O modules connected to the same coupler has an undefined value. Perform hot swap while the I/O modules connected to the same coupler do not control.

Precautions for Hot swap

- Check that the model names of the I/O modules are the same between before and after replacement.
- Check that the system is not affected even if the I/O of the I/O module to be replaced has been stopped.
- The I/O during Hot swap depends on the "Continue data exchange" or "Behaviour like fieldbus error" of "Module behaviour on hot swap" in the parameter of the coupler.
- For data sent from the NZ2FT-C24 to an external device, when the parameter "Module behaviour on hot swap" is set to "Behaviour like on fieldbus error", the operation of "All outputs off" is performed regardless of the setting of the parameter "Output behaviour on fieldbus error". However, if another I/O module is hot-swapped during serial communication with the NZ2FT-C24, TXBUFFER and RXBUFFER of the NZ2FT-C24 will be cleared. Therefore, it may be necessary to clear the send/receive data up to the present from the NZ2FT-C24 and an external device, and then send/receive again from the first data. After hot swapping, if necessary, create a program that checks that the data is guaranteed.
- Force mode is cleared during Hot swap.
- When using Hot swap, it is recommended to perform trial Hot swap with the system before operation to check that the system is not affected. Check that the system is not affected even if the I/O of the I/O modules to be replaced and not to be replaced has been stopped.

LED indications during Hot swap

The following shows the LED of the coupler and the I/O module during Hot swap.

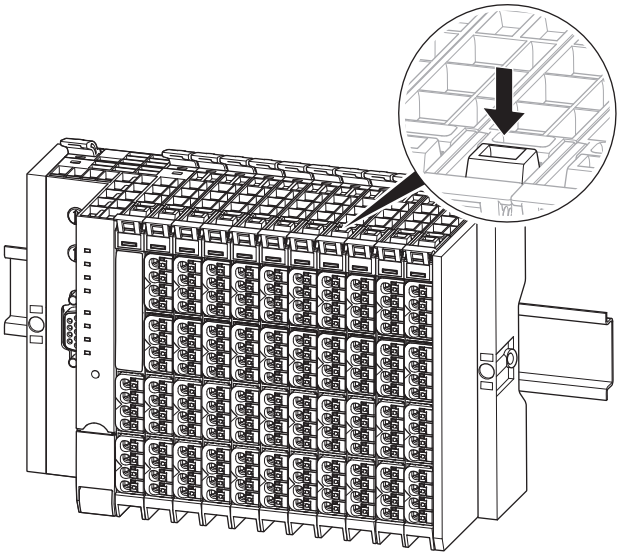
Module	LED	Status			
		Before replacement	During removal	Replacement completed	Contact failure*1
NZ2FT-GN	SF LED	Off	On in red	Off	On in red
	BF LED	Off	Flashing in red	Off	Flashing in red
NZ2FT-BT	SF LED	Off	On in red	Off	On in red
	BF LED	Off	Flashing in red	Off	Flashing in red
NZ2FT-PN	SF LED	Off	On in red	Off	On in red
	BF LED	Off	Flashing in red	Off	Flashing in red
NZ2FT-PBV	SF LED	Off	On in red	Off	On in red
	BF LED	Off	Flashing in red	Off	Flashing in red
NZ2FT-MT	SF LED	Off	On in red	Off	On in red
	BF LED	Off	Flashing in red	Off	Flashing in red
NZ2FT-EIP	SF LED	Off	On in red	Off	On in red
	BF LED	Off	Flashing in red	Off	Flashing in red
	MS LED	Off	Flashing in red	On in green	Flashing in red
Module status LED of I/O module being replaced		On in green	(During removal)	On in green	On in red
Module status LED of operating I/O module		On in green	On in green	On in green	Flash alternately in red and green

*1 A state where the electronic unit part is not inserted correctly. It was not inserted until the connector clicked.

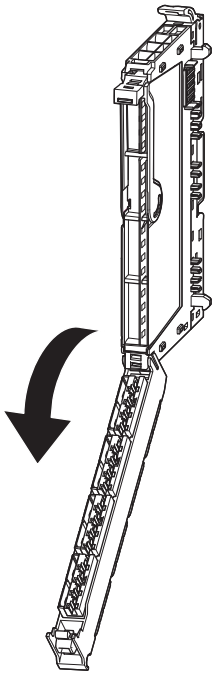
Procedure for Hot swap

The following describes the procedure for Hot swap.

■Removing electronic unit part

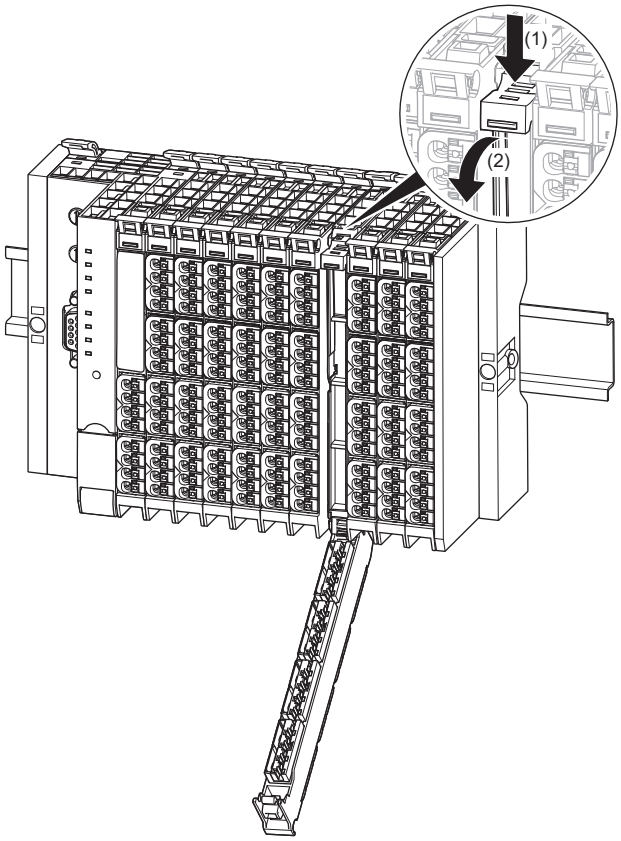


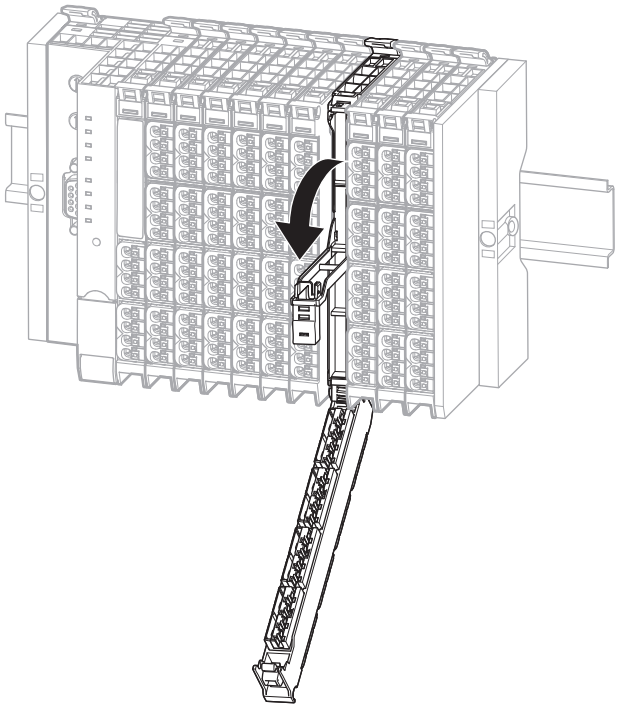
1. Unlock the connector frame open button.

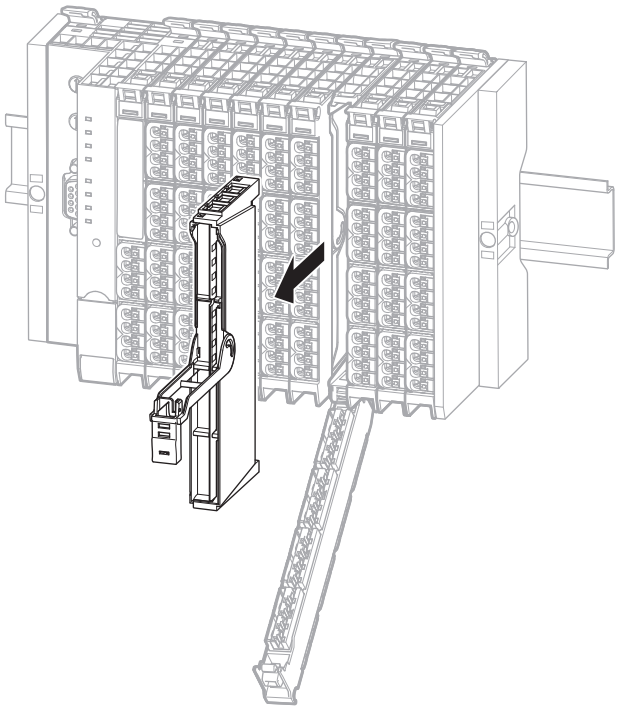


2. Open the plug-in unit part.

3. Open the removal lever of the electronic unit part.

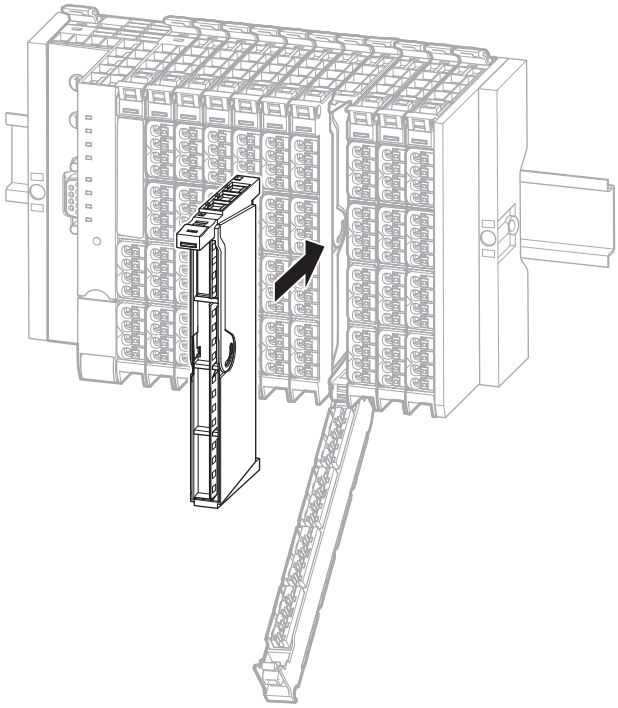




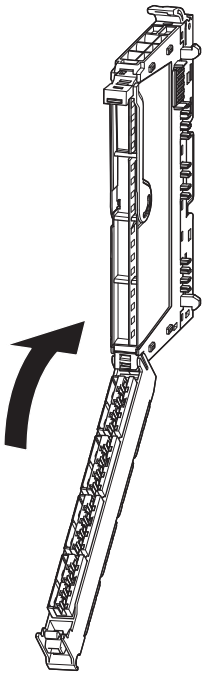


4. Pull the electronic unit part forward and remove it.

■Mounting electronic unit part



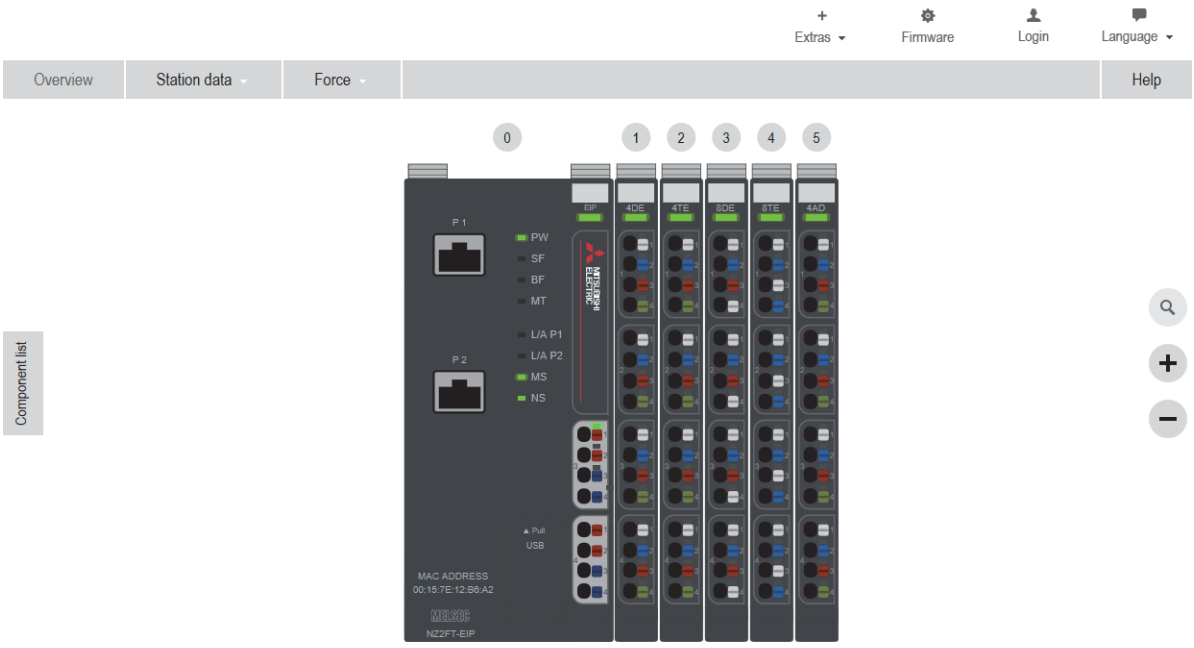
1. Hold the top and bottom of the electronic unit parts and insert it into the base unit until it clicks.



2. Restore the plug-in unit part until it clicks.

4 WEB SERVER

Since the coupler operates as a Web server, it can be accessed from a Web browser on a personal computer via the USB port or Ethernet port.
When the Web server is accessed, the NZ2FT system can be monitored and set and the functions can be performed from the following window.



Web browsers supported by Web server

For accessing the Web server, operation of the following Web browsers has been checked by Mitsubishi Electric.

- Microsoft Internet Explorer 11
- Google Chrome 9.0 or later

4.1 Connection with a Personal Computer

When the personal computer and the coupler are connected and the Web server is accessed from a Web browser, the Web server window is displayed.
There are two connection methods: via the USB port and via the Ethernet port.

Point

On the NZ2FT-GN, when installing 10 or more I/O modules or performing cyclic transmission with a communication cycle of less than 1ms, if the connection is made to a personal computer via the Ethernet port, the performance of the Web server may deteriorate and the access may be slow. In such a case, connect to the personal computer via the USB port.

If a proxy server is used, it may not be possible to connect to the Web server depending on the proxy server settings. If cannot be connected to the Web server, correct the proxy server settings.

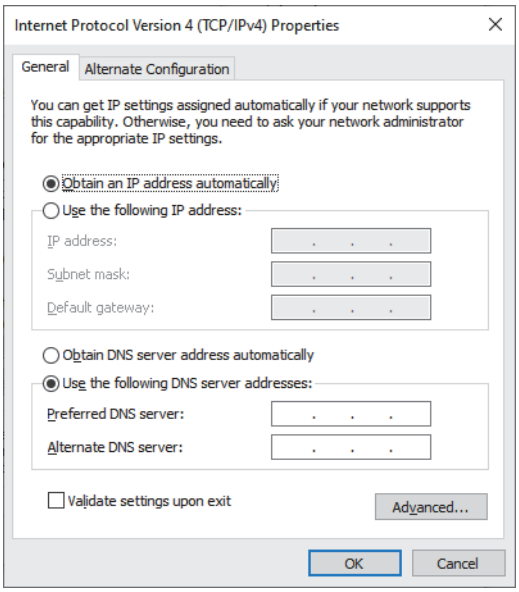
Via USB port

Operating procedure

1. Install the following USB driver only for the first time. For the driver file, contact your local Mitsubishi representative.

- usb8023.inf
- merndis.inf

2. Since the USB port of the coupler functions as a virtual DHCP server, check that the USB port of the personal computer is set to automatically acquire an IP address. (The following window is for Windows 10)



3. For the first time, enter the following default URL in the Web browser of the personal computer to display the Web server window.

Coupler	Default URL	Setting range of the parameter of the coupler "IP address USB port"
NZ2FT-GN	http://192.168.1.202	• 192.168.1.202 • 192.168.2.202 • 192.168.3.202 • 192.168.4.202 • 192.168.5.202
NZ2FT-BT	http://192.168.1.202	
NZ2FT-PN	http://192.168.1.202	
NZ2FT-PBV	http://192.168.1.202	
NZ2FT-MT	http://192.168.1.202	
NZ2FT-EIP	http://192.168.5.202	

When the parameter "IP address USB port" of the coupler has been changed from the default URL, after resetting the coupler, specify the changed IP address after "http://".

If the Web server window is not displayed, the following settings are required on the personal computer.

- Installation of the USB driver (☞ Page 61 Installation procedure of the USB driver)
- Proxy exception setting when using a proxy server (☞ Page 62 Proxy exception setting)

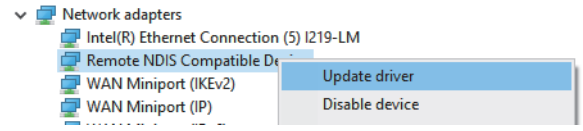
Installation procedure of the USB driver

The following describes the installation procedure of the USB driver. (The following example is provided for Windows 10. The windows and menu names may differ depending on the OS version.)

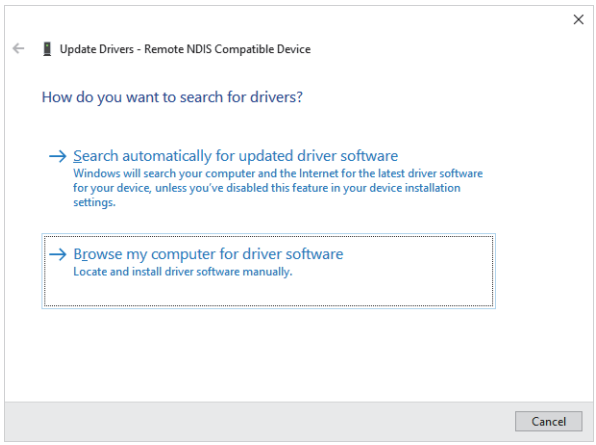
1. Turn on the coupler and connect to a personal computer using a USB cable. Pay attention to the orientation of the USB port and USB connector when connecting a USB cable.

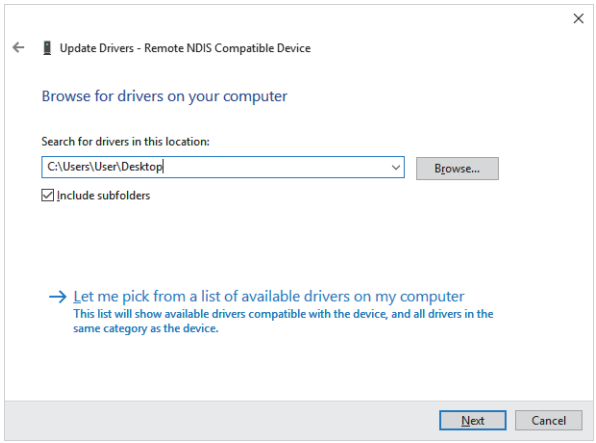
2. From the personal computer, select [Control Panel] ⇨ [Device Manager].

3. Select and right-click "Remote NDIS Compatible Device" in "Network Adapter" on the Device Manager view. Select "Update driver" from the popup window.



4. Select "Browse my computer for driver software".





5. Enter the folder where the USB drivers (usb8023.inf and merndis.inf) are stored and click "Next" to install the USB driver.

Precautions

Do not assign the IP address from 192.168.1.202 to 192.168.5.202 to the device in the subnetwork to be used. Otherwise, a network error may occur.

Proxy exception setting

When using a proxy server, specify "192.168.*" for the proxy exception setting.

Via Ethernet port

The following couplers allow a personal computer to be connected to the Web server via the Ethernet port.

- NZ2FT-GN
- NZ2FT-PN
- NZ2FT-MT
- NZ2FT-EIP

Operating procedure

1. Install the driver on the personal computer only for the first time. (Not required if installed via the USB port ☞ Page 60 Via USB port)
2. Set the coupler parameter "Webserver via Ethernet" to "Enabled".
3. Set the coupler parameters "IP address", "Subnet mask", and "Gateway". ("Gateway" is not available for the NZ2FT-GN.)
4. If the parameter is changed, reset the coupler.
5. From the Web browser of the personal computer, entering the URL with the value of the parameter "IP address" specified after http:// displays the Web server window.

Ex.

If the parameter "IP address" of the coupler is "192.168.100.64", the URL to be entered in the Web browser of the personal computer is http://192.168.100.64.

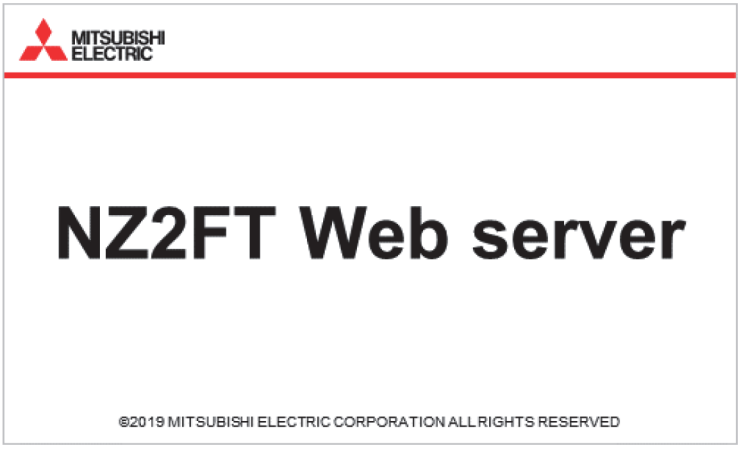
Precautions

"IP address" and "IP address USB port" cannot be set to the same value. Also, do not set the same value for the network part of the IP address (1st to 3rd octets when the subnet mask is set to 255.255.255.0).

Startup window

If the following window is not displayed or the following message is displayed, refer to the following.

☞ Page 89 Cannot access the Web server



The NZ2FT coupler is not accessible. Please check the power supply and data connection. The page will be reloaded.

Login/Logout

Authenticate/clear access to the Web server. Functions that require login cannot be used before login.
When the [Login] button on the menu bar is clicked, the "Login" window is displayed.



- For the first time, enter the default "User name" and "Password", and click the [Login] button.

Item	Default
"User name"	admin
"Password"	NZ2FT

- After login, the [Login] button on the menu bar becomes the [Logout] button.
- When logging out, click the [Logout] button on the menu bar.

Functions that require login

- Replacing and deleting a private key, server certificate, and CA certificate
- Switching the display language
- Replacing language files
- Changing parameters
- Changing to Force mode
- Loading the saved parameter file
- "Load" of Tag name to which "Save" was performed, "Delete" of Tag name to which "Load" was performed
- Changing I&M data
- Resetting the coupler
- Firmware update

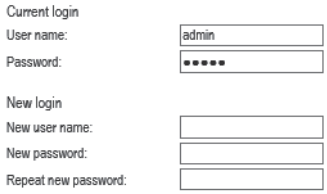
No login

For No Login state, remove the functional restrictions to all users.

■When changing to the No Login state

1. Display the coupler in "Component view", and click the [Change login] button.
2. Enter the "User name" and "Password" of "Current login", and click the [No login data] button.

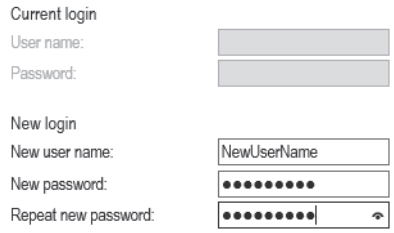
"New user name" and "Password" of "New login" need not be entered.



After the setting completed, the [Logout] button on the menu bar is grayed out.

■When canceling the No Login state

1. Display the coupler in "Component view", and click the [Change login] button.
2. Enter "New user name", "New password", and "Repeat new password" of "New login", and click the [Change login] button.



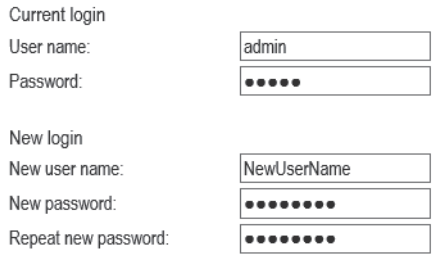
After the setting completed, the grayout of the [Logout] button on the menu bar is cleared.

Change of "User name" and "Password"

"User name" and "Password" can be changed.

■Operating procedure

1. Display the coupler in "Component view", and click the [Change login] button.
2. Enter "User name" and "Password" of "Current login", and enter "New user name", "New password", and "Repeat new password" of "New login".



The following table shows the input conditions and supported characters.

Item	Condition	Supported character
New user name	1 character or more, 30 characters maximum	• No restriction • One-byte and two-byte characters can be mixed. • Alphanumeric characters, symbols, and spaces are available.
New password	• 8 characters or more, 30 characters maximum • New Password and Repeat new password are the same. • It is different from User name. • Characters from at least three of the following types: lower-case characters, upper-case characters, numbers, and special characters	• Only one-byte characters • Alphanumeric characters, symbols, and spaces are available.

3. Click the [Change login] button.

Point

When the password is forgotten, refer to the following and set the password again.

☞ Page 90 Cannot log in to the Web server

HTTPS setting

This function provides encrypted communications in the transport layer between the Web server and client to ensure the reliability of the Web server and the consistency and confidentiality of send data.
The HTTPS communications are set with the parameter "HTTPS setting" of the coupler.

HTTPS server and connection

When connecting to the Web server using HTTPS, specify the following URLs in the Web browser.

Coupler	URL*1
NZ2FT-GN	https://192.168.1.202
NZ2FT-BT	https://192.168.1.202
NZ2FT-PN	https://192.168.1.202
NZ2FT-PBV	https://192.168.1.202
NZ2FT-MT	https://192.168.1.202
NZ2FT-EIP	https://192.168.5.202

*1 When the parameter "IP address USB port" of the coupler has been changed from the default, after resetting the coupler, specify the changed IP address after "https://".

When encrypted communications are performed, authentication of certificates is performed. For the following cases, a warning message may be displayed on the Web browser.

- When the certificate has a problem
- When the current certificate has been read
- When the IP address of the coupler has been changed
- When the certificate has been changed

In the case a warning message is displayed, allow unencrypted communications on the web browser to connect to the Web server.

TLS/SSL certificates

The CA certificate subscribed by the credible authentication station (CA) can be set in the coupler. TLS (Transport Layer Security) and SSL (Secure Socket Layer) are protocols for the secure communications between the Web server and Web client.
The private key, server certificate, and CA certificate to be replaced are sent from the personal computer to the Web server. Therefore, connect the personal computer to the USB port of the coupler when sending them.
Use OpenSSL or others to create a private key and the corresponding server certificate and CA certificate.
The Web server supports the following.

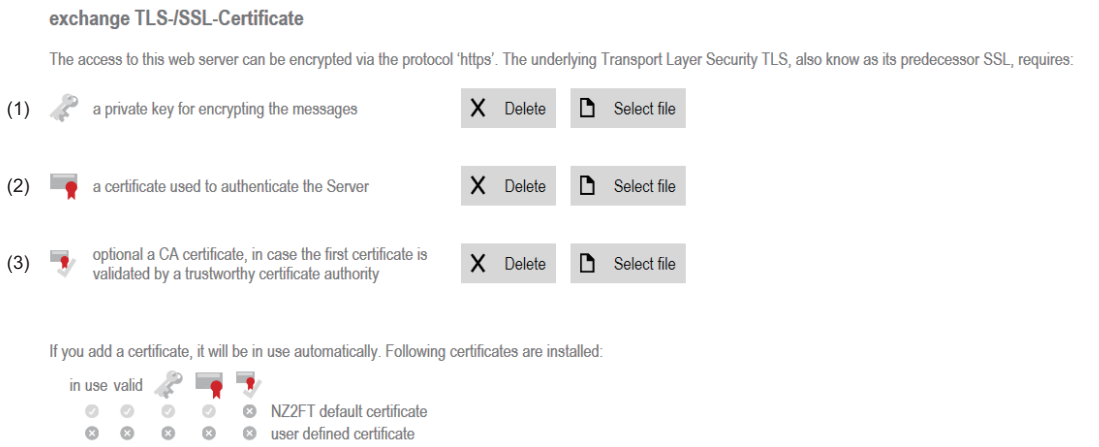
- Encryption by TLS 1.1 and TLS 1.2
- Key length up to 2048 bits
- PEM encode key and certificate (.pem)

■Change procedure of TLS/SSL certificate

The following shows the procedure to change the TLS/SSL certificate.

1. Start the Web server and log in.

2. Click the [Extras] menu ⇨ [Exchange TLS / SSL certificate] to display the "exchange TLS-/SSL-Certificate" window.



1) Private key
2) Server certificate
3) CA certificate

3. Click [Select file] and select the private key, server certification, and CA certification to be replaced. The key and certification are checked automatically, and the check result is displayed as an icon.

Icon	in use	valid	Private key	Server certificate	CA certificate
	This certificate is used.	The combination of key and certificate is valid.	available	available	available
	This certificate is not used.	The key or the certificates is missing.	not available	not available	not available
	—	—	invalid*1	invalid*1	invalid*1

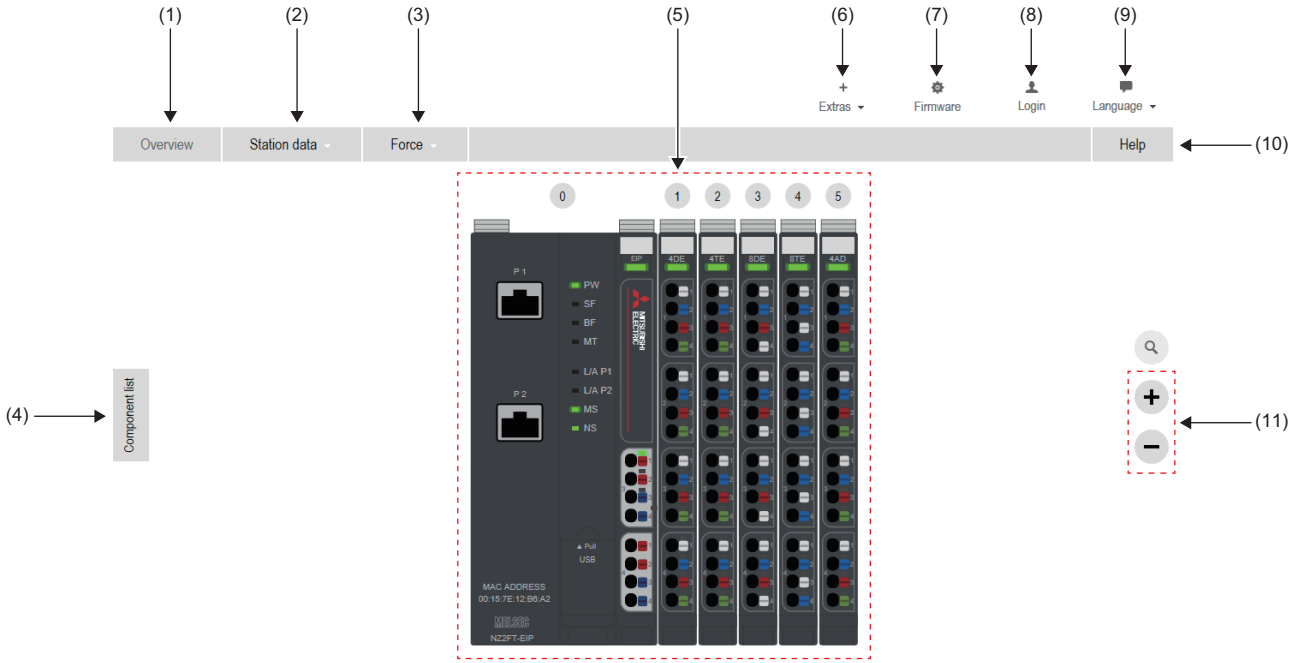
*1 When the file contents do not follow the format of the private key and certificate

4. When the coupler is reset, the replaced private key, server certification, and CA certification are enabled.

To delete the private key, server certification, and CA certification, click the [Delete] button and reset the coupler.

4.2 Window Layout

The following figure shows the window layout of the Web server.

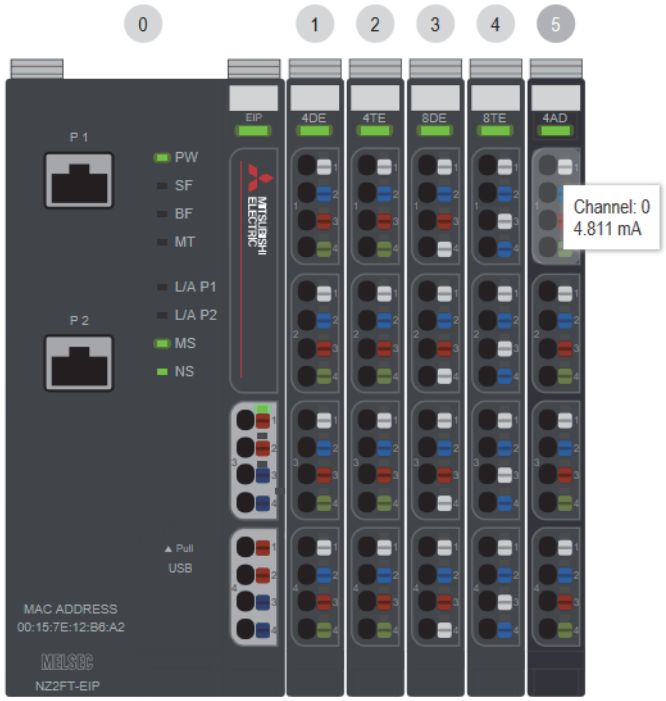


No.	Item		Description	Reference
(1)	"Overview"		Displays the configuration of the coupler and I/O modules.	Page 70 "Overview"
(2)	[Station data] menu	Process data	Displays the "Process data" window.	Page 72 "Process data"
		Diagnostic data	Displays the diagnostics data to be used inside the system.	—
(3)	[Force] menu	Enable	Displays the "Force mode" window.	Page 76 Force mode
		Disable		
		Station		
(4)	"Component list"		• Displays the list of couplers and I/O modules when the mouse cursor is placed. • Displays "Component view" when a coupler or an I/O module is clicked.	Page 71 "Component view"
(5)	Component view		Displays the setting information when a coupler or an I/O module is clicked.	Page 71 "Component view"
(6)	[Extras] menu	Save service file	Acquires the service file.	Page 88 Acquisition of the service file
		Stations parameters or Save/load configuration	"Stations parameters" window or Displays the "Save/load configuration" window.	Page 80 Saving/loading parameter files
		Tag names or User-defined tag names	"Tag names" window or Displays the "User-defined tag names" window.	Page 83 Tag name function
		Customisation file	Displays the "Customisation file" window.	Page 84 Saving/Loading customisation files
		exchange TLS-/SSL-Certificate	Displays the "exchange TLS-/SSL-Certificate" window.	Page 67 TLS/SSL certificates
(7)	"Firmware"		Displays the "Firmware update" window.	Page 87 Firmware update
(8)	"Login"		Displays the "Login" window.	Page 64 Login/Logout
(9)	[Language] menu	Chinese	Changes the display language to Chinese.	Page 73 Changing the language
		English	Changes the display language to English.	
		Deutsch	Changes the display language to German.	
		More	Switches the display language.	
(10)	"Help"		Displays the version of the Web server and the URL of our site.	
(11)	[+] button / [-] button		Scales "Overview".	

"Overview"

Displays the coupler and I/O modules.

This window is displayed when the Web server starts.

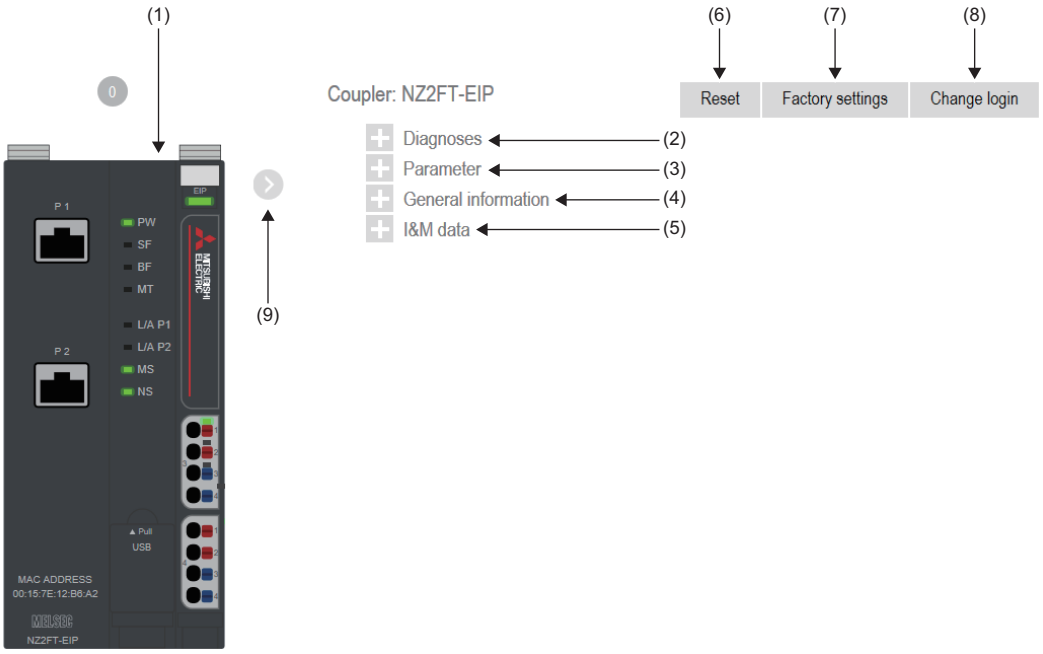


- The display is switched to "Component view" by clicking a coupler or an I/O module. (☞ Page 71 "Component view")
- The LED indication of the coupler or I/O module can be checked. However, the LED indication on this window and the on/flashing status of the LEDs on the NZ2FT system may not match.
- Place the mouse cursor on the connector part of the I/O module to display a tooltip and check Process data of the channel.
- The display on the Web server window is updated every three seconds.

"Component view"

This view is displayed by clicking a coupler or an I/O module in "Overview".

It can be displayed by selecting a coupler or an I/O module from "Component list".

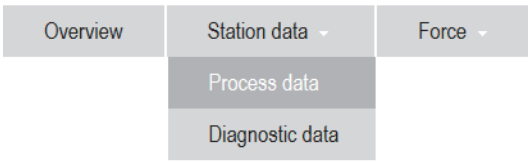


No.	Item	Description	Reference
(1)	Module	Used to check the LED indication of the coupler or I/O module.	—
(2)	Diagnoses	Displays the diagnostics data to be used inside the system.	—
(3)	Parameter	Used to set the parameters of the coupler or I/O module.	—
(4)	General information	Displays the serial number and firmware version of the coupler or I/O module.	—
(5)	I&M data	Used to enter the installation location and installed date of the system.	Page 85 I&M data function
(6)	[Reset] button	Displays the "Reset" window. It is displayed for the coupler.	Page 85 Resetting the coupler
(7)	[Factory settings] button	Restores the factory default setting. It is displayed for the coupler.	Page 86 Initialization of the coupler
(8)	[Change login] button	Used to change User name and Password. It is displayed for the coupler.	Page 64 Login/Logout
(9)	[>] button / [<] button	Changes the displayed module.	—

- Click the [+]/[-] button to display/hide the detailed information.
- For the I/O module, place the mouse cursor on each channel to check Process data.

"Process data"

Click "Process data" from "Station data" of "Overview" to display it.



Process data of all I/O modules is displayed.

Process data

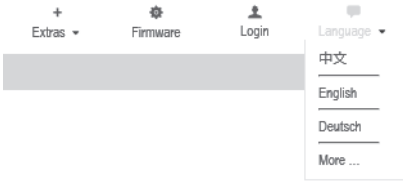
Channels	1 NZ2FTS4-4DE	2 NZ2FTS4-4TE	3 NZ2FTS3-8DE	4 NZ2FTS2-8TE	5 NZ2FTS-60AD4
0	0	0	0	0	4.794 mA
1	0	0	0	0	0.000
2	0	0	0	0	0.000
3	0	0	0	0	0.000
4			0	0	
5			0	0	
6			0	0	
7			0	0	

Point

Process data can be checked in "Component view". (☞ Page 71 "Component view")

Changing the language

The factory default options are Chinese, English, and German. The default display is English.



Switching the display language

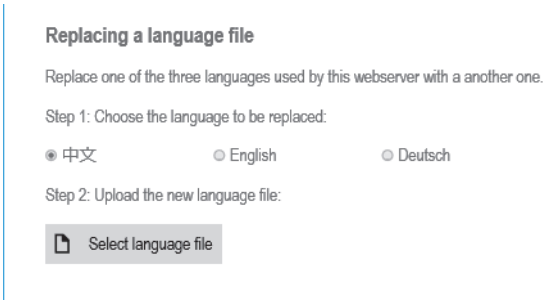
Select the language from the [Language] menu to switch the display language.
If the coupler is reset, the display language will return to English.

Replacing language files

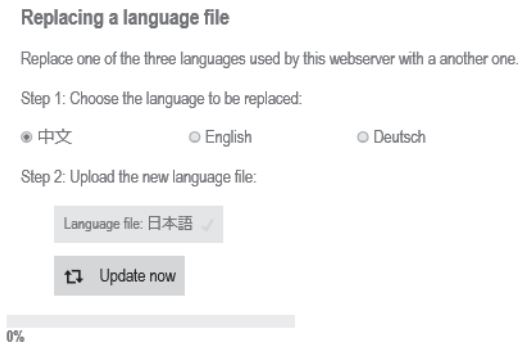
Languages other than Chinese, English, and German can be displayed by replacing the language file.
For the language file, please consult your local Mitsubishi representative.

■Replacement procedure

1. Stop communications with the master station.
2. Select "More" from the [Language] menu.
3. Select the language to be changed in "Step 1: Choose the language to be replaced".



4. Click the [Select language file] buttonand select the language file to be installed from the file selection window.



5. Click the [Update now] button to start updating.
6. After the update is complete, click the [Reset] button on the complete window to reset the coupler and start the Web server.

Precautions

If any of the following error conditions are met, display language change and language file update will fail.

- During communications with the master station
- When the coupler and Web server are not connected
- When the language file is incorrect

4.3 Functions to Set on the Web Server

This section describes the functions that can be achieved by operating the Web server window.

Parameter setting

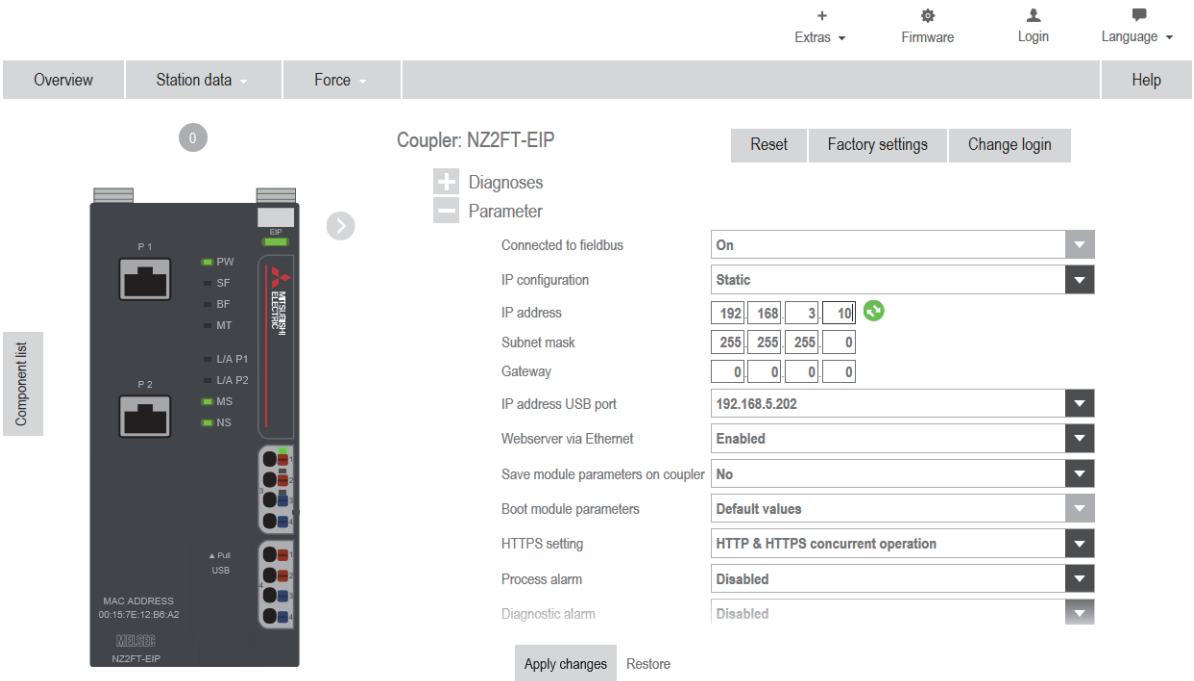
Set the parameters of the coupler and I/O module.

The coupler parameters are saved in non-volatile memory, and they are retained even when the module is turned off.

Operating procedure

1. Select the target coupler or I/O module from Component list or Overview.
2. Set each parameter with "Parameter".

- NZ2FT-GN: ☞ Page 112 Parameter list
- NZ2FT-BT: ☞ Page 145 Parameter list
- NZ2FT-PN: Only "Webserver via Ethernet" and "HTTPS setting" (☞ Page 209 Web server) Other parameters are set from the RJ71PN92 software package instead of the Web server (☞ Page 200 GX Configurator-PN setting procedure).
- NZ2FT-PBV: Set from the software package of the master station instead of the Web server (☞ Page 238 RJ71PB91V and QJ71PB92V setting).
- NZ2FT-MT: ☞ Page 304 Parameter list
- NZ2FT-EIP: ☞ Page 390 Parameter list



3. Click the [Apply changes] button displayed on the bottom of the window to reflect the changed parameters.

The "Login" window is displayed when the user does not log in. (☞ Page 64 Login/Logout)

Point

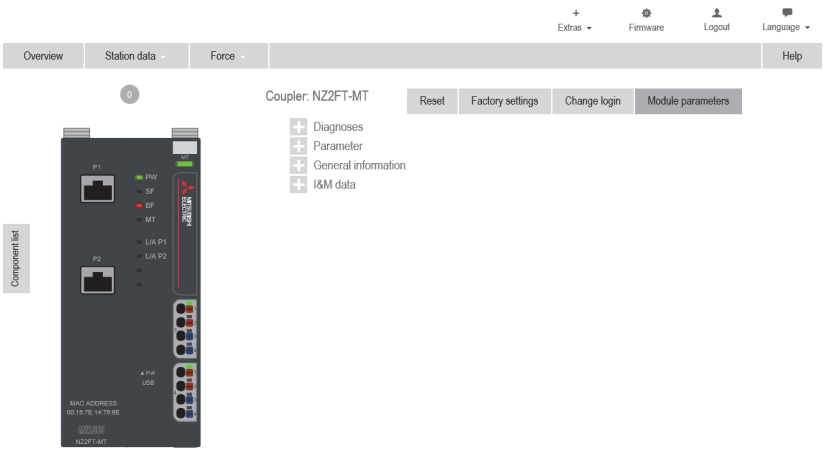
I/O module parameters are not recorded simply by clicking the [Apply changes] button. (When reset, the parameters are reset to the default values.)

To record the I/O module parameters in the non-volatile memory of the coupler, do the following.

☞ Page 75 Module parameter function

Module parameter function

Records the I/O module parameters in the non-volatile memory of the coupler.
Operate from the "Module parameters" window that is displayed when the [Module parameters] button is clicked from the "Component view" window.

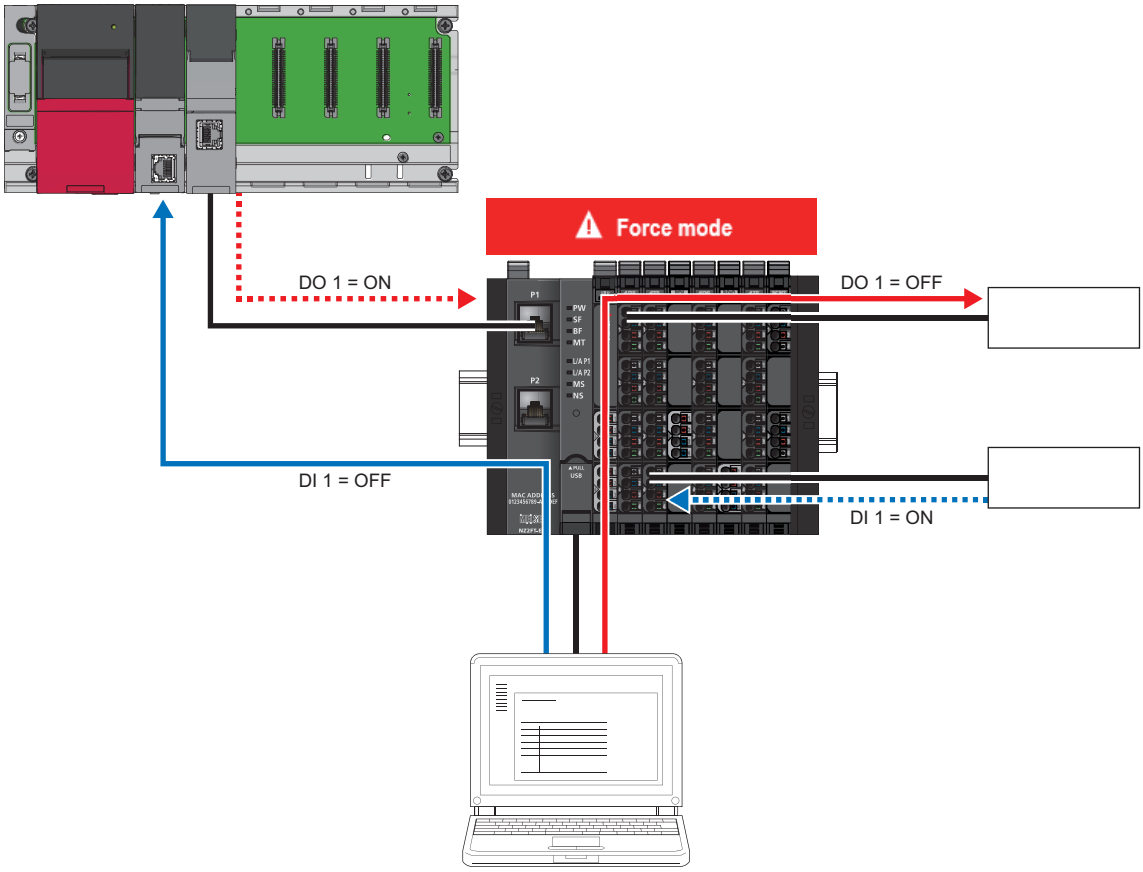


The following chart shows the operations that can be performed from the "Module parameters" window.

Button name	Operation
Restore default values	The I/O module parameters are set to their default values. (When reset, operation is performed with the default values.)
Save module parameters	The parameter settings of the I/O module are recorded. (When reset, the parameter settings recorded in the non-volatile memory of the coupler are loaded into the I/O module before operation.)
Cancel	Cancels the operation.

Force mode

This mode forcibly changes the input/output values at any time without being affected by the input from an external device or the operation result (cyclic data) of the program.



Point

The following cannot be performed during Force mode.

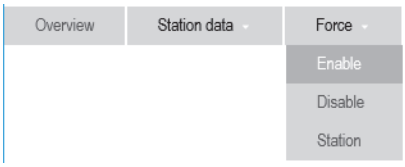
- Changing coupler parameters by the Web server
- Changing NZ2FT-EIP parameters by UCMM communication
- Operation of functions that require login by the Web server started on another personal computer (☞ Page 64 Functions that require login)

The NZ2FT-C24 does not support Force mode.

Operating procedure

1. Select "Enable" from the [Force] menu.

The "Login" window is displayed when the user does not log in. (☞ Page 64 Login/Logout)



2. A caution window will be displayed. Click the [Start force mode] button to switch to Force mode.

The SF LED flashes in red during Force mode. (For the NZ2FT-GN, the SF LED and ERR. LED flash in red during Force mode.)

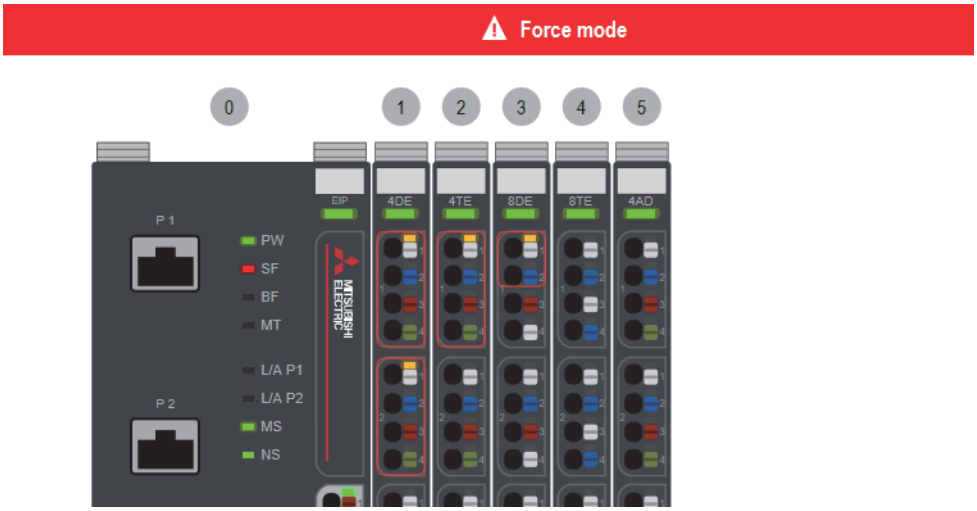
3. Change Process data of the channel of the I/O module.

Process data of the channel can be changed in the "Overview" or "Station" window.

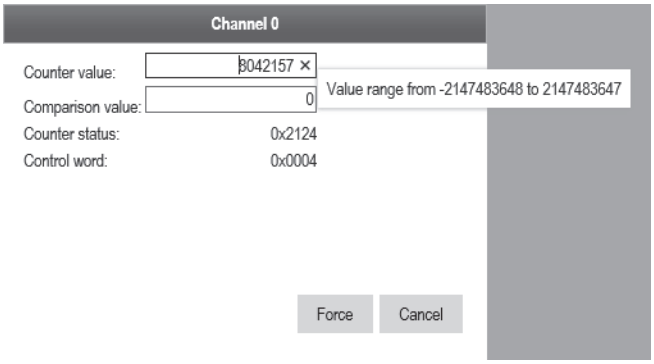
■When changing data in "Overview"

Click the channel of the I/O module to be changed.

The changed channel is displayed in the red box.



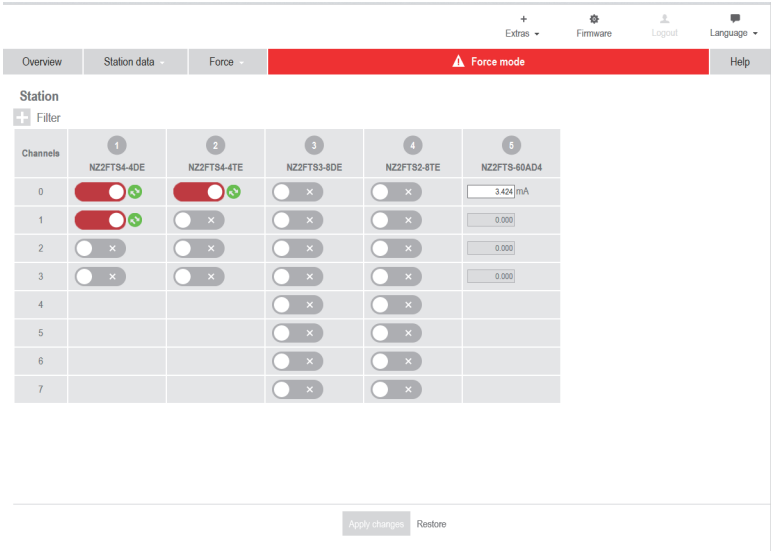
For data other than bit data, the entry window is displayed.



■When changing the data on the "Station" window

1. Select "Station" from the [Force] menu.

2. Click the channel of the I/O module to be changed. For data other than bit data, enter a value in the entry area.



3. Click the [Apply changes] button.

■Exiting Force mode

Select "Disable" from the [Force] menu.

Force mode is terminated and the I/O value operated in Force mode are cleared.

The SF LED stops flashing in red and returns to the module status display. (For the NZ2FT-GN, flashing of the ERR. LED in red will also stop.)

Also, exiting the Web server terminates Force mode.

I/O value setting for Hot swap

Set the I/O value of the I/O module of when replacing the I/O module while the power is on. (☞ Page 53 Hot swap)
The setting is selected by the parameter "Module behaviour on hot swap" of each coupler.

- "Continue data exchange": Continues data input/output.
- "Behaviour like on fieldbus error": It depends on the setting of the parameter "Output behaviour on fieldbus error" At this time, if the parameter "Output behaviour on fieldbus error" is set to "All outputs off", the result will be as follows.

For data sent from the NZ2FT-C24 to an external device, when the parameter "Module behaviour on hot swap" is set to "Behaviour like on fieldbus error", the operation of "All outputs off" is performed regardless of the setting of the parameter "Output behaviour on fieldbus error". (☞ Page 53 Precautions for Hot swap).

Ex.
For the digital I/O module

Operation status of the master station		Coupler parameter "Module behaviour on hot swap" setting							
		0: Continue data exchange				1: Behaviour like on fieldbus error And the parameter "Output behaviour on fieldbus error" is set to "All outputs off"			
		Replacement target module		Other modules		Replacement target module		Other modules	
		Digital input module	Digital output module	Digital input module	Digital output module	Digital input module	Digital output module	Digital input module	Digital output module
CPU module RUN state	Before Hot swap start	ON	ON	ON	ON	ON	ON	ON	ON
	During Hot swap*1	OFF	OFF	ON	ON	OFF	OFF	ON	OFF
	After Hot swap end	ON	ON	ON	ON	ON	ON	ON	ON

*1 While the I/O module is being replaced, the module is in a state where no external device is connected.

Ex.
For the NZ2FTS-60AD4 and NZ2FTS-60DA4

Operation status of the master station		Coupler parameter "Module behaviour on hot swap" setting							
		0: Continue data exchange				1: Behaviour like on fieldbus error And set the parameter "Output behaviour on fieldbus error" to "All outputs off"			
		Replacement target module		Other modules		Replacement target module		Other modules	
		NZ2FTS-60AD4	NZ2FTS-60DA4	NZ2FTS-60AD4	NZ2FTS-60DA4	NZ2FTS-60AD4	NZ2FTS-60DA4	NZ2FTS-60AD4	NZ2FTS-60DA4
CPU module RUN state	Before Hot swap start	A/D conversion value	D/A conversion value	A/D conversion value	D/A conversion value	A/D conversion value	D/A conversion value	A/D conversion value	D/A conversion value
	During Hot swap*1	0	0	A/D conversion value	D/A conversion value	0	0	A/D conversion value	0
	Hot swap end	A/D conversion value	D/A conversion value	A/D conversion value	D/A conversion value	A/D conversion value	D/A conversion value	A/D conversion value	D/A conversion value

*1 While the I/O module is being replaced, the module is in a state where no external device is connected.

Saving/loading parameter files

When replacing the coupler, save the parameters of the coupler and I/O module in a file. Also, load the saved parameters from the file.

Operating procedure

■Saving parameter files

1. Select "Stations parameters" or "Save/load configuration" from the [Extras] menu.
2. Click the [Save] button.

The parameter file is downloaded from the Web server. (The file name cannot be specified.)

■Loading parameter files

1. Select "Stations parameters" or "Save/load configuration" from the [Extras] menu.
2. Click the [Load] button.
3. Select the saved parameter file and click the [Open] button.

In the following cases, the parameter file cannot be loaded.

- When the system configuration of the saved parameter file is different from the actual system configuration (Including the case of loading the parameter file saved by the coupler of a different model)
- When the saved parameter file is damaged
- When the master station and the coupler are communicating I/O data (BF LED turns off)

4. Click the [Reset] button on the "load configuration" window to reset the coupler.

Parameters to be saved/loaded

○: Target, ×: Not applicable

■NZ2FT-GN

Parameter	Save/load
IP address	×
Subnet mask	×
IP address USB port	×
Webserver via Ethernet	×
HTTPS setting	×
Process alarm	○
Diagnostic alarm	○
Output behaviour on fieldbus error	○
Module behaviour on hot swap	○
Data format	○

■NZ2FT-BT

Parameter	Save/load
IP address USB port	×
Power up baud rate	○
Protocol Version	○
Number of Occupied Stations	○
Extended-Cyclic-Messaging-Factor	○
HTTPS setting	×
Output behaviour on fieldbus error	○
Module behaviour on hot swap	○
Data format	○

■NZ2FT-PN

Since the NZ2FT-PN receives the parameter settings from the RJ71PN92, it does not save/load the parameter file.

■NZ2FT-PBV

Since the NZ2FT-PBV receives the parameter settings from the RJ71PB91V, it does not save/load the parameter file.

■NZ2FT-MT

The parameter "Modbus Dual LAN Mode" is set to "Disabled"		The parameter "Modbus Dual LAN Mode" is set to "Enabled"	
Parameter	**Save/load**	**Parameter**	**Save/load**
IP address	×	IP address 1	×
Subnet mask	×	Subnet mask 1	×
Gateway	×	Gateway 1	×
—	—	IP address 2	×
—	—	Subnet mask 2	×
—	—	Gateway 2	×
IP configuration	×	IP configuration 1	×
—	—	IP configuration 2	×
Modbus DHCP timeout	○	Modbus DHCP timeout	○
Additional TCP port	○	Additional TCP port	○
Modbus Dual Lan Mode	○	Modbus Dual Lan Mode	○
IP address USB port	×	IP address USB port	×
Webserver via Ethernet	○	Webserver via Ethernet	○
Save module parameters on coupler	×	Save module parameters on coupler	×
Status Modbus watchdog	○	Status Modbus watchdog	○
Modbus connection timeout	○	Modbus connection timeout	○
Writing access in multi-client operation	○	Writing access in multi-client operation	○
Check reference list before data exchange	○	Check reference list before data exchange	○
HTTPS setting	×	HTTPS setting	×
Process alarm	○	Process alarm	○
Diagnostic alarm	○	Diagnostic alarm	○
Output behavior on fieldbus error	○	Output behaviour on fieldbus error	○
Module behaviour on hot swap	○	Module behaviour on hot swap	○
Data format	○	Data format	○
Lock force mode	○	Lock force mode	○

■NZ2FT-EIP

Parameter	Save/load
IP configuration	×
IP address	×
Subnet mask	×
Gateway	×
IP address USB port	×
Webserver via Ethernet	×
Save module parameters on coupler	×
HTTPS setting	×
Process alarm	○
Diagnostic alarm	○
Output behaviour on fieldbus error	○
Output behaviour on IDLE state	×
Module behaviour on hot swap	○
Data format	○
Lock force mode	○

■I/O module

All parameters can be saved/loaded.

Tag name function

Set an arbitrary character string as the channel name of the I/O module.
On the "Overview" window, hovering the mouse over the connector displays the Tag name. (Not displayed on the NZ2FT-C24)

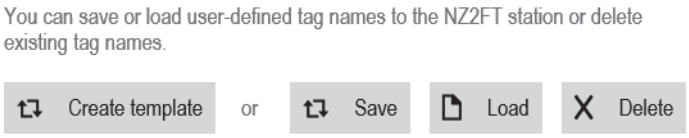
Ex.
When the Tag name of Channel 0 is set to Device01_Ready in the NZ2FTS4-4DE whose mounting position is the first (in order of proximity to the coupler)



Operating procedure

■Editing and uploading Tag name files

1. Select "Tag names" or "User-defined tag names" from the [Extras] menu.



2. Click the [Create template] button and click "Save" on the window that appears to download the template file. (The file name cannot be specified.)
3. Edit the text in the template file (the file name cannot be changed) and set the Tag name. This is called a Tag name file.

Ex.
When the mounting position is the first I/O module and the Tag name of Channel 0 is set to Device01_Ready

```
1;Device01_Ready;ch1;ch2;ch3
2;ch0;ch1;ch2;ch3
3;ch0;ch1;ch2;ch3;ch4;ch5;ch6;ch7
4;ch0;ch1;ch2;ch3;ch4;ch5;ch6;ch7;ch8;ch9;ch10;ch11;ch12;ch13;ch14;ch15
```

4. Click the [Load] button and upload the Tag name file.

Precautions

In the following cases, an error appears when the Tag name file is uploaded.
- When the file is not beginning with the mounting position number
- When a semicolon (;) is deleted
- When Tag name contains a comma (,) or double quotation ("")

Two-byte characters cannot be used because they become garbled.
One-byte characters such as alphanumeric characters, spaces, symbols, and special characters (except for a semicolon (;) and comma (,)) can be entered.

■Downloading a Tag name file

1. Select "Tag names" or "User-defined tag names" from the [Extras] menu.
2. Click the [Save] button to download the Tag name file. (The file name cannot be specified.)

Re-editing the downloaded Tag name file is the same as editing the template file.

■Deleting a Tag name file

1. Select "Tag names" or "User-defined tag names" from the [Extras] menu.
2. Click the [Delete] button to return to the character string in the template file.

Precautions

The Tag name file cannot be uploaded or deleted while in communication with the master station.

Saving/Loading customisation files

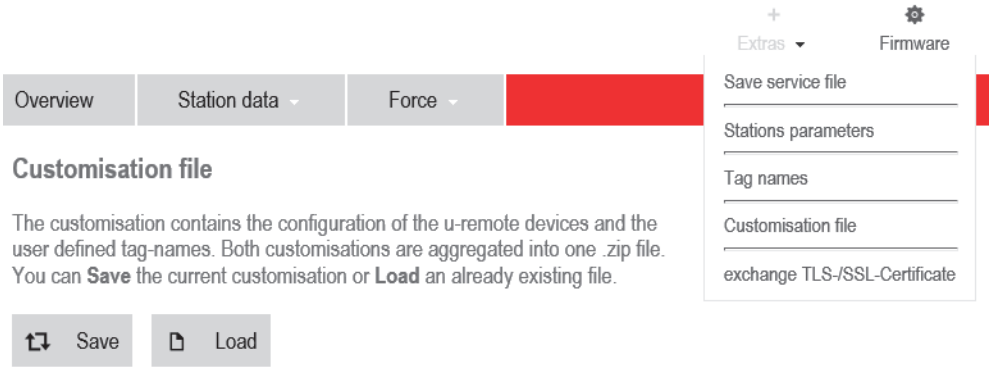
Save/load the parameter file and Tag name file at the same time.

- Parameter file (☞ Page 80 Saving/loading parameter files)
- Tag name file (☞ Page 83 Tag name function)

Operating procedure

■Saving the parameter file and Tag name file

1. Select "Customisation file" from the [Extras] menu.



2. Click the [Save] button.

A ZIP file that contains the parameter file and the Tag name file is downloaded. (The file name cannot be specified.)

■Loading the parameter file and Tag name file

1. Select "Customisation file" from the [Extras] menu.
2. Click the [Load] button.
3. Specify the parameter file and Tag name file, and click the [Open] button.

A ZIP file containing only the parameter file or only the Tag name file can be loaded.

If the file cannot be loaded, refer to the following.

- Parameter file (☞ Page 80 Loading parameter files)
- Tag name file (☞ Page 83 Editing and uploading Tag name files)

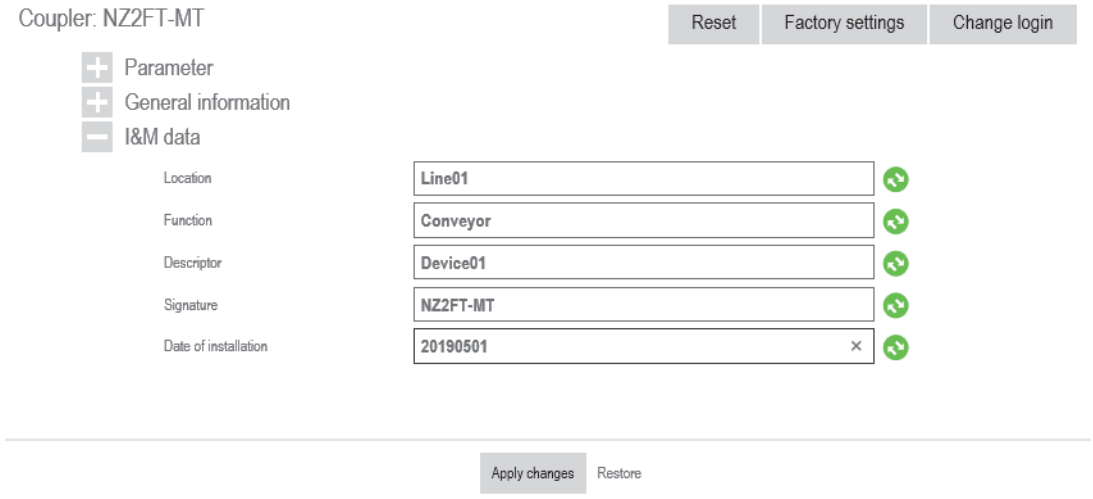
Point

Even when the Tag file name cannot be loaded, "The configuration file does not match the connected station." is displayed. Check both the parameter file and the Tag name file.

I&M data function

I&M data (Identification & Maintenance) can record the installation location and installation date of the system.
Click the [+]/[-] button of "I&M data" from "Component view" of the coupler to display the detailed information.
The characters that can be input in each item are as follows. Other characters cannot be saved correctly.

- One-byte alphanumeric characters: A to Z, a to z, 0 to 9
- One-byte symbol: ! # $ & ' ( ) * + , - . / : ; = ? @ _



Items and maximum number of characters

The following table lists the items and the maximum number of characters.

Item	Maximum number of characters
Location	22 one-byte characters
Function	32 one-byte characters
Descriptor	54 one-byte characters
Signature	54 one-byte characters
Date of installation	16 one-byte characters

- After characters are entered and deleted, a green symbol mark is displayed when the changes are confirmed.
- After the changes are confirmed, click the [Apply changes] button displayed on the bottom of the window to apply the changes.
- To restore the changes, click the [Restore] button. All changes are restored.

Resetting the coupler

Restarts the coupler from the Web server.
Display the coupler in "Component view", and click the [Reset] button.



If [Yes] button is clicked, the Web server will start after the reset is executed.

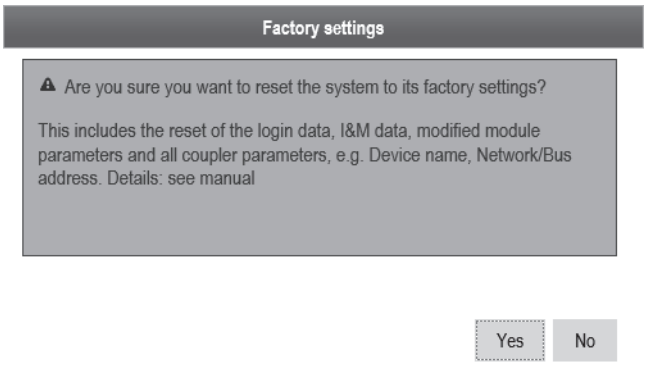
Initialization of the coupler

Restores the coupler to the factory default setting from the Web server. The following items are reset to the factory default setting.

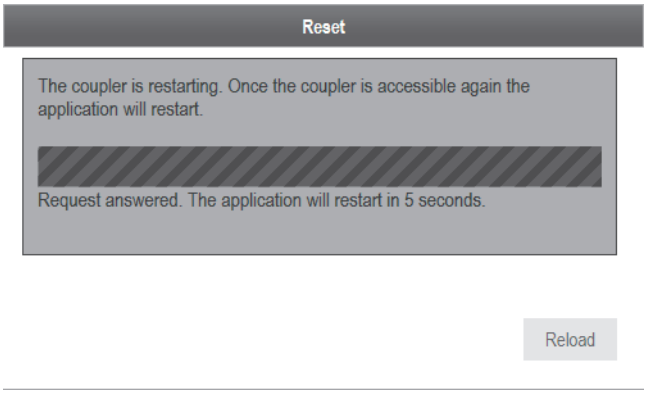
- Parameters of the coupler and I/O module
- Login data (User name and Password)
- I&M data
- Tag name
- exchange TLS-/SSL-Certificate
- NZ2FT-PN Dataset

Stop communications with the master station before initializing the coupler.

1. Display the coupler in "Component view", and click the [Factory settings] button.



2. Click the [Yes] button to perform initialization and reset the coupler and Web server.



Firmware update

Updates the firmware of the coupler or I/O module.

The language files can be replaced during the operating procedure. (☞ Page 73 Changing the language)

The file names of the firmware files used for firmware update are as follows.

[Model]-[Major version]_[Minor version]_[revision version]-[No.].extension

Module type	Update target module	Firmware file file name
Coupler	NZ2FT-GN	NZ2FT-GN-0010757-xx_xx_xx-x.bsc
	NZ2FT-BT	NZ2FT-BT-0010757-xx_xx_xx-x.bsc
	NZ2FT-PN	NZ2FT-PN-0010757-xx_xx_xx-x.bsc
	NZ2FT-PBV	NZ2FT-PBV-0010757-xx_xx_xx-x.bsc
	NZ2FT-MT	NZ2FT-MT-0010757-xx_xx_xx-x.bsc
	NZ2FT-EIP	NZ2FT-EIP-0010757-xx_xx_xx-x.bsc
I/O module	NZ2FTS-60AD4	NZ2FTS_60AD4-0702531-xx_xx_xx-x.bsm
	NZ2FTS-60DA4	NZ2FTS_60DA4-0702658-xx_xx_xx-x.bsm
	NZ2FTS-60RD4	NZ2FTS_60RD4-0702661-xx_xx_xx-x.bsm
	NZ2FTS-60TD4	NZ2FTS_60RD4-0702661-xx_xx_xx-x.bsm
	NZ2FT-C24	NZ2FT-C24-0702673-xx_xx_xx-x.bsm

For the firmware file, please consult your local Mitsubishi representative.

To restore the firmware, update the firmware file of the previous version again.

Precautions

- The firmware files of different modules cannot be updated.
- If the firmware update results in "Update failed" being displayed and the update fails, power off and on the coupler and update the firmware again.

Operating procedure

There are two methods to update firmware: update for each module (Single update) and update for multiple modules simultaneously (Multiple update).

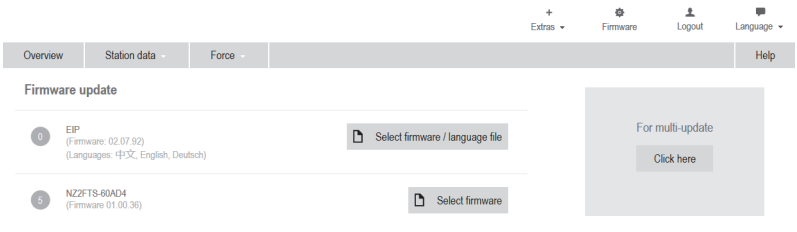
■Procedure for Single update

In the Single update procedure, perform the firmware update for one selected module.

1. Click [Firmware] on the menu bar.

The "Firmware Update" window is displayed.

Among the mounted modules, the modules to which the firmware update is applicable are displayed in a list.



2. Click the [Select firmware /language file] button or [Select Firmware] button. The language file can also be replaced at the same time when the [Select firmware /language file] button is selected.

3. Select an update file.

4. When the [Update now] button is clicked, BF LED flashes in red and the update is performed.

5. Click the [Reset] button displayed after the update is complete.

The coupler is reset and the Web server starts. Flashing of the BF LED in red will stop.

■Procedure for Multiple update

In Multiple update, multiple firmware files of the coupler and I/O module can be selected and updated simultaneously.

1. Click [Firmware] on the menu bar.
2. Click the [Click here] button of "For multi-update" on the "Single Update" window. The language file can also be replaced at the same time when the [Select firmware /language file] button is selected.
3. Select an update file.

Repeat the operation for every update.

4. When the [Update now] button is clicked, BF LED flashes in red and the update is performed.
5. Click the [Reset] button displayed after the update is complete.

The coupler is reset and the Web server starts. Flashing of the BF LED in red will stop.

Precautions

After the update is complete, check that the version is upgraded in "General information" of "Component view".

Acquisition of the service file

If troubleshooting does not resolve the problem, acquire a service file from the coupler to provide the service technician with the information about the problem.

Acquisition method

The following describes how to acquire the service file.

1. Select "Save service file" from the [Extras] menu.
2. Select the save destination of the service file on the personal computer, and click [Save]. (The file name cannot be specified.)

Precautions

The service file in the coupler is deleted by the following operations.

- At power-off
- At the completion of the acquisition of the service file
- When the [Cancel] button is clicked while the service file is being acquired
- When the Web server is closed while the service file is being acquired

4.4 Troubleshooting

If problems that occur on the Web server, perform the following.

Troubleshooting by symptom

Cannot access the Web server

Check the following items in order from the top.

Item	Action
Is the PW LED of the coupler lit in green?	If the PW LED of the coupler is off, check the following and take corrective action. ■The module status LED of the I/O module lights up in green. Repair or replace the coupler. The possible cause is an internal fuse failure. ■The module status LED of the I/O module is off. (1) If the external power supply (24VDC) is not wired, wire it. (2) If the external power supply (24VDC) is not turned on, turn it on. (3) Adjust the voltage of the external power supply (24VDC) if it is not within the range of performance specifications. If the problem still persists despite the above measures, replace the coupler. ■The PW LED on the NZ2FT-GN is flashing in green. ☞ Page 123 When the PW LED is flashing in green
■For the NZ2FT-GN, NZ2FT-PN, NZ2FT-MT, NZ2FT-EIP Is the USB cable or Ethernet cable connected correctly to the coupler? ■For the NZ2FT-BT and NZF2FT-PBV Is the USB cable connected correctly to the coupler?	Connect the USB cable or Ethernet cable correctly.
When connected via the USB port, is the URL set to the IP address specified by the parameter "IP address USB port"?	Change the URL to the IP address set with the parameter "IP address USB port". The setting range of the parameter "IP address USB port" is the following five patterns only. If the set IP address is forgotten, try these five patterns. • 192.168.1.202 • 192.168.2.202 • 192.168.3.202 • 192.168.4.202 • 192.168.5.202
When connected via the USB port, has the correct IP address been set on the personal computer?*1	An invalid IP address may be set on the personal computer. • Set the IP address of the personal computer manually and access the Web server.*2 • Set the parameter "IP address" correctly.
When connected via the Ethernet port, has the parameter "IP address" been set to the correct IP address on the Ethernet port?	Connect via the USB port and set the IP address of the parameter "IP address" correctly.
Is a proxy server being used?	Check the proxy server settings. After completion, restore the proxy server settings.
Is the parameter "Webserver via Ethernet" set to "Disabled"?	Set the parameter "Webserver via Ethernet" to "Enabled". Alternatively, connect via the USB port.
Is "Overview" displayed?	Clear the browsing history of the Web browser.
Is the Web server being accessed via HTTP?	Access the Web server via HTTPS. After accessing, change the parameter "HTTPS setting" to "HTTP & HTTPS concurrent operation".
Is the progress bar on the startup window stopped at 15%?	Change your Web browser to Mozilla Firefox, Google Chrome, or other browser.

*1 Even when connected via the USB port, it may not be possible to access the Web server if an invalid IP address is set on the personal computer. Check the IP address of the personal computer.

*2 The IP address of the personal computer connected via the USB port is assigned automatically. If the IP address of the personal computer is not as shown below, set the IP address manually.

Parameter "IP address USB port" setting	IP address of the personal computer connected via the USB port
192.168.1.202	192.168.1.201
192.168.2.202	192.168.2.201
192.168.3.202	192.168.3.201
192.168.4.202	192.168.4.201
192.168.5.202	192.168.5.201

Cannot log in to the Web server

Check the following item.

Item	Action
Check User name/Password.	If User name/Password is forgotten, reset them by the following procedure. (1) Power off the coupler. (2) Remove I/O modules but leave the coupler only. (3) Power on the coupler. (4) Set "New user name", "New password", and "Repeat new password" on the "Change login" window.

Cannot save/load the parameter file

Check the following items in order from the top. (☞ Page 80 Saving/loading parameter files)

Item	Action
■For the NZ2FT-GN Are the LINK P1 LED and LINK P2 LED on? ■For the NZ2FT-MT and NZ2FT-EIP Are the L/A P1 LED and L/A P2 LED on or flashing?	■For the NZ2FT-GN If the LINK P1 LED and LINK P2 LED are off, perform troubleshooting. Also, check other LEDs. (☞ Page 469 NZ2FT-GN) ■For the NZ2FT-MT and NZ2FT-EIP If the L/A P1 LED and L/A P2 LED are off, perform troubleshooting. Also, check other LEDs. (☞ Page 359 When the L/A P1 LED and L/A P2 LED turn off, Page 408 When the L/A P1 LED and L/A P2 LED turn off)
Is the BF LED on the coupler on in red?	• If the BF LED is flashing in red, perform troubleshooting. Also, check other LEDs. • If the BF LED is off, check the procedure for replacing the coupler. (☞ Page 49 Coupler).
Is the system configuration when the parameters are saved different from the system configuration to be loaded?	Match the system configuration when saving the parameters.
Is the parameter file invalid?	Save the parameter file again and load the parameter file into the coupler.
Is the voltage of the coupler power supply (24VDC) within the specified range?	Set the voltage value within the range of performance specifications.

If the parameter file is still not saved/loaded even after checking all of the above and checking with the LEDs of the I/O module and Web server, there is a risk of hardware failure in the I/O module.

Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

5 MAINTENANCE AND INSPECTION

Although the NZ2FT system does not require any specific check items, follow the check items described in the user's manual of the CPU module to ensure that the system is always used in the best condition.

MEMO

PART 2 COUPLER

This part consists of the following chapters.

6 OVERVIEW OF COUPLER

7 NZ2FT-GN

8 NZ2FT-BT

9 NZ2FT-PN

10 NZ2FT-PBV

11 NZ2FT-MT

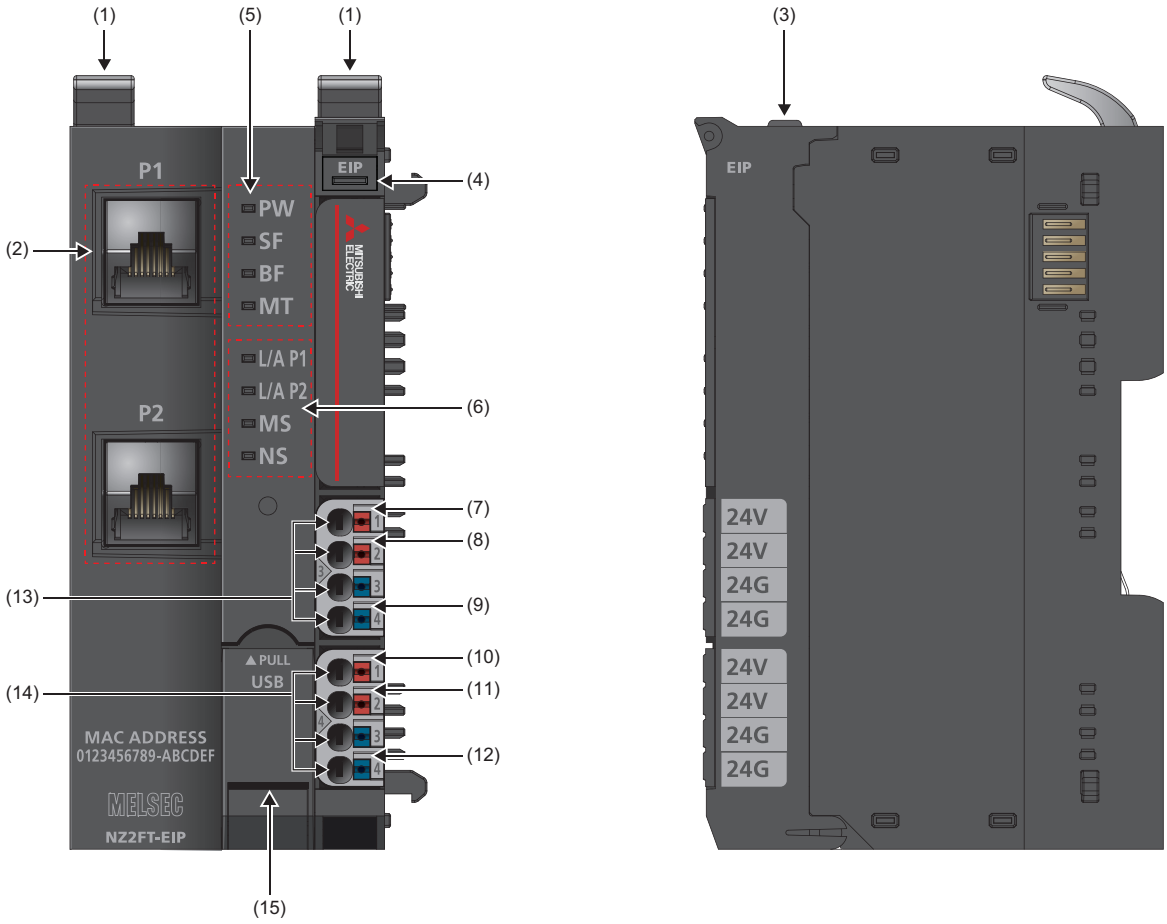
12 NZ2FT-EIP

6 OVERVIEW OF COUPLER

6.1 Coupler Common Part Names

The section describes the name of each part of the coupler.

Ex.
For the NZ2FT-EIP



No.	Name		Description
(1)	DIN rail fixing lever		Removes/attaches the module from/to a DIN rail. (☞ Page 38 Installation procedure of modules)
(2)	Network interface		Connect a network cable. (☞ Page 46 Wiring of network cable)
(3)	Connector frame open button		Opens the connector frame. (☞ Page 52 Connector replacement)
(4)	Coupler LED common part	Power supply LED	Indicates the power supply status. On in green: No error On in red: Supply voltage of the input power supply or output power supply < 18VDC, or internal fuse failure
(5)		Fieldbus/coupler status LEDs	Indicates the communication and operating status of the coupler.
(6)	Coupler LED specific part		

No.	Name		Description
(7)	Coupler LED common part	Input power supply LED 3.1	Indicates the power supply status. On in green: No error Off: Supply voltage of the input power supply < 18VDC
(8)		Input power supply LED 3.2	Indicates the power supply status. On in red: Supply voltage of the input power supply < 18VDC Off: No error
(9)		Input power supply internal protection circuit LED 3.4	Indicates the internal protection circuit error of the power supply. On in red: Internal fuse failure (NZ2FT-GN: ☞ Page 125 When the following LEDs turn on in red) Off: No error
(10)		Output power supply LED 4.1	Indicates the power supply status. On in green: No error Off: Supply voltage of the output power supply < 18VDC
(11)		Output power supply LED 4.2	Indicates the power supply status. On in red: Supply voltage of the output power supply < 18VDC Off: No error
(12)		Output power supply internal protection circuit LED 4.4	Indicates the internal protection circuit error of the power supply. On in red: Internal fuse failure (NZ2FT-GN: ☞ Page 125 When the following LEDs turn on in red) Off: No error
(13)	Input power supply connector		Connects the power supply. (☞ Page 45 Wiring of power cable and I/O cable)
(14)	Output power supply connector		Connects the power supply. (☞ Page 45 Wiring of power cable and I/O cable)
(15)	USB port cover		Covers the USB port. To use the Web server, open this cover and connect a USB cable. Close this cover to prevent entrance of foreign material such as dust when the Web server is not used.

7 NZ2FT-GN

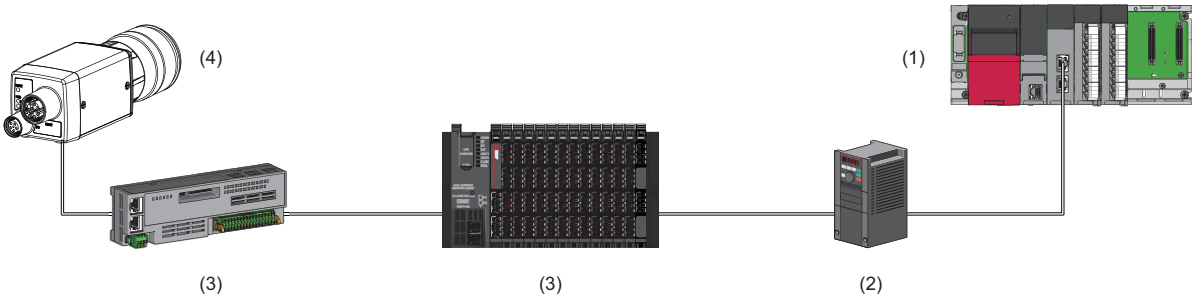
This chapter describes the details of the CC-Link IE TSN compatible coupler.

7.1 CC-Link IE TSN Configuration

The NZ2FT system using the NZ2FT-GN operates as a remote station for CC-Link IE TSN.
It uses an Ethernet cable and hub. (☞ Page 41 Wiring products for coupler that use the Ethernet cable)

When the master module is the RJ71GN11-T2

It consists of a master station (1), an inverter device (2), a remote station (3), and an Ethernet device (4). (System configuration 📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Startup))



Corresponding master module and software package

The master module corresponding to the NZ2FT-GN and the software package corresponding to the master module are shown.
For how to check the version, refer to the manual for each master module and software package.

Master module			Software package	
Name	Model	Firmware version	Product name	Version
CC-Link IE TSN master/local module	RJ71GN11-T2	"12" or later	GX Works3	1.070Y or later

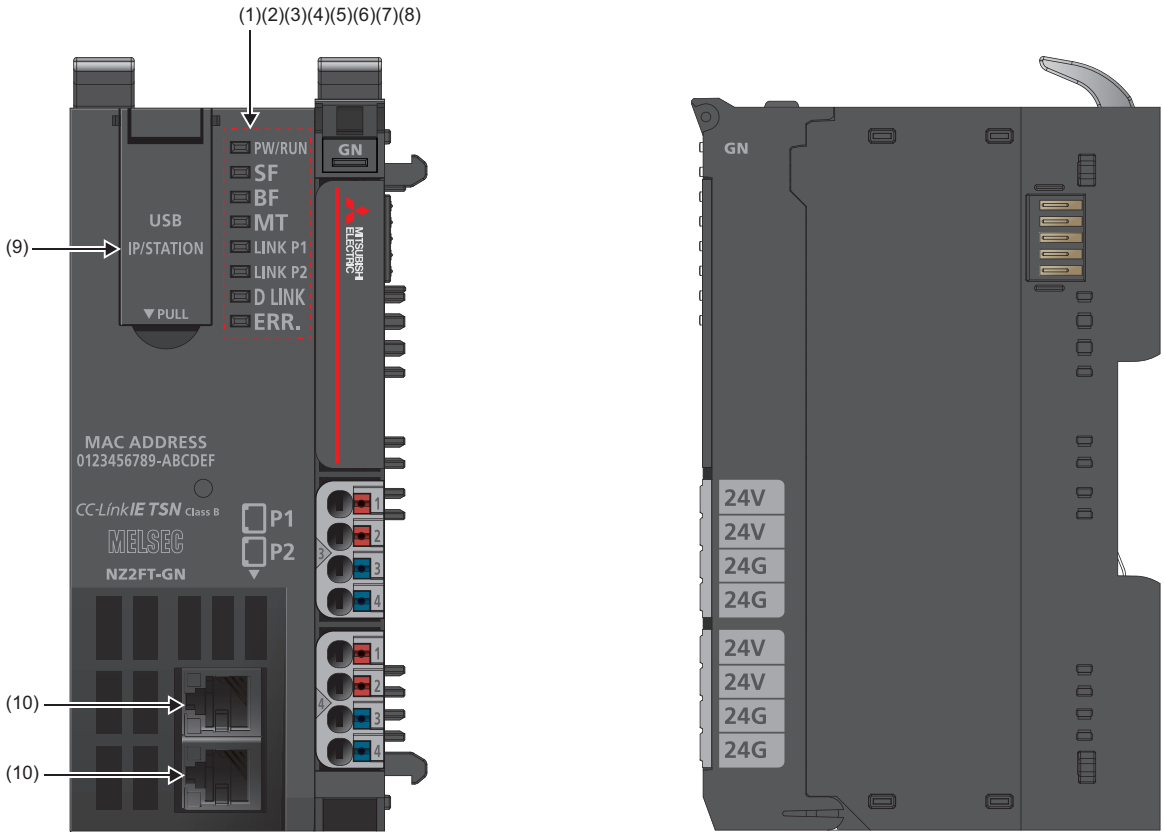
Profiles

The profile for setting the NZ2FT-GN and I/O module must be registered in the software package. For information on how to obtain the profile, contact your local Mitsubishi representative.

Registration destination software package	Name	Release file name	Version
GX Works3	CC-Link IE TSN profile for the NZ2FT-GN (CSP + file)	0x0000_NZ2FT-GN_[Device version]_[Language].CSPP.zip ([Device version]: 0001 to 9999, [Language]: en)	00 or later
	CC-Link IE TSN profile for the I/O module (CSP + file)	0x0000_[Model name]_[Device version]_[Language]_CCLinkIETSN.CSPP.zip ([Model name]: Model name of I/O module, [Device version]: 0001 to 9999, [Language]: en)	00 or later

7.2 Part Names

This section describes the LEDs of the NZ2FT-GN. (☞ Page 94 Coupler Common Part Names)



No.	Name	Description
(1)	PW LED	Displays the power supply status of the NZ2FT-GN. On in green: Power-on Flashing in green: Initializing the NZ2FT-GN Off: Power-off
(2)	SF LED	Displays the status of the NZ2FT-GN. On in red: Error (☞ Page 123 When the SF LED turns on in red) Flashing in red: Force mode or firmware update in progress Off: No error
(3)	BF LED	Displays a communication error. On in red: Fieldbus error (☞ Page 124 When the BF LED turns on in red) Flashing in red: Error (☞ Page 124 When the BF LED is flashing in red) Off: No error
(4)	MT LED	Displays the status of the NZ2FT-GN and I/O modules. On in yellow: Error (☞ Page 124 When the MT LED turns on in yellow) Off: No error
(5)	LINK P1 LED	Displays the fieldbus status. On in green: Link-up Off: Link-down
(6)	LINK P2 LED	Same as LINK P1 LED
(7)	D LINK LED	Displays the status of cyclic transmission. On in green: Cyclic transmission being performed Flashing: Cyclic transmission stopped Off: Disconnected
(8)	ERR. LED	Displays the error status. On in red: Moderate or major error Flashing in red: Minor error, Force mode, or firmware update in progress Off: Normal operation

No.	Name	Description
(9)	USB port and IP address setting switch cover	A cover for the USB port and IP address setting switch • USB port: To use the Web server, open this cover and connect a USB cable. • IP address setting switch: Set the fourth octet of the IP address. (☞ Page 98 IP address setting switch) When not in use, close this cover to prevent entrance of foreign material such as dust.
(10)	P1 (Ethernet port)	Connect an Ethernet cable. (☞ Page 41 Wiring products for coupler that use the Ethernet cable)
	P2 (Ethernet port)	

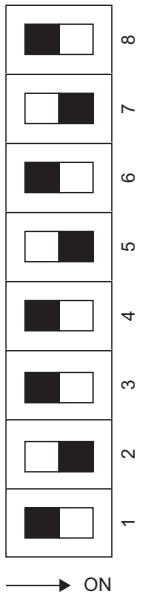
IP address setting switch

On the NZ2FT-GN, the IP address setting switch on the front of the module is used to set the 4th octet of the IP address. (For the 1st to 3rd octets, use the 1st to 3rd octets of the IP address of the master station.)
It is an 8-digit binary number, and the setting range is 1 to 254.

- If 0 is set, the IP address recorded in the non-volatile memory of the NZ2FT-GN (set value of parameter "IP address") will be used.
- If 255 is set, error code 0106H will occur and data link will not be performed with the master station. (☞ Page 129 Error code)

The setting is enabled when the power is turned on, so turn off the power of the NZ2FT-GN when setting.

Ex.
Fourth octet of IP address 173: 10101101 (binary)



Point

The IP address setting switches "8" to "1" correspond to the most significant digit (b7) to the least significant digit (b0) of the binary of the 4th octet of the IP address in order from the top.

Precautions

Depending on the IP address status, the LED of the NZ2FT-GN will be as follows.

- ERR. LED is on in red: An IP address that is out of range is set.
- ERR. LED is flashing in red: The IP address changed during operation. When the IP address setting switch is restored, the LED indication before the change is restored.

7.3 Performance Specifications

This section describes the performance specifications of the NZ2FT-GN. (☞ Page 30 General Specifications).

Item		Specifications
Connection		2×RJ45
Network		CC-Link IE TSN
Station type		Remote station
Authentication Class		Authentication Class B device
Number of connectable stations per master station		20 stations maximum
Input data size		RX: 1024 points maximum RWr: 512 points maximum
Output data size		RY: 1024 points maximum RWw: 512 points maximum
Parameter data		64×64 bytes maximum
Number of connectable I/O modules (excluding extension power supply modules)		64 modules maximum
Setting interface		Micro USB 2.0
Communication speed	Fieldbus	1Gbps maximum
Transfer rate	System bus	48Mbps maximum
External power supply voltage	Input power supply	24VDC +20%/-15%
	Output power supply	24VDC +20%/-15%
Power supply rated current	Input power supply	10A
	Output power supply	10A
Module current consumption		140mA
Power cable connection method		Spring clamp terminal block
Applicable wire size		Solid wire, stranded wire 0.14 to 1.5mm² (26 to 16 AWG)
Weight		234g

Precautions

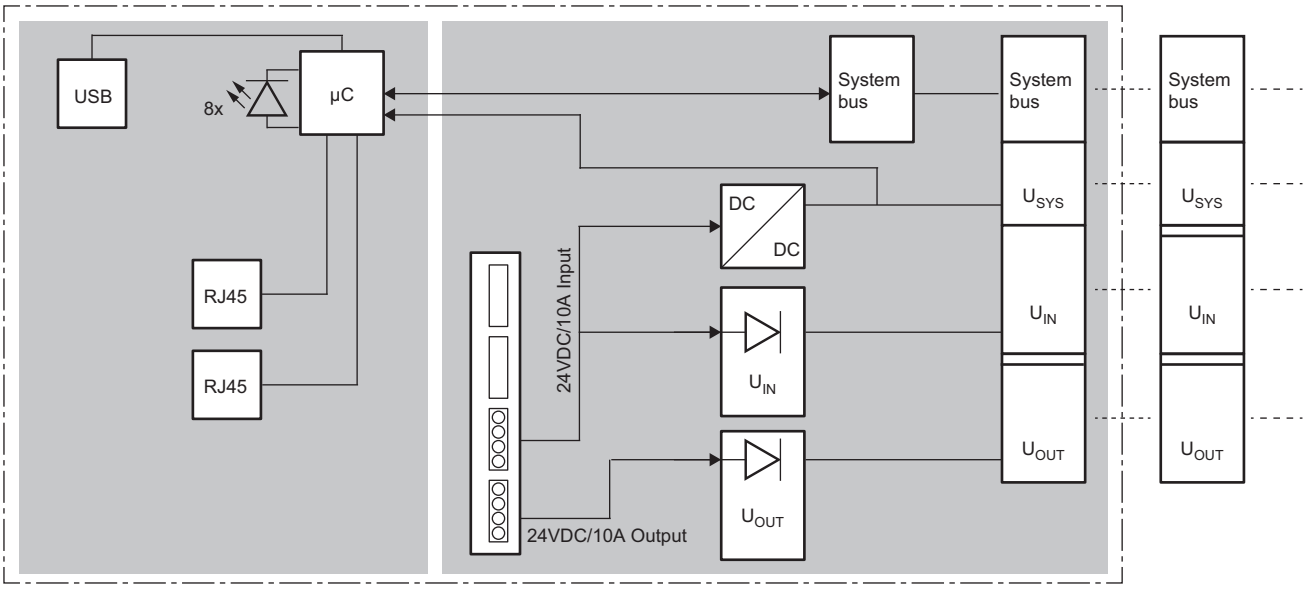
The NZ2FT-GN supports only the following master modules.

☞ Page 96 Corresponding master module and software package

Network ring connection, mesh connection, and communication speed of 100Mbps are not supported.

Block diagram

The following figure shows the internal block diagram of the NZ2FT-GN.



7.4 Functions

This section describes the functions of the NZ2FT-GN.

Function list

Item	Description	Reference
Fieldbus communication	The CC-Link IE TSN communicates with the master station as follows. • Periodic communication: Cyclic transmission • Communication at any time: Communication using the SLMP	Page 101 Cyclic transmission Page 101 Communications using the SLMP
IP address setting switch settings	Set the 4th octet of the IP address with the IP address setting switch.	Page 98 IP address setting switch
Parameter setting	Set the communication parameters of the NZ2FT-GN and the I/O module in GX Works3.	Page 107 Parameter Setting
Data format switching	Set the send/receive data format to big-endian or little-endian.	Page 112 Parameter list
Module parameter function	Saves the I/O module parameters to non-volatile memory.	Page 75 Module parameter function
Output value setting for fieldbus error	Set the output value of the I/O module for each case, such as when the CPU module status of the master station changes or a fieldbus error occurs.	Page 103 Output value setting for fieldbus error
I/O value setting for Hot swap	Set the I/O value of the I/O module of when replacing the I/O module while the power is on.	Page 79 I/O value setting for Hot swap
Checking warning output (Process alarm)	Checks whether Process alarm has occurred from the I/O module corresponding to the warning output, and reads Process alarm data of the content.	Page 105 Checking warning output (Process alarm)

Web server functions

Item	Description	Reference
Web server connection	Connect from a personal computer via the USB port or Ethernet port.	Page 60 Connection with a Personal Computer
Webserver via Ethernet	Set whether to enable or disable the access to the Web server via the Ethernet port.	Page 112 Parameter list
Login/Logout	Authenticate/clear access to the Web server. The functions will be limited if not logged in.	Page 64 Login/Logout
HTTPS setting	Encrypts the communications between the Web server and the personal computer.	Page 67 HTTPS setting
Help display	Displays Help of the Web server.	Page 69 Window Layout
Changing the language	Changes the display language of the Web server.	Page 73 Changing the language
Force mode	Inputs/outputs an arbitrary value forcibly from the Web server without being affected by the input from an external device or by the operation result (cyclic data) of the program.	Page 76 Force mode
Saving/loading parameter files	When replacing the NZ2FT-GN, save the parameters of the NZ2FT-GN and I/O module in a file. Also, load the saved parameters from the file.	Page 80 Saving/loading parameter files
Tag name function	Set an arbitrary character string as the channel name of the I/O module.	Page 83 Tag name function
Saving/Loading customisation files	Save/load the parameter file and Tag name file at the same time.	Page 84 Saving/Loading customisation files
I&M data function	Records I&M (Identification & Maintenance) data such as the installation location of the system and the installation date.	Page 85 I&M data function
Reset	Restarts the NZ2FT-GN.	Page 85 Resetting the coupler
Initialization	Restores the NZ2FT-GN to the factory default setting.	Page 86 Initialization of the coupler
Firmware update	Updates the firmware of the NZ2FT-GN and I/O module.	Page 87 Firmware update

Troubleshooting

Item	Description	Reference
LED indication	The status of the NZ2FT-GN is displayed in LED.	Page 97 Part Names Page 123 Checking with LEDs
CC-Link IE TSN/CC-Link IE Field diagnostics	Use GX Works3 to check the status of the CC-Link IE TSN system and for any errors that occurred in the NZ2FT-GN.	Page 126 CC-Link IE TSN/ CC-Link IE Field diagnostics
IP address duplication detection	If there are stations with the same IP address in one network, the NZ2FT-GN of each station detects duplicate IP addresses.	Page 102 IP address duplication detection
Status management	The status of the NZ2FT-GN is checked from the master station and the Web server.	Page 128 Confirmation by status information (Status word)
Acquisition of the service file	If troubleshooting does not solve the problem, provide the information about the problem to the service technician from the service file obtained from the NZ2FT-GN.	Page 88 Acquisition of the service file

Cyclic transmission

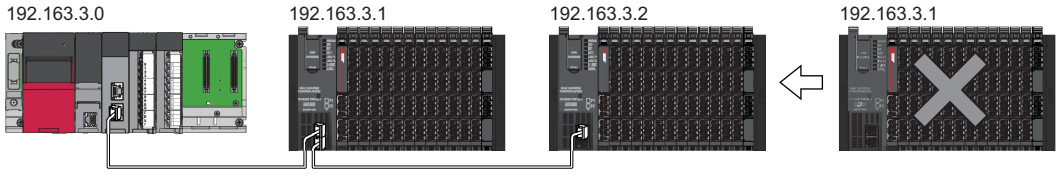
The CC-Link IE TSN communicates with the master station at regular intervals. (Cyclic transmission 📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Application))

Communications using the SLMP

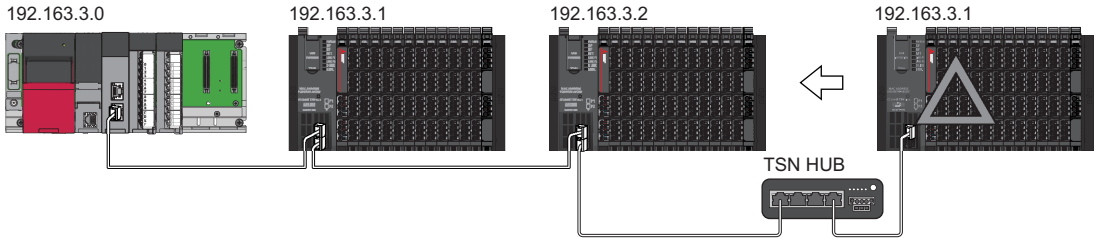
Use SLMP commands to communicate with the master station at any time. (Transient transmission 📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Application))

IP address duplication detection

When adding NZ2FT-GN to the network, if there are stations with the same IP address on the network, the added NZ2FT-GN will detect duplicate IP addresses. (RAS 📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Application))
The NZ2FT-GN checks if another station with the same IP address as its own station exists in the network when P1 or P2 links up. The NZ2FT-GN that detects duplicate IP addresses does not perform cyclic transmission.



However, if the NZ2FT-GN that is already linked up with the hub is added to the network together with the hub, the added NZ2FT-GN may not be able to detect duplicate IP addresses.
In this case, error code 1802H is detected at the master station, so disconnect the added NZ2FT-GN from the network.



Output value setting for fieldbus error

Set the output value of the I/O module for each case, such as when the CPU module status of the master station changes or a fieldbus error occurs.

The output value changes depending on the following five settings.

❶ The master station CPU module device to be set at the RY refresh target of the NZ2FT-GN

❷ RJ71GN11-T2 parameter "Output hold/clear setting during CPU STOP"

❸ NZ2FT-GN parameter "Output behaviour on fieldbus error"

❹ Parameter "Substitute value" for each I/O module

❺ RJ71GN11-T2 parameter "Output mode upon CPU error"

- The data sent from the NZ2FT-C24 to the external device is not affected by the setting of ❸ NZ2FT-GN parameter "Output behaviour on fieldbus error".
- For details on ❷ and ❺, refer to the following.

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

Ex.

For the digital output module

Status of master station (RJ71GN11-T2) ❶ NZ2FT-GN RY refresh target: CPU module device Y ❷ RJ71GN11-T2 parameter "Output hold/clear setting during CPU STOP": no effect		**❸ NZ2FT-GN parameter "Output behaviour on fieldbus error" setting**							
		0: All outputs off (All outputs are turned off.)		**1: Enable substitute value (A substitute value is output.)**				**2: Hold last value (The last output value is held.)**	
				❹ The I/O module parameter "Substitute value" set to 1		**❹ The I/O module parameter "Substitute value" set to 0**			
		Last output value is off	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
	When in CPU module stop error: Follow ❺.	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Status of master station (RJ71GN11-T2) ❶ NZ2FT-GN RY refresh target: other than CPU module device Y ❷ RJ71GN11-T2 parameter "Output hold/clear setting during CPU STOP": Hold		**❸ NZ2FT-GN parameter "Output behaviour on fieldbus error" setting**							
		0: All outputs off (All outputs are turned off.)		**1: Enable substitute value (A substitute value is output.)**				**2: Hold last value (The last output value is held.)**	
				❹ The I/O module parameter "Substitute value" set to 1		**❹ The I/O module parameter "Substitute value" set to 0**			
		Last output value is off	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
	When in CPU module stop error: Follow ❺.	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Status of master station (RJ71GN11-T2) ❶ NZ2FT-GN RY refresh target: other than CPU module device Y ❷ RJ71GN11-T2 parameter "Output hold/clear setting during CPU STOP": Clear		❸ NZ2FT-GN parameter "Output behaviour on fieldbus error" setting							
		0: All outputs off (All outputs are turned off.)		1: Enable substitute value (A substitute value is output.)				2: Hold last value (The last output value is held.)	
				❹ The I/O module parameter "Substitute value" set to 1		❹ The I/O module parameter "Substitute value" set to 0			
		Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
	When in CPU module stop error: Follow ❺.	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Ex.

For the NZ2FTS-60DA4

Status of master station (RJ71GN11-T2) (No effect on the settings ❶❷)		❸ NZ2FT-GN parameter "Output behaviour on fieldbus error" setting		
		0: All outputs off (All outputs are turned off.)	1: Enable substitute value (A substitute value is output.) (No effect on the setting ❹)	2: Hold last value (The last output value is held.)
Data link in operation	CPU module RUN state	D/A conversion value		
	CPU module: RUN → STOP	D/A conversion value		
	CPU module PAUSE state	D/A conversion value		
	When the CPU module is reset	0	A substitute value is output.	The last output value is held.
	When in CPU module stop error: Follow ❺.	D/A conversion value		
Disconnected (fieldbus error occurred)		0	A substitute value is output.	The last output value is held.

Checking warning output (Process alarm)

Checks whether Process alarm has occurred from the I/O module corresponding to the warning output, and reads Process alarm data of the content.

The I/O modules that support the alarm output and their details are as follows.

- NZ2FTS-60RD4: ☞ Page 504 Warning output (Process alarm)
- NZ2FTS-60TD4: ☞ Page 516 Warning output (Process alarm)
- NZ2FTS-D62P2: ☞ Page 535 Warning output (Process alarm)

Process alarm cannot be checked from the Web server.

How to check Process alarm

Use the SLMP command to read Process alarm data of the I/O module that is detecting Process alarm.

■Reading procedure

1. Whether Process alarm that has not been read has occurred is indicated by Process Alarm event notify (b1) of Status word1. Status word1 is transferred to the master station CPU module device by cyclic transmission. (☞ Page 128 Status word1)
2. When Process alarm occurs in the I/O module, Process Alarm event notify (b1) becomes 1 in the NZ2FT-GN and the master station.
3. The master station sends the read request of Process alarm data to the NZ2FT-GN by a program that uses the SLMP command Device Read.
4. The NZ2FT-GN sends response data to the read request of Process alarm data.
5. Process Alarm event notify (b1) of the NZ2FT-GN becomes 0, and Status word1 is sent to the master station by cyclic transmission.

If Process alarm has occurred in multiple slots of the I/O module, repeat procedures 2 to 4. When all the responses of the slot where Process alarm has occurred are completed, Process Alarm event notify (b1) of Status word1 becomes 0.

■SLMP message format

Process alarm data is read by using the SLMP command Device Read. Use the module access device and set it to perform extension specification for the binary code. For details, refer to the following.

📖 SLMP Reference Manual

Use 45239 as the NZ2FT-GN port number to be used for SLMP commands.

- Process alarm read request data

SLMP Request	Command	Subcommand	Reserved	Start device number	Device code	Reserved	Extension specification	Reserved	Number of device points
Device Read	0401H	0080H	0000H	000002H	00ABH	0000H	00FFH	F8H	0008H

- Process alarm read response data

SLMP Response	Alarm type	Slot number	Res	Data
Device Read	02H	The slot number where the error occurred (I/O module mounting position) is stored.*1	FFH	4 bytes (Process alarm data)*2

*1 If there is no unacknowledged Process alarm, FFH is stored.

*2 If there is no unacknowledged Process alarm, 0 is stored.

Point

If the second Process alarm is detected on the same channel of the same I/O module before reading Process alarm data, the second Process alarm data will not be stored correctly.

If Process alarm is detected, read Process alarm data.

7.5 Procedures Before Operation

1. IP address setting

Set the IP address of the NZ2FT-GN. (☞ Page 98 IP address setting switch)

2. Installation

Attach the NZ2FT system to the DIN rail and install it in a suitable environment. (☞ Page 36 Installation Environment and Installation Position of Module, Page 38 Installation)

3. Wiring

Connect the power cable and Ethernet cable to the NZ2FT-GN. (☞ Page 45 Wiring of power cable and I/O cable, ☞ Page 46 Ethernet cable)

Connect the I/O cables to the I/O module. (☞ Page 45 Wiring of power cable and I/O cable)

4. Master station setting

Register the CC-Link IE TSN profile and set the communication parameters. (☞ Page 107 Master station setting)

5. Connection between the Web server and personal computer

Access the NZ2FT-GN Web server via the USB port or the Ethernet port. (☞ Page 60 Connection with a Personal Computer)

6. Remote station setting

Set the parameters of the NZ2FT-GN and I/O module. (☞ Page 109 NZ2FT-GN and I/O module setting)

7.6 Parameter Setting

Register the CC-Link IE TSN profile and set the parameters of the RJ71GN11-T2, NZ2FT-GN, and I/O module.
Use the following window of GX Works3 of the master station or the Web server.

Parameter setting content	Relevant product	Reference
Master station	RJ71GN11-T2	Page 107 Settings by GX Works3
Network configuration	RJ71GN11-T2 and NZ2FT-GN	Page 108 "CC-Link IE TSN Configuration" window
Remote station	NZ2FT-GN	• Page 109 "Parameter of Slave Station" window (NZ2FT-GN) • Page 109 Setting by the Web server
	NZ2FT-GN and I/O module (extension module)	Page 110 "Extension Module Configuration" window
	I/O module (extension module)	• Page 111 "Parameter of Slave Station" window (I/O module) • Page 109 Setting by the Web server

Profile registration

Register the CC-Link IE TSN profile for the NZ2FT-GN and I/O module in GX Works3 of the master station. (☞ Page 96 Profiles)

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

Master station setting

This section describes the case where the RJ71GN11-T2 is used as the master module and the NZ2FT-GN and the I/O module are used as remote stations.

Settings by GX Works3

Set the parameters (required settings, basic settings, application settings) of the RJ71GN11-T2. (📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Application))

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2]

■Basic settings

Set the "Basic Period Setting" of "Basic Settings" within the following range.

Setting in Units of 1μs	Setting range
Not Set	• 125.00μs • 250.00μs • 500.00μs • 1000.00μs • 2000.00μs • 4000.00μs • 8000.00μs
Set	125.00μs to 8000.00μs (in increments of 1μs)

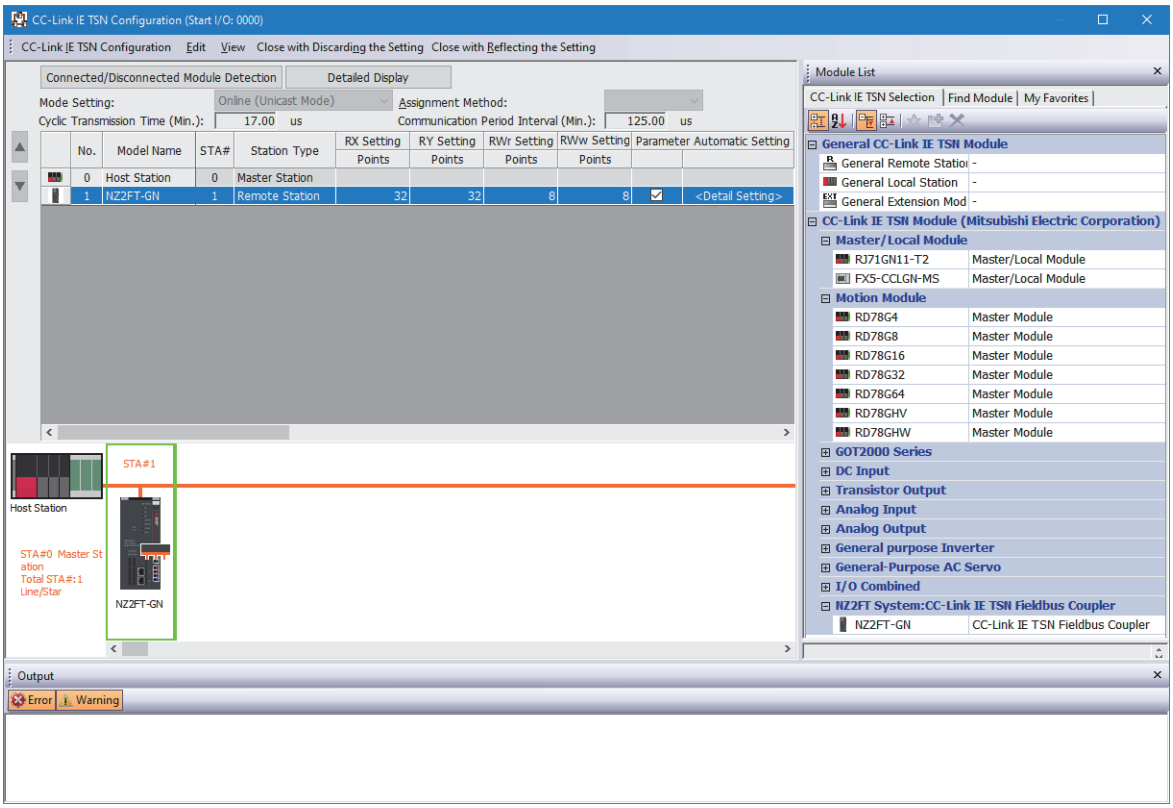
■Application Settings

Set "Communication Speed" in "Application Settings" to "1Gbps".

■"CC-Link IE TSN Configuration" window

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

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



2. Select NZ2FT-GN from "Module List" and drag and drop it onto the network map to set the network configuration.

3. Set "RX Setting", "RY Setting", "RWr Setting", and "RWw Setting" of the NZ2FT-GN. Set "Points" by adding the points required for the NZ2FT-GN and the I/O module. (☞ Page 113 Data configuration).

Point

Whether the NZ2FT-GN profile is registered can be checked from "Module List" on the "CC-Link IE TSN Configuration" window.

Whether the I/O module profile is registered can be checked from "Module List" on the "Extension Module Configuration" window. (☞ Page 110 "Extension Module Configuration" window)

NZ2FT-GN and I/O module setting

Set these settings on the Web server or GX Works3 of the master station.

Setting by the Web server

Set the parameters of the NZ2FT-GN and I/O module on the Web server. (☞ Page 112 Parameter list)
Turn off the master station and configure the settings while communications are not being performed with the master station. (Communication does not stop by changing RUN to STOP in the master station CPU module.)

Setting by GX Works3 of the master station

If the master station and NZ2FT-GN can communicate, set the parameters of the NZ2FT-GN and I/O module according to the following procedure. (📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Application))

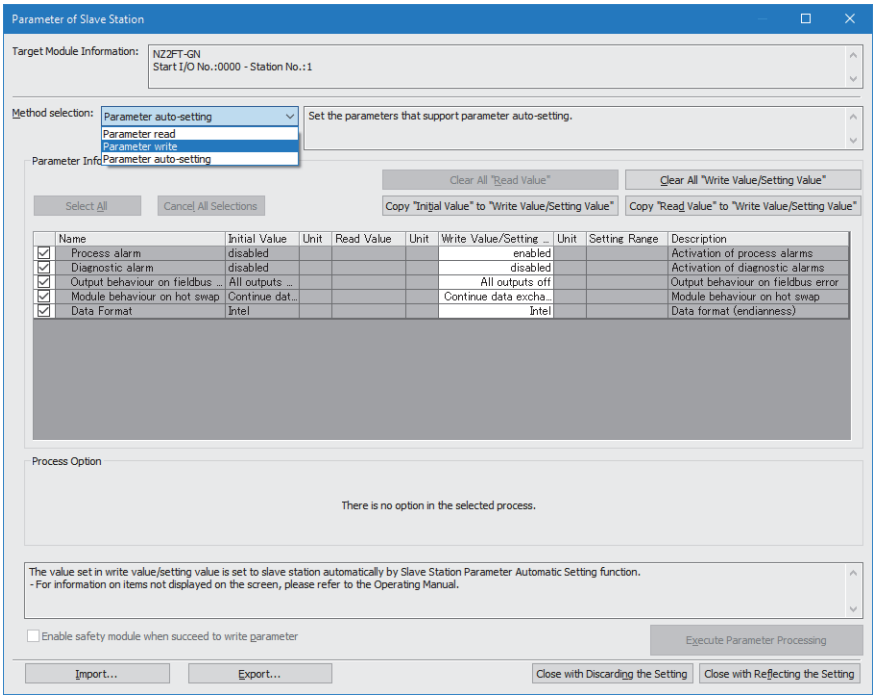
■"Parameter of Slave Station" window (NZ2FT-GN)

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

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2] ⇨ [Basic Settings] ⇨ [CC-Link IE TSN Configuration]

2. Open the "Parameter of Slave Station" window.

"CC-Link IE TSN Configuration" window ⇨ Right click on the NZ2FT-GN icon ⇨ [Parameter of Slave Station]



3. In "Method selection", select the parameter operation from the following.

Method selection	Operation
Parameter read	Reads the parameters of the target NZ2FT-GN or I/O module.
Parameter write	Set the parameters of the target NZ2FT-GN or I/O module.
Parameter auto-setting	The parameters of the NZ2FT-GN and I/O module are saved in the master station, and the parameters are automatically set when the NZ2FT-GN is connected or returned. (Slave station parameter automatic setting 📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Application))

4. For "Parameter write", select each item of "Write Value/Setting Value". (☞ Page 112 Parameter list)

5. Click the [Execute Parameter Processing] button to execute the parameter processing of the NZ2FT-GN.

■"Extension Module Configuration" window

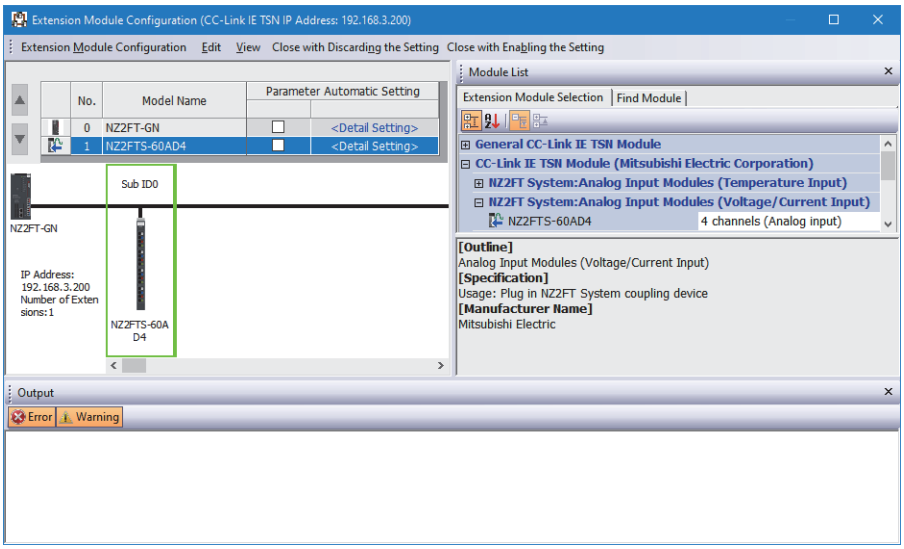
1. Open the "CC-Link IE TSN Configuration" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2] ⇨ [Basic Settings] ⇨ [CC-Link IE TSN Configuration]

2. Open the "Extension Module Configuration" window.

"CC-Link IE TSN Configuration" window ⇨ Right click on the NZ2FT-GN icon ⇨ [Open System Configuration] ⇨ [Open Extension Module Configuration]

3. Select an I/O module from the "Module List" and drag and drop it onto the network map.

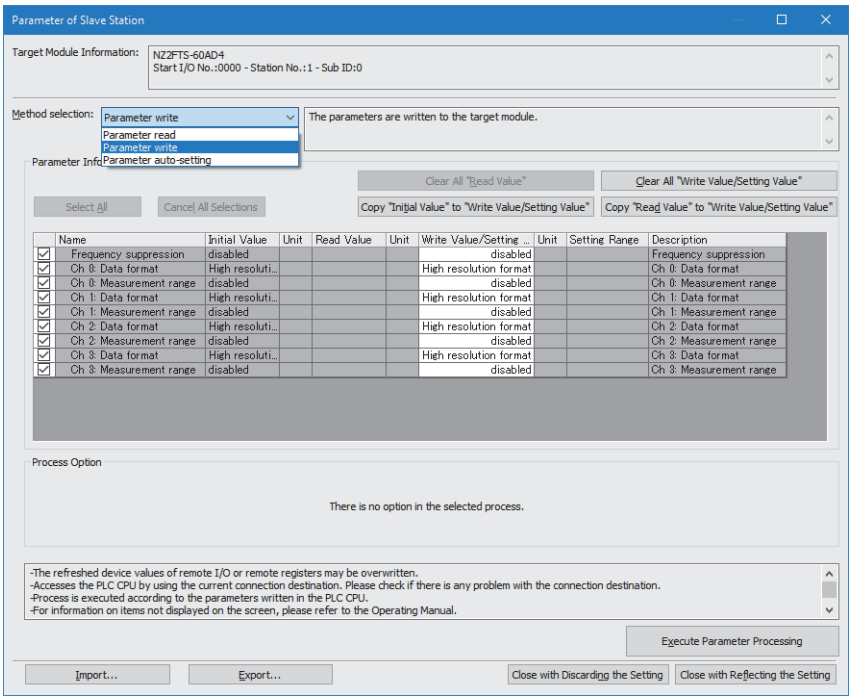


Item	Description	Setting range
No.	The number of I/O modules set on the "Extension Module Configuration" window is displayed.	—
Model Name	The module model name is displayed. For a module where the profile is not registered, select it from "General CC-Link IE TSN Module" or register the profile before setting. (☞ Page 107 Profile registration)	—
Parameter Automatic Setting	Set whether to set the parameters of each I/O module automatically. This can be set when "Parameter Automatic Setting" on the "CC-Link IE TSN Configuration" window is enabled. (☞ Page 108 "CC-Link IE TSN Configuration" window)	• Checked: Distribute parameters. • Not checked: Do not distribute parameters. (Default: Not checked)

■"Parameter of Slave Station" window (I/O module)

1. Open the "Parameter of Slave Station" window. The operation is the same as the parameter setting of NZ2FT-GN. (☞ Page 109 "Parameter of Slave Station" window (NZ2FT-GN))

"Extension Module Configuration" window ⇨ Right-click on the icon for each I/O module ⇨ [Parameter of Slave Station]



2. When "Parameter write" is selected in "Method selection", each item of "Write Value/Setting Value" is selected. (Parameter settings of each I/O module ☞ I/O MODULE)

3. Click the [Execute Parameter Processing] button to execute the parameter processing of the I/O module.

Precautions

After executing the parameter processing of the I/O module, select "Parameter write" on the "Parameter of Slave Station" window (NZ2FT-GN) and click the [Execute Parameter Processing] button. (☞ Page 109 "Parameter of Slave Station" window (NZ2FT-GN)).

If the above is not executed, the I/O module parameters will not be recorded in the non-volatile memory of the NZ2FT-GN. (When reset, the parameters are reset to the default values.)

Parameter list

These parameters can be set in the NZ2FT-GN from the Web server or GX Works3 of the master station.

○: Can be set, —: Cannot be set

Item	Description	Setting range	Default	Web server	GX Works3
IP address USB port	Set the IP address of the USB port.	• 192.168.1.202 • 192.168.2.202 • 192.168.3.202 • 192.168.4.202 • 192.168.5.202	192.168.1.202	○	—
IP address	When the IP address setting switch is 0, the IP address of the NZ2FT-GN is set. Do not set the values out of the setting range.	0.0.0.1 to 223.255.255.254	192.168.0.202	○	—
Subnet mask	Set the subnet mask of the NZ2FT-GN. When connected to the master station, operation is performed with the subnet mask of the master station until the NZ2FT-GN is turned off and on. Do not set the values out of the setting range.	128.0.0.0 to 255.255.255.248	255.255.255.0	○	—
Webserver via Ethernet	Set whether to enable or disable the access to the Web server via the Ethernet port. The NZ2FT-GN must be reset after the setting.	• Disabled • Enabled	Enabled	○	—
Process alarm	Set whether to detect Process alarm that occurred in the I/O module. (☞ Page 105 Checking warning output (Process alarm)) • Disabled: Does not detect Process alarm. • Enabled: Detects Process alarm.	• Disabled • Enabled	Disabled	○	○
Diagnostic alarm	Set it to "Disabled".	• Disabled • Enabled	Disabled	○	○
HTTPS setting	Set this parameter when encrypting the communications with the Web server. (☞ Page 67 HTTPS setting). • HTTP & HTTPS concurrent operation: HTTP and HTTPS communications are possible. • only HTTPS; no HTTP: Only HTTPS communications are possible.	• HTTP & HTTPS concurrent operation • only HTTPS; no HTTP	HTTP & HTTPS concurrent operation	○	—
Output behaviour on fieldbus error	Set the output operation when a fieldbus error occurs. • All outputs off: All outputs are turned off. • Enable substitute value: Output is produced according to the substitute value of the output module. • Hold last value: The output status is maintained.	• All outputs off • Enable substitute value • Hold last value	All outputs off	○	○
Module behaviour on hot swap	Set the I/O module operation during Hot swap. • Continue data exchange: The operation of the output module is maintained. • Behaviour like on fieldbus error: The output module is operated according to the setting of Output behaviour on fieldbus error.	• Continue data exchange • Behaviour like on fieldbus error	Continue dataexchange	○	○
Data format	Set how to send communication data. • Motorola: Communication data is sent in big-endian format. • Intel: Communication data is sent in little-endian format. The data format of the RJ71GN11-T2 is little endian, so fix it to "Intel".	• Motorola • Intel	Intel	○	○

Precautions

"IP address" and "IP address USB port" cannot be set to the same value. Also, do not set the same value for the network part of the IP address (1st to 3rd octets when the subnet mask is set to 255.255.255.0).

7.7 Access to Process Data

This section describes the cyclic transmission data of the NZ2FT-GN, including Process data (I/O module input/output data).

Data configuration

Process data and Status word are placed in the link devices RX, RY, RWr, and RWw, and are stored in the CPU module device of the master station for each NZ2FT-GN station number by cyclic transmission. (☞ Page 115 Allocation of master station CPU module to device)

If the refresh device is set in "Refresh Settings" of "Basic Settings" of GX Works3, auto transfer can be performed between RX, RY, RWr, RWw of the NZ2FT-GN and the CPU module device.

Status word is data indicating the status of the NZ2FT-GN. (☞ Page 128 Confirmation by status information (Status word))

Master station	Station number	Link device	Item	Data size	Description
CPU module device X	1	RX	Status word1	16 bits	Indicates whether Process alarm has occurred from the I/O module with station number 1.
			Process data RX	Variable length (bit)	Bit input data for the I/O module with station number 1 (In order of proximity to the NZ2FT-GN)
			System area	16 bits	—
	⋮				
	20 (maximum)	RX	Status word1	16 bits	Indicates whether Process alarm has occurred from the I/O module with station number 20.
			Process data RX	Variable length (bit)	Bit input data for the I/O module with station number 20 (In order of proximity to the NZ2FT-GN)
			System area	16 bits	—

Master station	Station number	Link device	Item	Data size	Description
CPU module device Y	1	RY	System area	16 bits	—
			Process data RY	Variable length (bit)	Bit output data of the I/O module with station number 1 (In order of proximity to the NZ2FT-GN)
			System area	16 bits	—
	⋮				
	20 (maximum)	RY	System area	16 bits	—
			Process data RY	Variable length (bit)	Bit output data of the I/O module with station number 20 (In order of proximity to the NZ2FT-GN)
			System area	16 bits	—

Master station	Station number	Link device	Item	Data size	Description
CPU module device W	1	RWr	System area	3 words	—
			Status word2	1 words	Indicates the status (such as configuration error) of the NZ2FT-GN with station number 1.
			Process data RWr	Variable length (word)	Word input data for the I/O module with station number 1 (In order of proximity to the NZ2FT-GN)
	⋮				
	20 (maximum)	RWr	System area	3 words	—
			Status word2	1 words	Indicates the status (such as configuration error) of the NZ2FT-GN with station number 20.
			Process data RWr	Variable length (word)	Word input data for the I/O module with station number 20 (In order of proximity to the NZ2FT-GN)

Master station	Station number	Link device	Item	Data size	Description
CPU module device W	1	RWw	System area	4 words	—
			Process data RWw	Variable length (word)	Word output data for the I/O module with station number 1 (In order of proximity to the NZ2FT-GN)
	⋮				
	20 (maximum)	RWw	System area	4 words	—
			Process data RWw	Variable length (word)	Word output data for the I/O module with station number 20 (In order of proximity to the NZ2FT-GN)

The size of Process data depends on the number of digital I/O modules, analog modules, and absolute encoder modules, and the number of occupied stations. (☞ Page 114 Data width used by the I/O module)

For an example of link device allocation, refer to the following communication example.

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

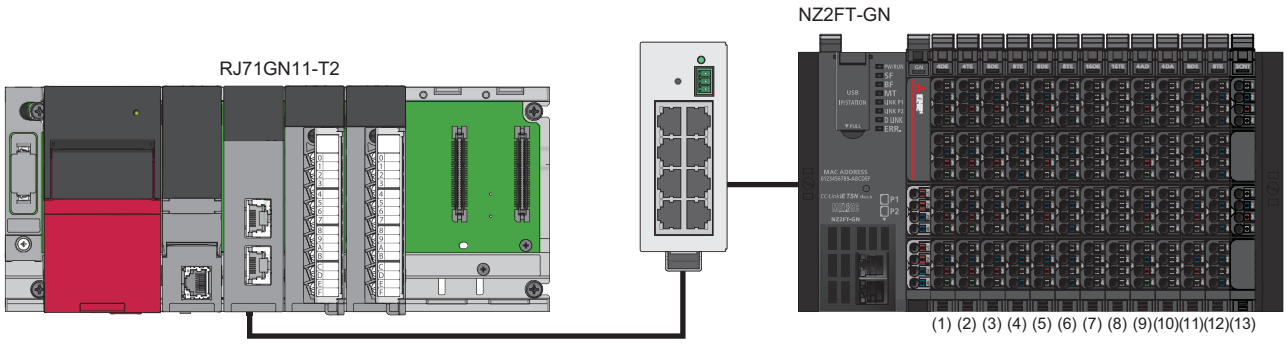
Data width used by the I/O module

The following table shows the data width used by each I/O module in the NZ2FT-GN during cyclic transmission.

I/O module	Process data RX	Process data RY	Process data RWr	Process data RWw	Reference
NZ2FTS4-4DE	16 bits	—	—	—	Page 420 Process data
NZ2FTS3-8DE	16 bits	—	—	—	Page 425 Process data
NZ2FTS1-16DE	16 bits	—	—	—	Page 429 Process data
NZ2FTS4-4D	16 bits	—	—	—	Page 433 Process data
NZ2FTS3-8D	16 bits	—	—	—	Page 437 Process data
NZ2FTS1-16D	16 bits	—	—	—	Page 440 Process data
NZ2FTS2-4A	16 bits	—	—	—	Page 444 Process data
NZ2FTS4-4TE	—	16 bits	—	—	Page 449 Process data
NZ2FTS2-8TE	—	16 bits	—	—	Page 453 Process data
NZ2FTS1-16TE	—	16 bits	—	—	Page 457 Process data
NZ2FTS4-4T	—	16 bits	—	—	Page 461 Process data
NZ2FTS2-8T	—	16 bits	—	—	Page 465 Process data
NZ2FTS1-16T	—	16 bits	—	—	Page 469 Process data
NZ2FTS3-4R	—	16 bits	—	—	Page 473 Process data
NZ2FTS-60AD4	—	—	4 words	—	Page 484 Process data
NZ2FTS-60DA4	—	—	—	4 words	Page 496 Process data
NZ2FTS-60RD4	—	—	4 words	—	Page 506 Process data
NZ2FTS-60TD4	—	—	4 words	—	Page 518 Process data
NZ2FTS-D62P2	—	—	8 words	8 words	Page 545 Process data
NZ2FTS-D66D1	—	—	4 words	—	Page 556 Process data
NZ2FT-C24	—	—	8 words	8 words	Page 575 Process data

Allocation of master station CPU module to device

The following system configuration describes the allocation of the master station CPU module device using the RJ71GN11-T2 and the data structure of Process data of the NZ2FT-GN.



(1) NZ2FTS4-4DE
(2) NZ2FTS4-4TE
(3) NZ2FTS3-8DE
(4) NZ2FTS2-8TE
(5) NZ2FTS3-8DE
(6) NZ2FTS2-8TE
(7) NZ2FTS1-16DE
(8) NZ2FTS1-16TE
(9) NZ2FTS-60AD4
(10) NZ2FTS-60DA4
(11) NZ2FTS3-8DE
(12) NZ2FTS2-8TE
(13) NZ2FTS-D62P2

Master station CPU module	NZ2FT-GN		
Device	**Station number**	**I/O module name**	**Process data**
X1000 to X100F	1	Status word1 (16 bits)	RX0 to RXF
X1010 to X101F		NZ2FTS4-4DE	RX10 to RX1F
X1020 to X102F		NZ2FTS3-8DE	RX20 to RX2F
X1030 to X103F		NZ2FTS3-8DE	RX30 to RX3F
X1040 to X104F		NZ2FTS1-16DE	RX40 to RX4F
X1050 to X105F		NZ2FTS3-8DE	RX50 to RX5F
X1060 to X106F		System area (16 bits)	RX60 to RX6F

Master station CPU module	NZ2FT-GN		
Device	**Station number**	**I/O module name**	**Process data**
Y1000 to Y100F	1	System area (16 bits)	RY0 to RYF
Y1010 to Y101F		NZ2FTS4-4TE	RY10 to RY1F
Y1020 to Y102F		NZ2FTS2-8TE	RY20 to RY2F
Y1030 to Y103F		NZ2FTS2-8TE	RY30 to RY3F
Y1040 to Y104F		NZ2FTS1-16TE	RY40 to RY4F
Y1050 to Y105F		NZ2FTS2-8TE	RY50 to RY5F
Y1060 to Y106F		System area (16 bits)	RY60 to RY6F

Master station CPU module	NZ2FT-GN		
Device	**Station number**	**I/O module name**	**Process data**
W0 to W2	1	System area (3 words)	RWr0 to RWr2
W3		Status word2 (1 word)	RWr3
W4 to W7		NZ2FTS-60AD4	RWr4 to RWr7
W8 to W15		NZ2FTS-D62P2	RWr8 to RWr15

Master station CPU module	NZ2FT-GN		
Device	**Station number**	**I/O module name**	**Process data**
W100 to W103	1	System area (4 words)	RWw0 to RWw3
W104 to W107		NZ2FTS-60DA4	RWw4 to RWw7
W108 to W115		NZ2FTS-D62P2	RWw8 to RWw15

Point

- Process data of I/O modules can also be checked from the Web server. (☞ Page 72 "Process data").
- The communication data format can be changed to little-endian or big-endian by setting the parameter. (☞ Page 107 Checking warning output (Process alarm))

Process data of each I/O module is stored in the buffer memory of the master module or the CPU module device of the master station by cyclic transmission. For how to read Process data, refer to the following.

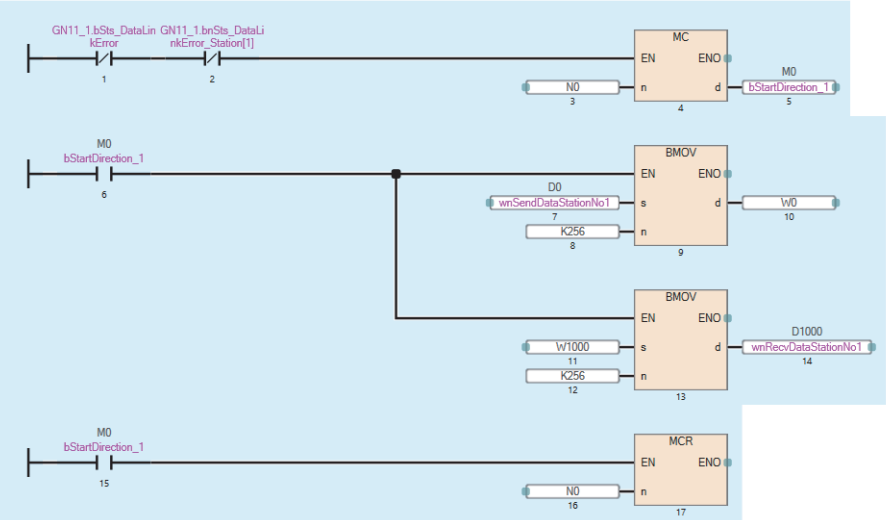
📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Application)

7.8 Program Example

Precautions for programming

For cyclic transmission, configure an interlock program. The following shows an example example of an interlock program.

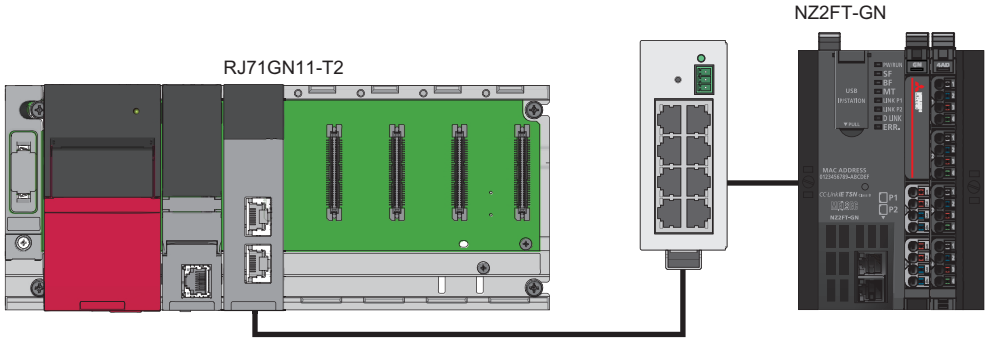
Classification	Label name	Description	Device
Module label	GN11_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GN11_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station number 1)	SW00B0.0



Example using the NZ2FTS-60AD4

The following example is for a program to read AI values that are obtained from A/D conversion performed on AI 0 (Channel 0) to AI 3 (Channel 3) of the analog input module.

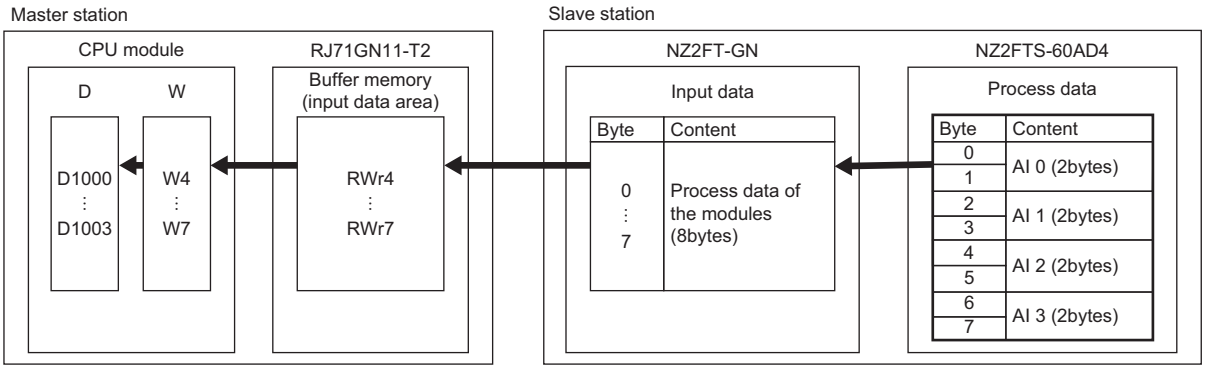
System configuration



No.	Item		Model
(1)	Master station (Station number 0, IP address: 192.168.3.10)	CPU module	R04CPU
		Power supply module	R61P
		CC-Link IE TSN module	RJ71GN11-T2
(2)	Remote station (Station number 1, IP address: 192.168.3.200)	CC-Link IE TSN compatible coupler	NZ2FT-GN
		4ch analog input module	NZ2FTS-60AD4

Device assignment

Allocate Process data of the NZ2FT-GN to the link device of the RJ71GN11-T2. (☞ Page 115 Allocation of master station CPU module to device).

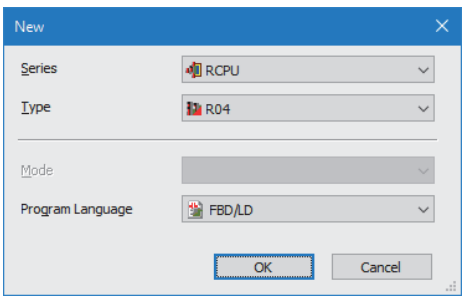


Master station setting

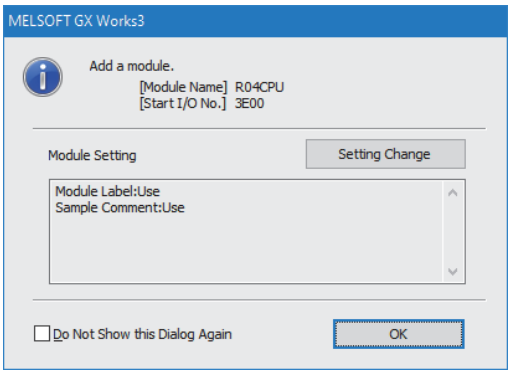
Connect the software package to the master station CPU module and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]

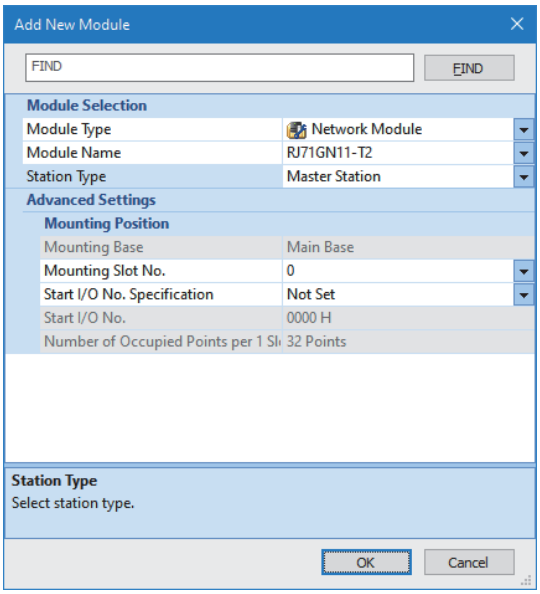


2. Click the [Setting Change] button and set to use the module label.

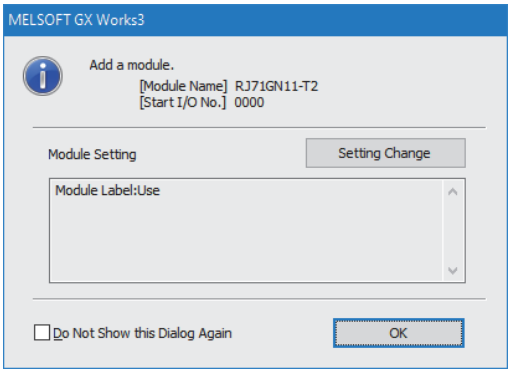


3. Set the RJ71GN11-T2 as follows.

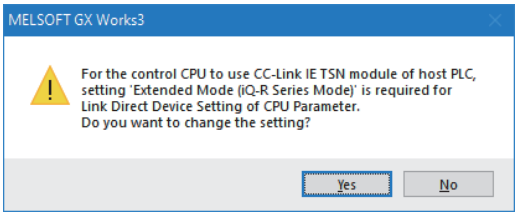
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]



4. Click the [OK] button to add a module label of the RJ71GN11-T2.

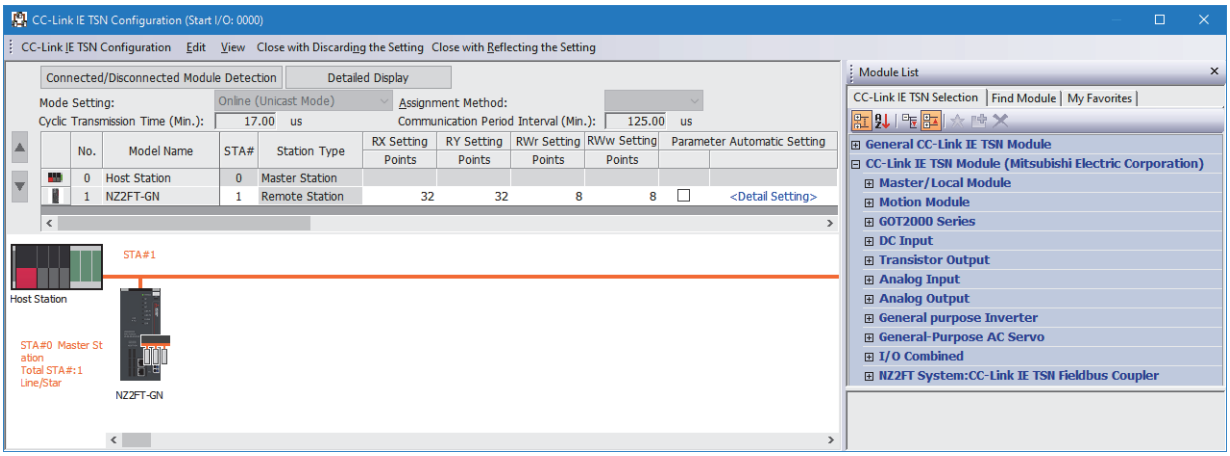


5. The following window will be displayed. Click "Yes".



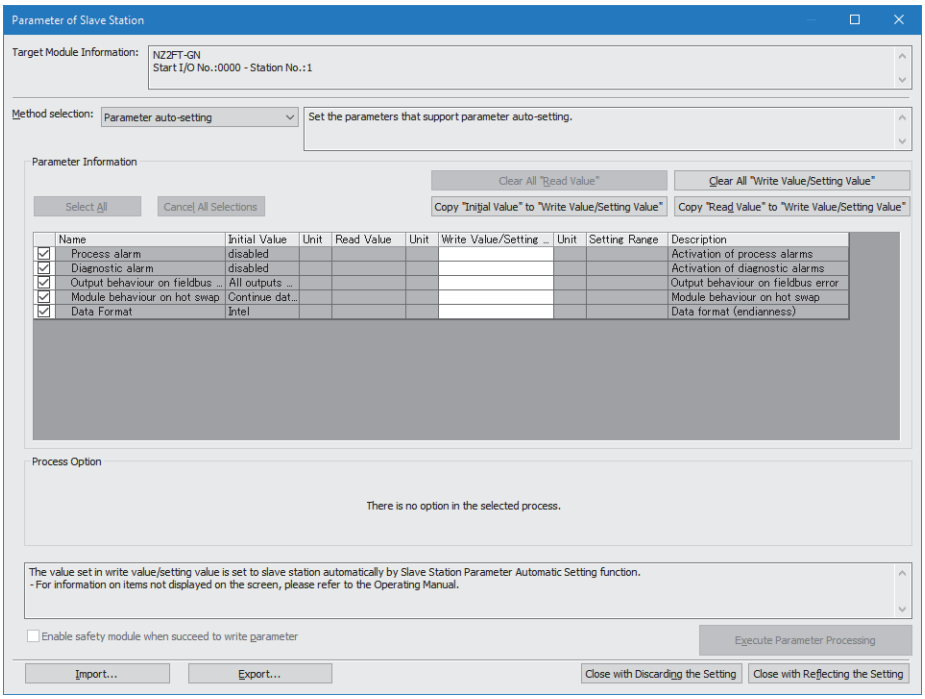
6. Set the network configuration of the RJ71GN11-T2 and NZ2FT-GN on the "CC-Link IE TSN Configuration" window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [NZ2FT-GN] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



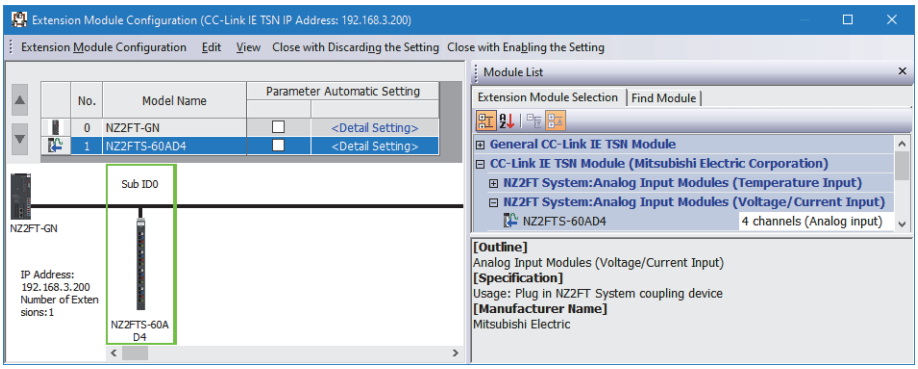
7. Set the NZ2FT-GN on the "Parameter of Slave Station" window.

"CC-Link IE TSN Configuration" window ⇨ Right click on the NZ2FT-GN icon ⇨ [Parameter of Slave Station]



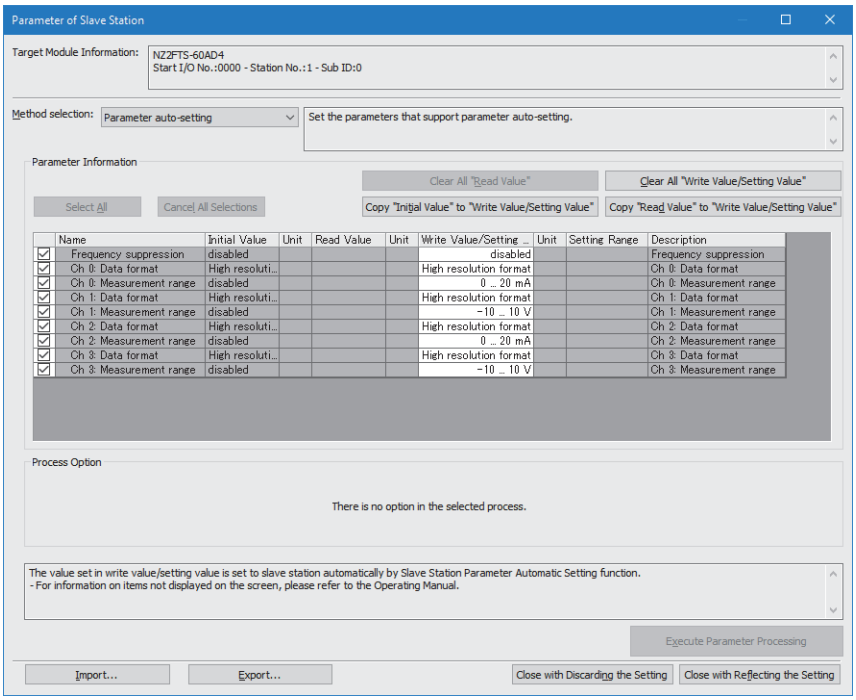
8. Set the configuration of the NZ2FT-GN and NZ2FTS-60AD4 on the "Extension Module Configuration" window.

"CC-Link IE TSN Configuration" window ⇨ Right click on the NZ2FT-GN icon ⇨ [Open System Configuration] ⇨ [Open Extension Module Configuration]



9. Set the NZ2FTS-60AD4 on the "Parameter of Slave Station" window. (☞ Page 484 Parameter settings)

"Extension Module Configuration" window ⇨ Right click on the NZ2FTS-60AD4 icon ⇨ [Parameter of Slave Station]



10. Set the refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GN11-T2] ⇨ [Basic Settings] ⇨ [Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	4096	00000	00FFF	⇔	Module Label				
-	SW	4096	00000	00FFF	⇔	Module Label				
1	RX	32	00000	0001F	⇔	Specify Device	X	32	01000	0101F
2	RY	32	00000	0001F	⇔	Specify Device	Y	32	01000	0101F
3	RWr	8	00000	00007	⇔	Specify Device	W	8	00000	00007
4	RWw	8	00000	00007	⇔	Specify Device	W	8	00100	00107

11. Write the set parameters to the master station CPU module, and reset or power off and on the CPU module.

[Online] ⇨ [Write to PLC]

Device/label to be used

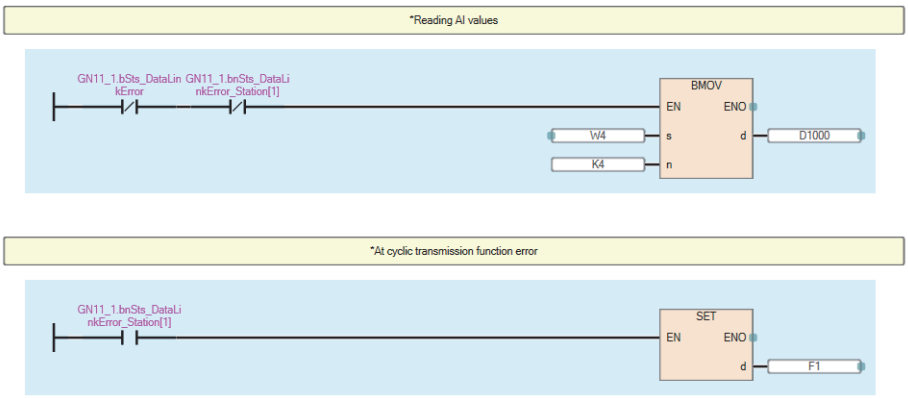
Device	Description	
D1000	Cyclic transmission	AI0
D1001		AI1
D1002		AI2
D1003		AI3
GN11_1.bSts_DataLinkError		Data link error status of own station
GN11_1.bnSts_DataLinkError_Station[1]		Data link status of each station
X1000 to X101F	Refresh settings	Remote input (RX0 to RX1F)
Y1000 to Y101F		Remote output (RY0 to RY1F)
W0 to W7		Remote register (RWr0 to RWr7)
W100 to W107		Remote register (RWw0 to RWw7)
GN11_1 (module label)		Link special relay (SB0 to SB0FFF) Link special register (SW0 to SW0FFF)

Program Example

■Cyclic transmission program example

Change the CPU module from STOP to RUN to start cyclic transmission.

The values of AI 0 to AI 3 of the NZ2FTS-60AD4 are stored in D1000 to D1003.



7.9 Troubleshooting

This section describes troubleshooting of the NZ2FT-GN.

Point

If troubleshooting does not solve the problem, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Checking with LEDs

When the PW LED turns off

Check the following items in order from the top.

Item	Action
Is the module status LED of the I/O module on in green?	Repair or replace the NZ2FT-GN. The possible cause is an internal fuse failure.
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 of the external power supply within the range of performance specifications.

If the problem still persists despite the above measures, replace the NZ2FT-GN.

When the PW LED is flashing in green

Check the following item.

Item	Action
Is the latest firmware installed?	Please install the latest firmware.

When the SF LED turns on in red

Check the following items in order from the top.

Item	Action
Is the electronic unit part detached?	Insert the electronic unit part.
Is the NZ2FT-GN and I/O module connected with no clearance between them?	Connect the NZ2FT-GN and the I/O module with no clearance between them.

When the SF LED is flashing in red

Check the following item.

Item	Action
Has the Force mode been selected?	The NZ2FT-GN is in Force mode. Clear the Force mode.

When the BF LED turns on in red

Check the following items in order from the top.

Item	Action
Are the Ethernet cables between the master station, hub, NZ2FT-GN (or between the master station and NZ2FT-GN directly connected) inserted as far as they will go?	Push in the Ethernet cable of each connection section until it clicks.
Has the Ethernet cable been disconnected?	Replace the Ethernet cable.
Is the IP address setting switch set to 255?	Set the IP address setting switch in the range of 0 to 254.
Are there any mistakes in the parameter settings of the master station and NZ2FT-GN?	Review the parameters of the master station and NZ2FT-GN. ■Master module • IP address setting • Network configuration setting ■NZ2FT-GN • Parameter "IP address" • Parameter "Subnet mask"
Is the firmware version appropriate?	Check the firmware version of the master module and NZ2FT-GN. Update the firmware if necessary.
Is the RUN/STOP/RESET switch of the master station CPU module in the STOP or RESET position?	Set the RUN/STOP/RESET switch of the master station CPU module to the RUN position.
Has an error occurred in the master station?	Follow the manual of the master station and perform troubleshooting.
Is event code 00C71 registered in the event history of the master station?	• The network synchronization communication setting may be enabled for I/O modules that do not support CC-Link IE TSN network synchronization communications. Disable the network synchronization communication setting. • If event code 00C71 is registered even after performing the above, refer to the manual of the master station and eliminate the cause of event code 00C71.

When the BF LED is flashing in red

Check the following items in order from the top.

Item	Action
Is the electronic unit part detached?	Insert the electronic unit part.
Are the NZ2FT-GN and I/O module connected with no clearance between them?	Connect the NZ2FT-GN and the I/O module with no clearance between them.
Is a firmware update in progress?	Wait for the firmware update to end.

When the MT LED turns on in yellow

Check the following item.

Item	Action
Is the I/O module mounted correctly?	Mount the I/O module again by pressing it to the NZ2FT-GN until it clicks.

When the LINK P1 LED and LINK P2 LED turn off

Check the following items in order from the top.

Item	Action
Are the Ethernet cables between the master station, hub, NZ2FT-GN (or between the master station and NZ2FT-GN directly connected) inserted as far as they will go?	Push in the Ethernet cable of each connection section until it clicks.
Has the Ethernet cable been disconnected?	Replace the Ethernet cable.
Is the power of the connection destination (master station and hub) turned off?	Turn on the power of the connection destination (master station and hub).
Is there any noise affecting the system?	Perform the following. • Install a noise filter between the external power supply and the NZ2FT-GN. • Attach a ferrite core to the Ethernet cable.

When the D LINK LED is flashing in green

Check the following items in order from the top.

Item	Action
Is the target NZ2FT-GN set as the reserved station in the master station setting?	In the network configuration setting of the master station, set "No Setting" for "Reserved/ Error Invalid Station".
Has the high-priority time synchronization source station been connected to the network?	The time synchronization source is switched and thus temporarily disconnected. Wait until communication resumes.

When the D LINK LED turns off

Check the following items in order from the top.

Item	Action
Has the Ethernet cable been disconnected?	Replace the Ethernet cable.
Does the Ethernet cable meet the standard?	Replace the Ethernet cables that meet the standards.
Does the station-to-station distance exceed the range of the specifications?	Set the station-to-station distance within the range of the specifications.
Does the cabling condition (bending radius) of the Ethernet cable exceed the range of the specifications?	Set the bending radius of the Ethernet cable to be within the range of the specifications.
Is the hub and other stations turned on?	Turn on the hub and other stations.
Is the hub being used corresponds to the specifications of the master station?	• Use a hub that meets the standard. • Turn off and on the hub.
Is the master station connected on the network and operating normally?	• Connect the master station to the network. • If an error occurs at the master station, eliminate the error at the master station.
When connecting the line, is a remote station whose power is off connected between the master station and NZ2FT-GN?	The remote station whose power is off will be disconnected. In line topology, the stations after the disconnected station will be disconnected, so turn on the power.
Is a station with a communication error connected between the master station and NZ2FT-GN? Or has an error occurred at the master station?	Eliminate the error at the station with a communication error.
Is the master station and NZ2FT-GN linked up at the expected communication speed?	Change the communication speed of the station or hub so that it meets the expected communication speed.
Is the IP address of NZ2FT-GN duplicated with other devices within the access range of CC-Link IE TSN?	Change the IP address so that the IP address does not overlap in the access range of CC-Link IE TSN.
Is the station type set to anything other than remote station in the network configuration setting of the master station?	Set the station type to remote station in the network configuration setting of the master station.
Does the model name of the remote station match the model name of the actual machine in the network configuration setting of the master station?	Match the model name of the remote station with the model name of the actual machine in the CC-Link IE TSN configuration setting of the master station.
Has an error occurred in the NZ2FT-GN?	Check the details of the error and resolve it.

When the ERR. LED turns on or is flashing in red

Check the following item.

Item	Action
Has an error occurred in the NZ2FT-GN?	Identify the cause of the error from the CC-Link IE TSN/CC-Link IE Field diagnostics and take corrective action.

When the following LEDs turn on in red

- Power supply LED
- Input power supply LED 3.2
- Output power supply LED 4.2

Check the following item.

Item	Action
Is the voltage of the external power supply (24VDC) within the specified range?	The power supply voltage is less than 18VDC. Set the voltage value within the range of performance specifications. If the problem still persists, replace the NZ2FT-GN.

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

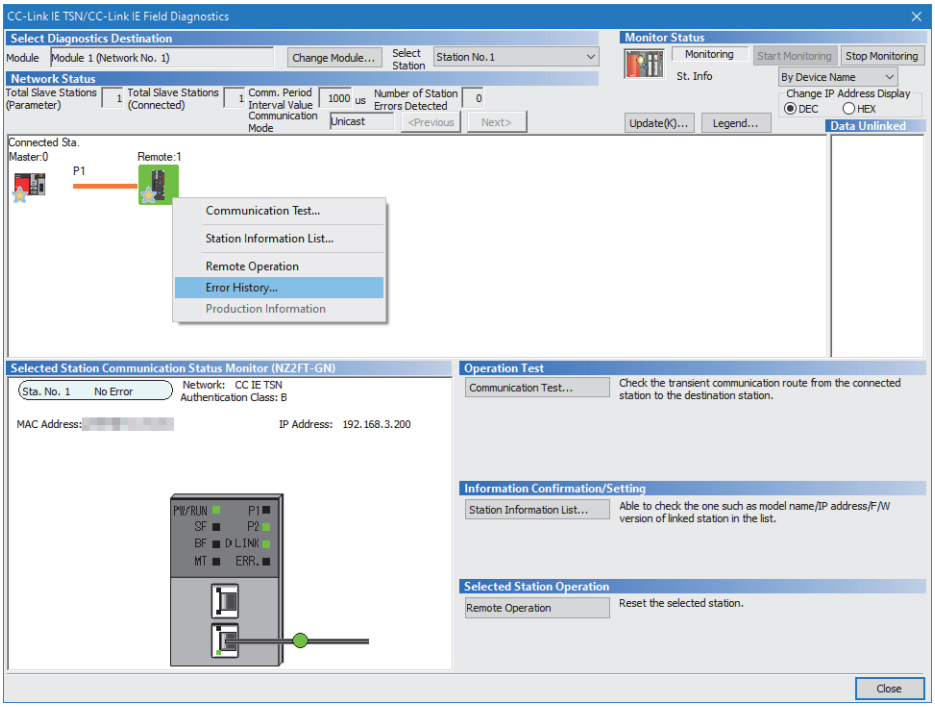
Use GX Works3 to check the status of the CC-Link IE TSN system and for any errors that occurred in the NZ2FT-GN.
(Checking the network status MELSEC iQ-R CC-Link IE TSN User's Manual (Application))

Item	Description
Network map monitor	Check if any errors have occurred in the devices and cables that configure the network. Also, check the operating status of each station. The NZ2FT-GN responds to the request of the master station.
Selected Station Communication Status Monitor	Check details of and actions for errors that occurred in a selected station. The NZ2FT-GN responds to the request of the master station.
Communication Test	Check whether outgoing/incoming paths of transient transmission between the master station and the communication target are correct. The NZ2FT-GN responds to the request of the master station.

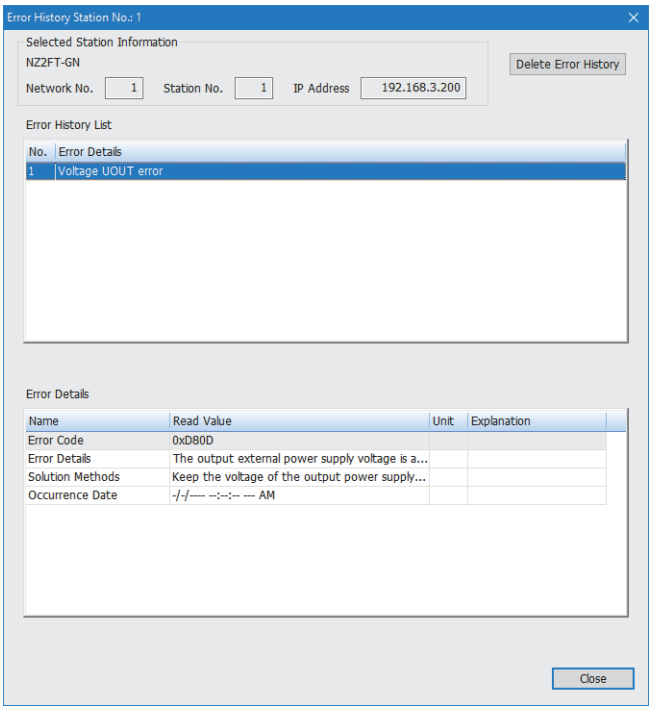
How to check the error

This procedure is for checking the error that occurred in the NZ2FT-GN with CC-Link IE TSN/CC-Link IE Field diagnostics.

1. Select "CC-Link IE TSN/CC-Link IE Field Diagnostics" from the [Diagnostics] menu of GX Works3 of the master station.
2. The "CC-Link IE TSN/CC-Link IE Field Diagnostics" window will open. Right-click the NZ2FT-GN icon for which you want to check for errors and select "Error History".



3. Follow the instructions on the window to display the "Error History" window.



Item	Description
Error History List	Reads the error history held inside the NZ2FT-GN. In the error history, up to 16 errors are recorded in the order of new occurrence. If the number of errors exceeds 16, the oldest errors are deleted in order.
Error Details	"Error Code", "Error Details", "Solution Methods", and "Occurrence Data" are displayed. (☞ Page 129 Error code) "Occurrence Data" of the error history is recorded after the time is delivered from the master station. If an error occurs before the time is delivered from the master station, "Occurrence Data" will not be recorded.

Precautions

Turn off and on the NZ2FT-GN to clear the error history.

Confirmation by status information (Status word)

There are two types of data that indicate the status of the NZ2FT-GN: Status word1 and Status word2. (☞ Page 113 Access to Process Data)

Data configuration

Status word1 is stored in Process data (RX(n~n+3)) of each station.
Status word2 is stored in Process data (RWr(n+3)) of each station.

■Status word1

Bit	Item	Description
0	Error bit 0	System area
1	Process Alarm event notify	Indicates whether the status of Process alarm of the I/O module has changed. ■When Process alarm is Disabled 0: Process alarm is not monitored. ■When Process alarm is Enabled 0: Process alarm has not occurred in all I/O modules, or Process alarm data has been read in all I/O modules. 1: An I/O module with unacknowledged Process alarm is present.
2 to 15	Error bit 2 to 15	System area

■Status word2

Bit	Item	Description
0	Error bit 0	System area
1	Station pending	0: Normal state, or one electronic unit part or I/O module removed 1: Multiple electronic unit parts and I/O modules removed
2	Error bit 2	System area
3	Systembus error	Indicates the System bus status. 0: Normal 1: Error
4 to 5	Error bit 4 to 5	System area
6	I/O-Configuration error	Indicates an I/O module configuration error. 0: Normal 1: Abnormal (There is a difference between the configuration information saved in the NZ2FT-GN and the current configuration information.) During I/O module replacement, this bit is set to 1 when the module is disconnected and is set to 0 when a new module is mounted.
7 to 9	Error bit 7 to 9	System area
10	Force mode active	0: Force mode not implemented 1: Force mode implemented
11 to 12	Error bit 11 to 12	System area
13	Voltage U_{OUT} error	Indicates the external power supply voltage for output. 0: Normal 1: Abnormal (Power supply voltage of the output current path is less than 18VDC.)
14	Voltage U_{IN} error	Indicates the external power supply voltage for input. 0: Normal 1: Abnormal (Power supply voltage of the input current path is less than 18VDC.)
15	Error bit 15	System area

How to check Status word

■GX Works3

Read the link device of "Status word2" on the monitor.

■Web server

It is displayed in decimal in "Coupler status" of "General information" of the NZ2FT-GN. (☞ Page 71 "Component view")
Only "Status word2" is displayed.

Troubleshooting by symptom

Cannot communicate with the master station

Check the following item.

Item	Action
Are the LINK P1 LED and LINK P2 LED on?	If they are off, perform troubleshooting. Also, check other LEDs. (☞ Page 123 Checking with LEDs)
Is the BF LED off?	If it is not turned off, perform troubleshooting. Also, check other LEDs. (☞ Page 123 Checking with LEDs)
Is the voltage of the power supply (24VDC) within the specified range?	Set the voltage value within the range of performance specifications.
Is the wiring between the master station and NZ2FT-GN appropriate?	Review the wiring between the master station and NZ2FT-GN. (☞ Page 46 Ethernet cable).
Are the parameters correct?	Check the parameters. (☞ Page 107 Parameter Setting).
Are the IP address and subnet mask set correctly?	Review the IP address and subnet mask settings. If the settings have been changed, turn off and on the NZ2FT-GN.

If communication is not established with the master station even after checking all of the above and checking with the LEDs of the I/O module and Web server, there is a risk of hardware failure in the NZ2FT-GN.
Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Error code

Check with CC Link IE TSN/CC Link IE Field diagnostics. (☞ Page 126 How to check the error).

List of error codes

- Major: The NZ2FT-GN has stopped operating due to an error and cannot be recovered. It cannot be cleared.
- Moderate: The NZ2FT-GN has stopped operating due to an error but it can be recovered. After removing the cause of the error, turn off and on the NZ2FT-GN to clear the error.
- Minor: The NZ2FT-GN continues to operate despite an error and can be recovered. After removing the cause of the error, turn off and on the NZ2FT-GN to clear the error.

Error code	Error type	Error name	Error description and cause	Action
0010H	Major	Hardware error	NZ2FT-GN hardware error	Turn off and on the system. If the error occurs again, the NZ2FT-GN may have failed. Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)
0106H	Moderate	IP address setting switch out of range error	The IP address setting switch is set to 255.	Turn on the power with the IP address setting switch set between 0 to 254.
0200H	Minor	IP address setting switch changed error	The IP address setting switch was changed while the power was on.	Return the IP address setting switch to the setting when the power was turned on.
D010H	Minor	IP address duplication detection	IP address duplication was detected.	Change the IP address so that it does not overlap in the access range of CC-Link IE TSN. After the change, turn off and on the power.
D800H	Minor	Summarized module diagnosis	NZ2FT-GN error or Force Mode	Take the following actions. • Turn the power off and on. • Check the wiring. • Check the settings. If the error occurs again, the NZ2FT-GN may have failed. Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file) In Force Mode, the output is not normal, so pay close attention to the operation of the output destination device.
D801H	Minor	Station pending	Multiple electronic unit parts and I/O modules have been removed.	Restore the electronic unit parts and I/O modules according to the settings of the master station.
D803H	Moderate	Systembus error	The system bus status is abnormal.	Replace the defective I/O module with a normal I/O module.
D806H	Minor	I/O-Configuration error	The I/O module configuration is abnormal.	Match the I/O module configuration with the settings on the master station.

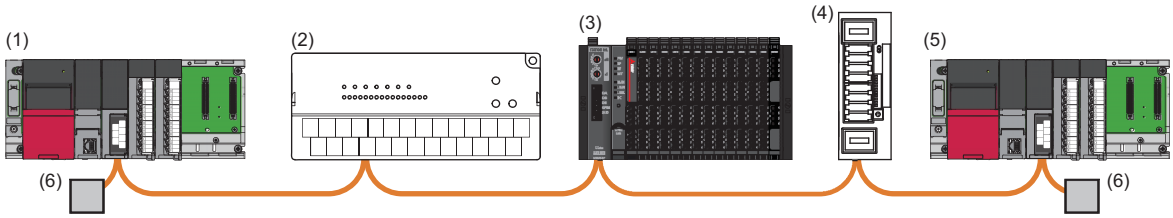
Error code	Error type	Error name	Error description and cause	Action
D80DH	Minor	Voltage UOUT error	The external power supply voltage for output is abnormal.	Set the voltage of the output power supply (24VDC) within the range of performance specifications.
D80EH	Moderate	Voltage UIN error	The external power supply voltage for input is abnormal.	Set the voltage of the input power supply (24VDC) within the range of performance specifications.

8 NZ2FT-BT

This chapter describes the details of the CC-Link compatible coupler.

8.1 CC-Link Configuration

A CC-Link system is configured with a master station (1), remote I/O station (2), remote device station (3), intelligent device station (4), local station (5), and terminating resistor (6).
The NZ2FT system using the NZ2FT-BT supports CC-Link Ver.1.10 and Ver.2.00 and operates as a remote device station.



Corresponding master module and software package

The master module corresponding to the NZ2FT-BT and the software package corresponding to each master module are shown.
For how to check the version, refer to the manual for each master module and software package.

Master module			Software package	
Name	Model	Version	Product name	Version
CC-Link system master/local module	RJ61BT11	Firmware version "05" or later	GX Works3	1.045X or later
	QJ61BT11N	The serial number (first five digits) of 17012 or later	GX Works2	1.68W or later
CC-Link system master intelligent device module	FX5-CCL-MS	1.000 or later	GX Works3	1.045X or later

Point

In this manual, the RJ61BT11 is mainly explained as the master station, but it can be replaced with the QJ61BT11N or FX5-CCL-MS. However, the FX5-CCL-MS does not support dedicated instructions.

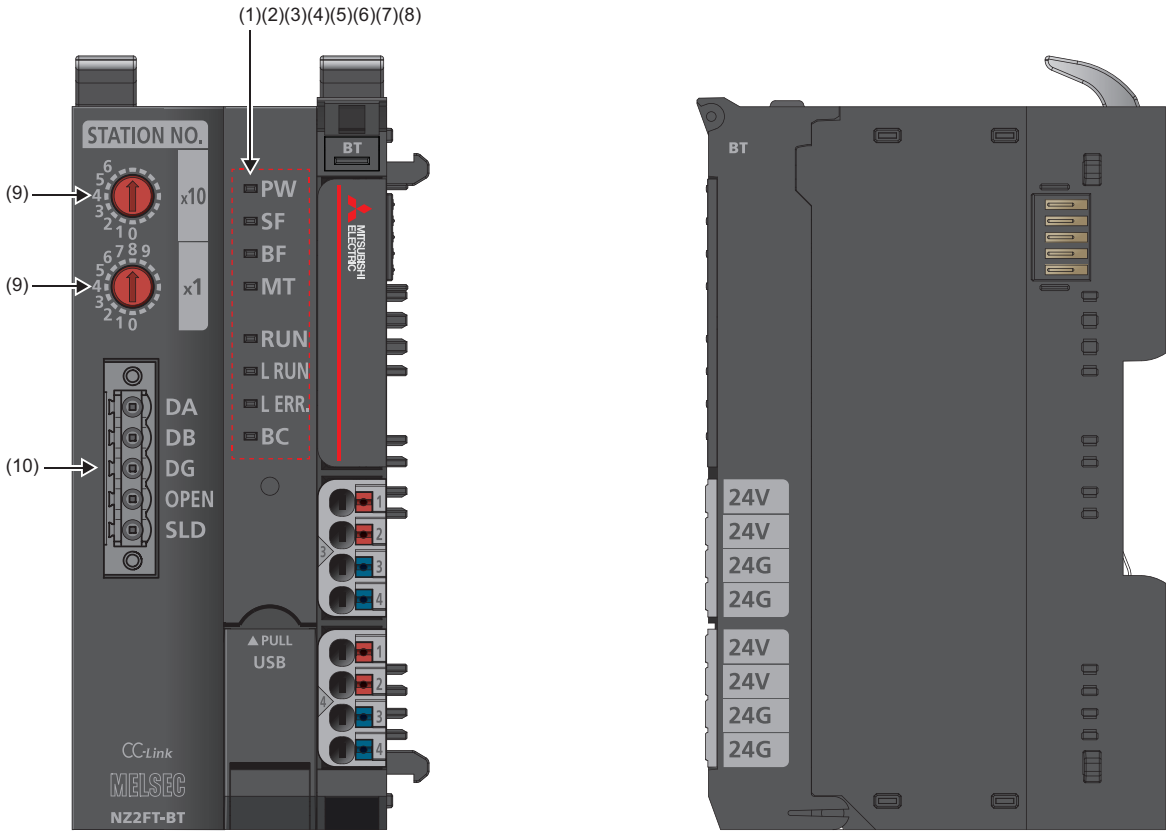
Profiles

The profile for setting the NZ2FT-BT and I/O module must be registered in the software package. For information on how to obtain the profile, contact your local Mitsubishi representative.

Registration destination software package	Name	Release file name	Version
• GX Works3 • GX Works2	CC-Link profile for the NZ2FT-BT (CSP + file)	0x0000_NZ2FT-BT_[Device version]_[Language].CSPP.zip ([Device version]: 0001 to 9999, [Language]: en)	00 or later
	CC-Link profile for the I/O module (CSP + file)	0x0000_[Model name]_[Device version]_[Language]_CCLink.CSPP.zip ([Model name]: Model name of I/O module, [Device version]: 0001 to 9999, [Language]: en)	00 or later

8.2 Part Names

This section describes the LEDs of the NZ2FT-BT. (☞ Page 94 Coupler Common Part Names)



No.	Name	Description
(1)	PW LED	Displays the power supply status of the NZ2FT-BT. On in green: Power-on Off: Power-off
(2)	SF LED	Displays the status of the NZ2FT-BT. On in red: Error (☞ Page 162 When the SF LED turns on in red) Flashing in red: Force mode Off: No error
(3)	BF LED	Displays a communication error or station number error. On in red: Fieldbus error or station number error (☞ Page 163 When the BF LED turns on in red). The operating status of the CPU module is set to PAUSE by "Remote Operation" of GX Works. Flashing in red: Configuration error, no connection with the master station, parameter setting error, firmware update in progress, or station number mismatch due to the rotary switch setting being changed during operation (☞ Page 163 When the BF LED is flashing in red) Off: No error
(4)	MT LED	Displays the status of the NZ2FT-BT and I/O modules. On in yellow: Error (☞ Page 163 When the MT LED turns on in yellow) Off: No error
(5)	RUN LED	Displays the operating status. On in green: Normal operation Off: Hardware failure or watchdog timer error
(6)	L RUN LED	Displays the status of data exchange. On in green: Data exchange enabled Off: No data exchange
(7)	L ERR. LED	Displays a communication error. On in red: Communication error (own station) or invalid device address Flashing in red: The rotary switch setting was changed during operation and does not match the current device address. Off: No error

No.	Name	Description
(8)	BC LED	Displays the transmission speed auto-tracking status. (☞ Page 137 Transmission speed auto-tracking) Flashing in red/green (every 0.5 seconds): Transmission speed auto-tracking in progress On in green: Transmission speed auto-tracking complete On in red: Fieldbus error Off: Power-off or station number error
(9)	Rotary switch	Set the CC-Link station number. (☞ Page 133 Rotary switch)
(10)	CC-Link interface	Connect the included terminal block to the NZ2FT-BT. (☞ Page 47 CC-Link cable)

Rotary switch

Use the rotary switch to set the station number of the NZ2FT-BT.

The ×10 switch indicates the 10s place in 2-digit hexadecimal, and ×1 switch indicates the 1s place in 2-digit hexadecimal.

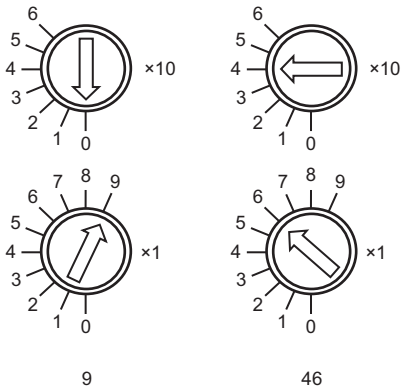
Set the station number to 1 to 64. It cannot be set to 0 or 65 or more.

When setting the station number, turn off the NZ2FT-BT.

Ex.

Station number 9: ×10=0, ×1=9

Station number 46: ×10=4, ×1=6



Precautions

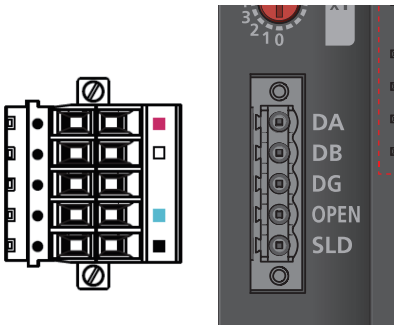
Depending on the status of the station number, the LED of the NZ2FT-BT will be as follows.

Station number status	PW LED	SF LED	BF LED	MT LED	RUN LED	L RUN LED	L ERR. LED	BC LED
It is normal.	On in green	Off	Off	Off	On in green	On in green	Off	On in green
Data link cannot be performed because the station number does not match the station number of the remote station set in the network configuration setting of the software package of the master station.	On in green	Off	On in red	Off	On in green	Off	Off	On in green
• Data link cannot be performed because the station number is out of the setting range (0 or 65 or more). • A number other than that available for ×10 switch or ×1 switch is selected.	On in green	On in red	On in red	Off	On in green	Off	On in red	Off
The rotary switch was changed during operation, but the data link is still in operation with the station number before the change. When the rotary switch is restored, the LED indication before the change is restored.	On in green	On in red	Flashing in red	Off	On in green	On in green	Flashing in red	On in green
There is a slave station with a duplicate station number, but since the data link was established earlier, it is operating as a slave station with the station number of the rotary switch.	On in green	Off	Off	Off	On in green	On in green	Off	On in green
The data link is not established because there are slave stations with duplicate station numbers.	On in green	Off	On in red	Off	On in green	Off	Off	*1
There is a fieldbus error.	On in green	Off	On in red	Off	On in green	Off	Off	On in red

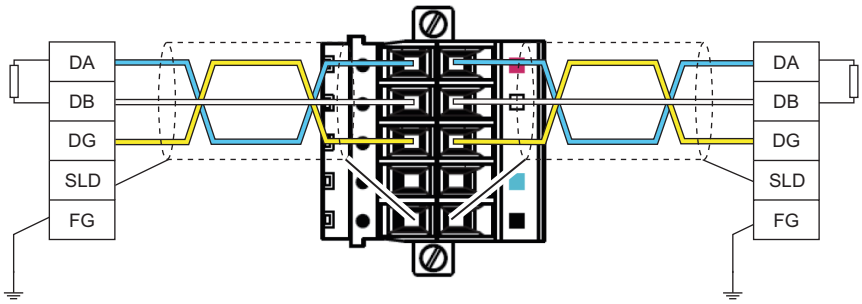
*1 When the NZ2FT-BT parameter "Power up baud rate" is "Auto baud", it flashes red/green and then lights up in green. Lights up in green in statuses other than "Auto baud".

Connector

This section describes the CC-Link interface connector.



The following figure shows the wiring to the terminal block. Connect a Ver.1.10-compatible CC-Link dedicated cable as shown below.



Ver.1.10-compatible CC-Link dedicated cable	Terminal to connect
DA line (blue)	DA
DB line (white)	DB
DG line (yellow)	DG
Shield wire	SLD

Point

- Connect a terminating resistor between DA and DB.
- For the terminal processing of when connecting the Ver.1.10-compatible CC-Link dedicated cable to the terminal block, do not unfasten the DA/DB/DG cable (three wires in one cable) or remove the sheath more than necessary. (For cables with fillers, cut them using a tool.)

8.3 Performance Specifications

This section describes the performance specifications of the NZ2FT-BT. (☞ Page 30 General Specifications).

Item		Specifications
Connection		Socket for 5-pole PCB plug-in connector (screw connection)
Network		CC-Link
Supported version of CC-Link		Ver.1.11, Ver.2.00
Station type		Remote device station
Number of occupied stations		Ver.1.11: 2 to 4 stations, Ver.2.00: 1 to 4 stations
Number of connectable stations per master station		20 stations maximum
Input data size		RX: 896 points maximum RWr: 256 points maximum
Output data size		RY: 896 points maximum RWw: 256 points maximum
Parameter data		64×64 bytes maximum
Number of connectable I/O modules (excluding extension power supply modules)		64 modules maximum
Setting interface		Micro USB2.0
Communication speed	Fieldbus	10Mbps maximum
Transfer rate	System bus	48Mbps maximum
External power supply voltage	Input power supply	24VDC +20%/-15%
	Output power supply	24VDC +20%/-15%
Power supply rated current	Input power supply	10A
	Output power supply	10A
Module current consumption		85mA
Power cable connection method		Spring clamp terminal block
Applicable wire size		Solid wire, stranded wire 0.14 to 1.5mm² (26 to 16 AWG)
Weight		240g

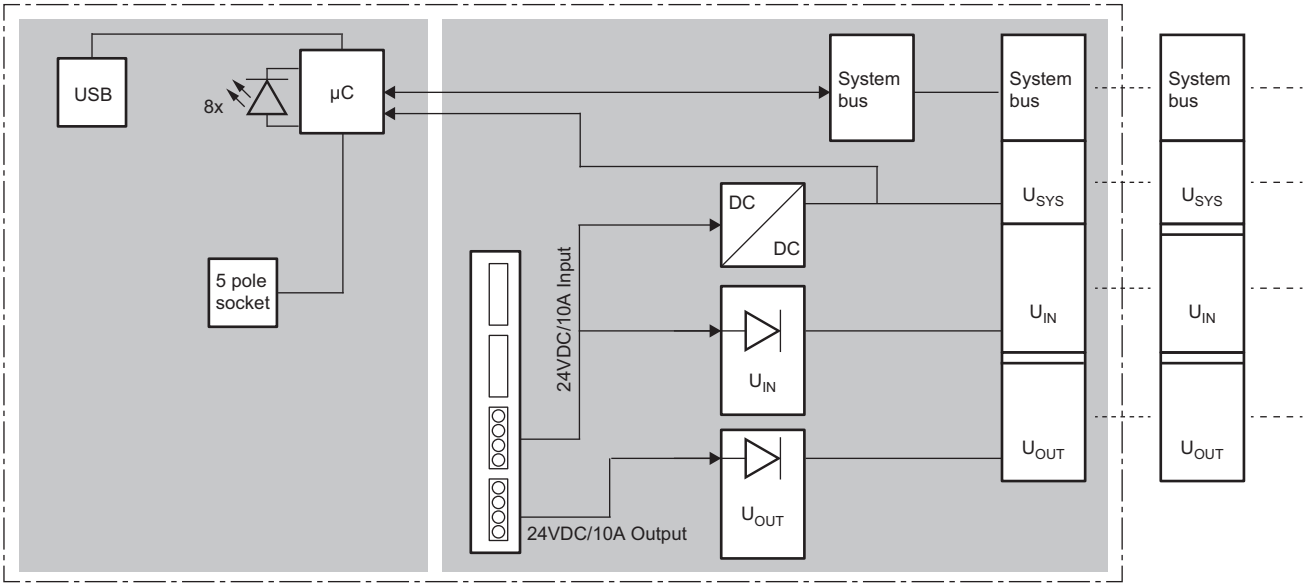
Precautions

The NZ2FT-BT supports only the following master modules.

☞ Page 131 Corresponding master module and software package

Block diagram

The following figure shows the internal block diagram of the NZ2FT-BT.



8.4 Functions

This section describes the functions of the NZ2FT-BT.

Function list

Item	Description	Reference
Fieldbus communication	The CC-Link communicates with the master module as follows. • Periodic communication: Cyclic transmission • Communication at any time: Dedicated instruction RDMSG	—
Station number setting	Set the station number by two rotary switches.	Page 133 Rotary switch
Parameter setting	Use GX Works3 or GX Works2 to set the communication parameters of the NZ2FT-BT and the I/O module.	Page 143 Parameter Setting
Transmission speed auto-tracking	The transmission speed of the NZ2FT-BT is automatically adjusted to the transmission speed of the master module.	Page 137 Transmission speed auto-tracking
Data format switching	Set the send/receive data format to big-endian or little-endian.	Page 145 Parameter list
Module parameter function	Saves the I/O module parameters to non-volatile memory.	Page 75 Module parameter function
Output value setting for fieldbus error	Set the output value of the I/O module for each case, such as when the CPU module status of the master station changes or a fieldbus error occurs.	Page 138 Output value setting for fieldbus error
I/O value setting for Hot swap	Set the I/O value of the I/O module of when replacing the I/O module while the power is on.	Page 79 I/O value setting for Hot swap
Checking warning output (Process alarm)	Check whether Process alarm has occurred from the I/O module corresponding to the warning output, and read the Process alarm data of the content.	Page 140 Checking warning output (Process alarm)

Web server functions

Item	Description	Reference
Web server connection	Connect from a personal computer via the USB port.	Page 60 Connection with a Personal Computer
Login/Logout	Authenticate/clear access to the Web server. The functions will be limited if not logged in.	Page 64 Login/Logout
HTTPS setting	Encrypts the communications between the Web server and the personal computer.	Page 67 HTTPS setting
Help display	Displays Help of the Web server.	Page 69 Window Layout
Changing the language	Changes the display language of the Web server.	Page 73 Changing the language
Force mode	Inputs/outputs an arbitrary value forcibly from the Web server without being affected by the input from an external device or by the operation result (cyclic data) of the program.	Page 76 Force mode
Tag name function	Set an arbitrary character string as the channel name of the I/O module.	Page 83 Tag name function
I&M data function	Records I&M (Identification & Maintenance) data such as the installation location of the system and the installation date.	Page 85 I&M data function
Reset	Restarts the NZ2FT-BT.	Page 85 Resetting the coupler
Saving/loading parameter files	When replacing the NZ2FT-BT, save the parameters of the NZ2FT-BT and I/O module in a file. Also, load the saved parameters from the file.	Page 80 Saving/loading parameter files
Initialization	Restores the NZ2FT-BT to the factory default setting.	Page 86 Initialization of the coupler
Firmware update	Updates the firmware of the NZ2FT-BT and I/O module.	Page 87 Firmware update

Troubleshooting

Item	Description	Reference
LED indication	The status of the NZ2FT-BT is displayed in LED.	Page 132 Part Names Page 162 Checking with LEDs
CC-Link diagnostics	Monitors the CC-Link status with GX Works3 or GX Works2. If an error occurs, the location of the error, the cause of the error, and the corrective action are displayed.	Page 165 CC-Link diagnostics
Status management	The status of the NZ2FT-BT is checked from the master module and the Web server.	Page 166 Confirmation by status information (Status word)
Acquisition of the service file	If troubleshooting does not solve the problem, provide the information about the problem to the service technician from the service file obtained from the NZ2FT-BT.	Page 88 Acquisition of the service file

Transmission speed auto-tracking

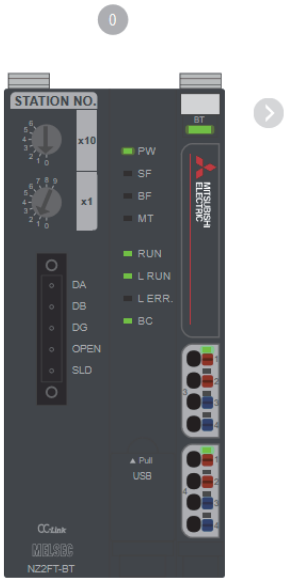
The transmission speed set by the master station is automatically followed, and the NZ2FT-BT has the same transmission speed.

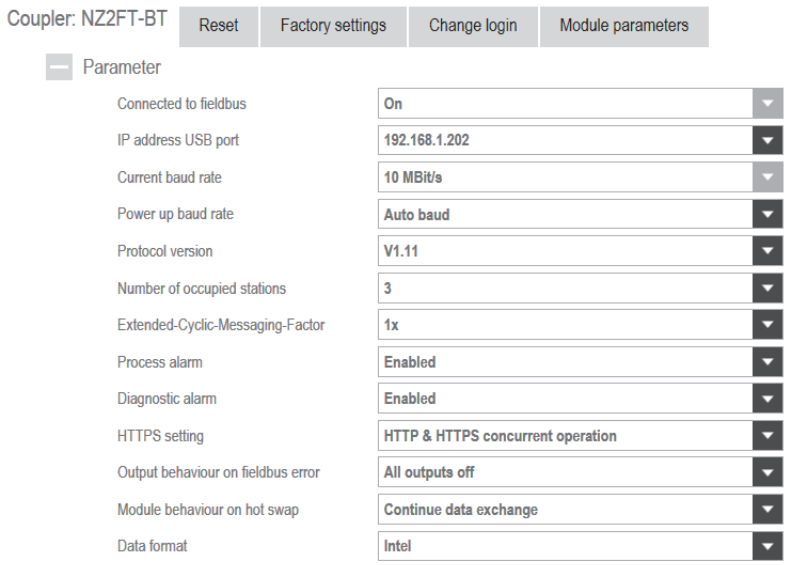
Set the NZ2FT-BT parameter "Power up baud rate" to "Auto baud" (default). (☞ Page 145 Parameter list)

The conditions under which transmission speed auto-tracking operates are as follows. It takes about 5 seconds for the transmission speed to be confirmed.

- The NZ2FT-BT is powered on.
- The NZ2FT-BT has returned after disconnection.

The transmission speed can be checked during operation from "Current baud rate" on the "Component view" window of the Web server.





Output value setting for fieldbus error

Set the output value of the I/O module for each case, such as when the CPU module status of the master station changes or a fieldbus error occurs.

The output value changes depending on the following five settings.

❶ The master station CPU module device to be set at the RY refresh target of the NZ2FT-BT

❷ The following parameters of the master module

- RJ61BT11 "Output Mode upon CPU STOP": A "Send Remote Output (RY)", B "Send 0 data"
- QJ61BT11N "Case of CPU STOP Setting": A "Refresh", B "Clear compulsorily"
- FX5-CCL-MS "Output Mode upon CPU STOP": A "Send the output data", B "Send 0 data"

❸ NZ2FT-BT parameter "Output behaviour on fieldbus error"

❹ Parameter "Substitute value" for each I/O module

❺ The following parameters of the master module

- RJ61BT11 "Output Mode upon CPU Error"
- QJ61BT11N "PLC Down Select"
- FX5-CCL-MS "Output Mode upon CPU Error"

The data sent from the NZ2FT-C24 to the external device is not affected by the setting of ❸ NZ2FT-GN parameter "Output behaviour on fieldbus error".

For details on ❷ and ❺, refer to the following.

- RJ61BT11: 📖 MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application)
- QJ61BT11N: 📖 MELSEC-Q CC-Link System Master/Local Module User's Manual
- FX5-CCL-MS: 📖 MELSEC iQ-F FX5 User's Manual (CC-Link)

Ex.

For the digital output module

Status of master station (RJ61BT11/ QJ61BT11N/FX5-CCL-MS) ❶ NZ2FT-BT RY refresh target: CPU module device Y ❷ Master module parameters: no effect		**❸ NZ2FT-BT parameter "Output behaviour on fieldbus error" setting**							
		0: All outputs off (All outputs are turned off.)		**1: Enable substitute value (A substitute value is output.)**				**2: Hold last value (The last output value is held.)**	
				❹ The I/O module parameter "Substitute value" set to 1		**❹ The I/O module parameter "Substitute value" set to 0**			
		Last output value is off	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
	When in CPU module stop error: Follow ❺.	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Status of master station (RJ61BT11/ QJ61BT11N/FX5-CCL-MS) ❶ NZ2FT-BT RY refresh target: other than CPU module device Y ❷ Master module parameters: A		❸ NZ2FT-BT parameter "Output behaviour on fieldbus error" setting							
		0: All outputs off (All outputs are turned off.)		1: Enable substitute value (A substitute value is output.)				2: Hold last value (The last output value is held.)	
				❹ The I/O module parameter "Substitute value" set to 1		❹ The I/O module parameter "Substitute value" set to 0			
		Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
	When in CPU module stop error: Follow ❺.	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Status of master station (RJ61BT11/ QJ61BT11N/FX5-CCL-MS) ❶ NZ2FT-BT RY refresh target: other than CPU module device Y ❷ Master module parameters: B		❸ NZ2FT-BT parameter "Output behaviour on fieldbus error" setting							
		0: All outputs off (All outputs are turned off.)		1: Enable substitute value (A substitute value is output.)				2: Hold last value (The last output value is held.)	
				❹ The I/O module parameter "Substitute value" set to 1		❹ The I/O module parameter "Substitute value" set to 0			
		Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	CPU module PAUSE state	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	When the CPU module is reset	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
	When in CPU module stop error: Follow ❺.	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Ex.

For the NZ2FTS-60DA4

Status of master station (RJ61BT11/ QJ61BT11N/FX5-CCL-MS) (No effect on the settings ❶❷)		❸ NZ2FT-BT parameter "Output behaviour on fieldbus error" setting		
		0: All outputs off (All outputs are turned off.)	1: Enable substitute value (A substitute value is output.) (No effect on the setting ❹)	2: Hold last value (The last output value is held.)
Data link in operation	CPU module RUN state	D/A conversion value		
	CPU module: RUN → STOP			
	CPU module PAUSE state			
	When the CPU module is reset	0	A substitute value is output.	The last output value is held.
	When in CPU module stop error: Follow ❺.	0	A substitute value is output.	The last output value is held.
Disconnected (fieldbus error occurred)		0	A substitute value is output.	The last output value is held.

Checking warning output (Process alarm)

Check whether Process alarm has occurred from the I/O module corresponding to the warning output, and read the Process alarm data of the content.

The I/O modules that support the alarm output and their details are as follows.

- NZ2FTS-60RD4: ☞ Page 504 Warning output (Process alarm)
- NZ2FTS-60TD4: ☞ Page 516 Warning output (Process alarm)
- NZ2FTS-D62P2: ☞ Page 535 Warning output (Process alarm)

Process alarm cannot be checked from the Web server.

When Process alarm is detected from the I/O module, Process Alarm event notify (b1), which indicates if an unacknowledged Process alarm occurred in Status word1, becomes 1. (☞ Page 166 Status word1)

How to check Process alarm

Use the RDMSG instruction to read Process alarm data of the I/O module that is detecting Process alarm.

■Reading procedure

1. The NZ2FT-BT is sending Status word1 by cyclic transmission.
2. When an error occurs in the I/O module, Status word1 whose Process Alarm event notify (b1) became 1 is sent, and the master station detects Process alarm.
3. When Process Alarm event notify (b1) is 1, the master station uses RDMSG Request of the RDMSG instruction to read Process alarm.
4. The NZ2FT-BT sends RDMSG Response (response data) for RDMSG Request to the master station.
5. Status word1 whose Process Alarm event notify (b1) became 0 is sent by cyclic transmission.

If an error occurs in multiple slots, repeat procedures 2 to 4. When all the responses of the slot where an error has occurred are completed, Process Alarm event notify (b1) of Status word1 becomes 0.

■RDMSG instruction format

The RDMSG instruction format refers to the format of the setting data of dedicated instruction G.RDMSG or GP.RDMSG. For details, refer to the following.

- When the master module is the RJ61BT11: Message transmission to the remote device station (📖 MELSEC iQ-R Programming Manual (Module Dedicated Instruction))
- When the master module is the QJ61BT11N: G(P).RDMSG (📖 MELSEC-Q CC-Link System Master/Local Module User's Manual)

Operand	+0	+1		+2		+3	+4
(U)	Start I/O number of the module: 0000H	—		—		—	—
(s1)	Completion status: 0000H	Station number: 0001H		Send data size: 000AH		Receivable data size: 000AH	Receive data size: 0000H
(s2) RDMSG Request	Command No.: 0820H	Msg ID: 02H	Len: 0AH	Res: FFH	Slot: FFH	Send data (4 bytes): All 0	
(d1)*3 RDMSG Response	Command No.: 0820H	Msg ID: 02H	Len: 0AH	Res: FFH	Slot: *1	Receive data (4 bytes): Process Alarm*2 When there is no unacknowledged Process alarm: All 0	
(d2)*3	Instruction completion: 0	Completed with an error: 0		—		—	—
EN	Execution flag: 1	—		—		—	—
ENO*3	Execution result: 0	—		—		—	—

*1 The slot number where the error occurred is stored. If there is no unacknowledged Process alarm, FFH is stored.

*2 For the data structure, refer to Process alarm data on each I/O module page.

*3 Since it is stored by the NZ2FT-BT, store 0 when sending RDMSG Request.

Point

If the second Process alarm is detected on the same channel of the same I/O module before reading Process alarm data, the second Process alarm data will not be stored correctly.
If Process alarm is detected, read Process alarm data.

8.5 Procedures Before Operation

1. Station number setting

Set the station number of the NZ2FT-BT. (☞ Page 133 Rotary switch)

2. Installation

Attach the NZ2FT system to the DIN rail and install it in a suitable environment. (☞ Page 36 Installation Environment and Installation Position of Module, Page 38 Installation)

3. Wiring

Connect the power cable and CC-Link cable to the NZ2FT-BT. (☞ Page 45 Wiring of power cable and I/O cable, ☞ Page 134 Connector)

Connect the I/O cables to the I/O module. (☞ Page 45 Wiring of power cable and I/O cable)

4. Master station setting

Register the CC-Link profile and set communication parameters. (☞ Page 143 Master station setting)

5. Connection between the Web server and personal computer

Access the NZ2FT-BT Web server via the USB port. (☞ Page 60 Connection with a Personal Computer)

6. Remote device station setting

Set the parameters of the NZ2FT-BT and I/O module. (☞ Page 144 NZ2FT-BT and I/O module setting)

8.6 Parameter Setting

Register the CC-Link profile and set the parameters of the CC-Link master module, NZ2FT-BT, and I/O module.
Use the software package of the master station or the Web server.
For details on parameter settings of each master module, refer to the following.

- RJ61BT11: 📖 MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application)
- QJ61BT11N: 📖 MELSEC-Q CC-Link System Master/Local Module User's Manual
- FX5-CCL-MS: 📖 MELSEC iQ-F FX5 User's Manual (CC-Link)

Profile registration

Register the CC-Link profile for the NZ2FT-BT and I/O module in GX Works3. (☞ Page 131 Profiles)

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

Master station setting

This section describes the case where the RJ61BT11 is used as the master module and the NZ2FT-BT and the I/O module are used as remote stations.

Settings by GX Works3

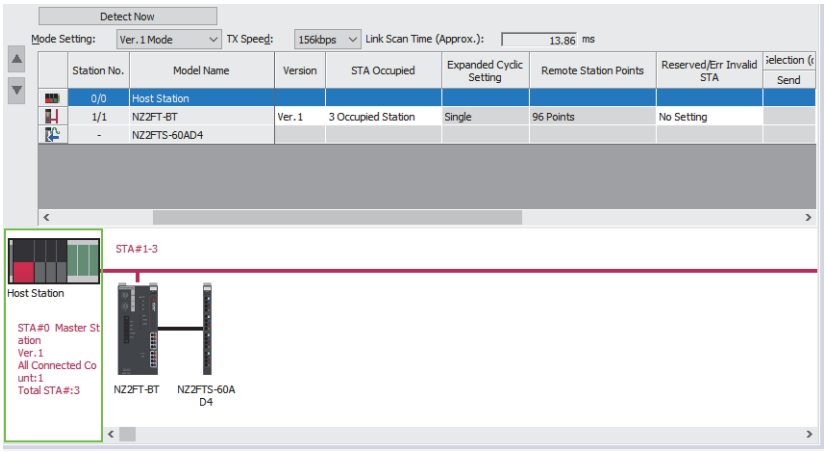
Set the parameters (required settings, basic settings, application settings) of the RJ61BT11. (Parameter settings 📖 MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application))

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ61BT11]

■CC-Link configuration settings

On the "CC-Link Configuration" window, set the configuration of the NZ2FT-BT and I/O module.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ61BT11] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



Select "Version", "STA Occupied", and "Expanded Cyclic Setting" after calculating with reference to the following.
☞ Page 151 Concept of data length

NZ2FT-BT and I/O module setting

Set these settings on the Web server or GX Works3 of the master station.

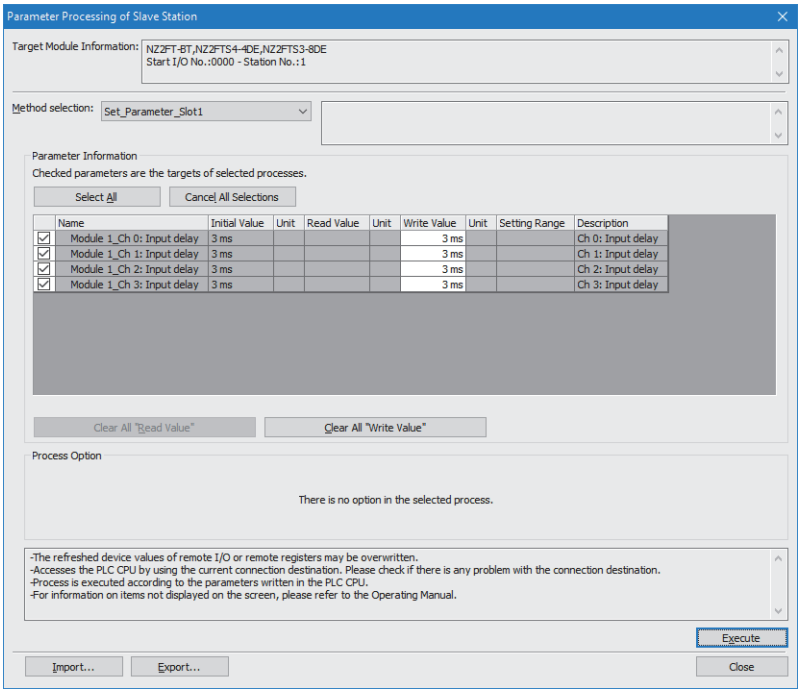
Setting by the Web server

Set the parameters of the NZ2FT-BT and I/O module on the Web server. (☞ Page 145 Parameter list)
Turn off the master station and configure the settings while communications are not being performed with the master station. (Communication does not stop by changing RUN to STOP in the master station CPU module.)

Setting by GX Works3 of the master station

If the master station and NZ2FT-BT can communicate, the parameters of the NZ2FT-BT and I/O module can be set in "CC-Link Configuration" of GX Works3 of the master station.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ61BT11] ⇨ [Basic Settings] ⇨ [CC-Link Configuration]
Right-click the NZ2FT-BT icon on the "CC-Link Configuration" window and select [Online] and [Parameter Processing of Slave Station].



In "Method selection", select parameter read/write, NZ2FT-BT, or each I/O module.

Process to be executed	Operation
Get_Parameter_Coupler	Reads the parameters of the NZ2FT-BT.
Set_Parameter_Coupler	Writes the parameters of the NZ2FT-BT. (Setting details are recorded in the non-volatile memory.)
Get_Parameter_Slot* (*: 1 to 64)	Reads the parameters of each I/O module.
Set_Parameter_Slot* (*: 1 to 64)	Writes the parameters for each I/O module. (Setting details are not recorded in the non-volatile memory)

Precautions

The I/O module parameters are not recorded in the non-volatile memory just by executing the processing with "Set_Parameter_Slot". (When reset, the parameters are reset to the default values.)
To record the parameters of the I/O module in the non-volatile memory of the NZ2FT-BT, select "Set Parameter Coupler", check "Module Parameters", select "save parameters" from "Write Value", and click the [Execute] button.
The parameters of the NZ2FT-BT are recorded in the non-volatile memory without executing the above.

Parameter list

This parameter can be set in the NZ2FT-BT from the Web server or GX Works3/GX Works2 of the master station.

○: Can be set, —: Cannot be set

Item	Description	Setting range	Default	Web server	GX Works3/2
IP address USB port	Set the IP address of the USB port.	• 192.168.1.202 • 192.168.2.202 • 192.168.3.202 • 192.168.4.202 • 192.168.5.202	192.168.1.202	○	—
Power up baud rate	Set the transmission speed of the NZ2FT-BT.	• 156kBit/s • 625kBit/s • 2.5MBit/s • 5MBit/s • 10MBit/s • Auto baud (auto-tracking)	Auto baud	○	○
Protocol version	Specify the supported version of CC-Link.	• V 1.11 • V 2.00	V 1.11	○	○
Number of occupied stations	Set the number of occupied stations of the NZ2FT-BT.	• 1 • 2 • 3 • 4	2	○	○
Extended-Cyclic-Messaging-Factor	Set the extended cyclic transmission of a local station or the standby master station. This parameter is valid when Protocol version is V 2.00.	• 1× • 2×(Protocol V2 only) • 4×(Protocol V2 only) • 8×(Protocol V2 only)	1×	○	○
HTTPS setting	Encrypts the communications with the Web server. (☞ Page 67 HTTPS setting) • HTTP & HTTPS concurrent operation: HTTP and HTTPS communications are possible. • only HTTPS; no HTTP: Only HTTPS communications are possible.	• HTTP & HTTPS concurrent operation • only HTTPS; no HTTP	HTTP & HTTPS concurrent operation	○	—
Process alarm	Set whether to detect when Process alarm occurs in the I/O module.	• Disabled • Enabled	Disabled	○	○
Diagnostic alarm	Set it to "Disabled".	• Disabled • Enabled	Disabled	○	○
Output behaviour on fieldbus error	Set the output operation when a fieldbus error occurs. • All outputs off: All outputs are turned off. • Enable substitute value: Output is produced according to the substitute value of the output module. • Hold last value: The output status is maintained.	• All outputs off • Enable substitute values • Hold last value	All outputs off	○	○
Module behaviour on hot swap	Set the I/O module operation during Hot swap. • Continue data exchange: The operation of the output module is maintained. • Behaviour like on fieldbus error: The output module is operated according to the setting of Output behaviour on fieldbus error.	• Continue data exchange • Behaviour like on fieldbus error	Continue data exchange	○	○
Data format	Set the data format of communication data. • Motorola: Communication data is sent in big-endian format. • Intel: Communication data is sent in little-endian format. The data format of the master module that supports the NZ2FT-BT is little endian, so fix it to "Intel".	• Motorola • Intel	Intel	○	○
Module Parameters	Set the recording of the I/O module parameter setting. • no action: Not recorded. • restore default parameters: Set to the default value. • save module parameters: Recorded in the non-volatile memory of the NZ2FT-BT. Operates with the recorded parameters when reset.	• no action • restore default parameters • save module parameter	no action	—	○
Factory settings	Set the initialization of the NZ2FT-BT and I/O module. • no action: Not initialized • reset to factory settings: Initialized	• no action • reset to factory settings	no action	—	○

Item	Description	Setting range	Default	Web server	GX Works3/2
Reset Device	Set the resetting of the NZ2FT-BT. • no action: Not reset • restart: Reset	• no action • restart	no action	—	○

8.7 Access to Process Data

This section describes the cyclic transmission data of the NZ2FT-BT, including Process data (I/O module input/output data).

Data configuration

Process data and Status word are placed in the link devices RX, RY, RWr, and RWw, and are stored in the CPU module device of the master station for each NZ2FT-BT station number by cyclic transmission. (☞ Page 149 Allocation of master station CPU module to device)

If the refresh device is set in "Link Refresh Settings" of "Basic Settings" of GX Works3, auto transfer can be performed between RX, RY, RWr, RWw of the NZ2FT-BT and the CPU module device.

Status word is data indicating the status of the NZ2FT-BT. (☞ Page 166 Confirmation by status information (Status word))

Master station device	Station number	Link device	Item	Data size	Description
X	1	RX	Status word1	16 bits	Data indicating the status (such as alarm) of the NZ2FT-BT with station number 1
			Process data RX	Variable length (bit)	Bit input data for the I/O module with station number 1 (In order of proximity to the NZ2FT-BT)
			System area	16 bits	—
	⋮				
	20 (maximum)	RX	Status word1	16 bits	Data indicating the status (such as alarm) of the NZ2FT-BT with station number 20 is stored.
			Process data RX	Variable length (bit)	Bit input data for the I/O module with station number 20 (In order of proximity to the NZ2FT-BT)
			System area	16 bits	—

Master station device	Station number	Link device	Item	Data size	Description
Y	1	RY	System area	16 bits	—
			Process data RY	Variable length (bit)	Bit output data of the I/O module with station number 1 (In order of proximity to the NZ2FT-BT)
			System area	16 bits	—
	⋮				
	20 (maximum)	RY	System area	16 bits	—
			Process data RY	Variable length (bit)	Bit output data of the I/O module with station number 20 (In order of proximity to the NZ2FT-BT)
			System area	16 bits	—

Master station device	Station number	Link device	Item	Data size	Description
W	1	RWr	System area	3 words	—
			Status word2	1 words	Data indicating the status (such as configuration error) of the NZ2FT-BT with station number 1
			Process data RWr	Variable length (word)	Word input data for the I/O module with station number 1 (In order of proximity to the NZ2FT-BT)
	⋮				
	20 (maximum)	RWr	System area	3 words	—
			Status word2	1 words	Data indicating the status (such as configuration error) of the NZ2FT-BT with station number 20
			Process data RWr	Variable length (word)	Word input data for the I/O module with station number 20 (In order of proximity to the NZ2FT-BT)

Master station device	Station number	Link device	Item	Data size	Description
W	1	RWw	System area	4 words	—
			Process data RWw	Variable length (word)	Word output data for the I/O module with station number 1 (In order of proximity to the NZ2FT-BT)
	⋮				
	20 (maximum)	RWw	System area	4 words	—
			Process data RWw	Variable length (word)	Word output data for the I/O module with station number 20 (In order of proximity to the NZ2FT-BT)

The size of Process data depends on the number of digital I/O modules, analog modules, and absolute encoder modules, and the number of occupied stations. (☞ Page 148 Data width used by the I/O module)

Point

- Process data can be checked from the Web server. (☞ Page 72 "Process data").
- The communication data format can be changed to little-endian or big-endian by setting the parameter. (☞ Page 145 Parameter list)

Data width used by the I/O module

The following table shows the data width used by each I/O module in the NZ2FT-BT during cyclic transmission.

I/O module	Process data RX	Process data RY	Process data RWr	Process data RWw	Reference
NZ2FTS4-4DE	16 bits	—	—	—	Page 420 Process data
NZ2FTS3-8DE	16 bits	—	—	—	Page 425 Process data
NZ2FTS1-16DE	16 bits	—	—	—	Page 429 Process data
NZ2FTS4-4D	16 bits	—	—	—	Page 433 Process data
NZ2FTS3-8D	16 bits	—	—	—	Page 437 Process data
NZ2FTS1-16D	16 bits	—	—	—	Page 440 Process data
NZ2FTS2-4A	16 bits	—	—	—	Page 444 Process data
NZ2FTS4-4TE	—	16 bits	—	—	Page 449 Process data
NZ2FTS2-8TE	—	16 bits	—	—	Page 453 Process data
NZ2FTS1-16TE	—	16 bits	—	—	Page 457 Process data
NZ2FTS4-4T	—	16 bits	—	—	Page 461 Process data
NZ2FTS2-8T	—	16 bits	—	—	Page 465 Process data
NZ2FTS1-16T	—	16 bits	—	—	Page 469 Process data
NZ2FTS3-4R	—	16 bits	—	—	Page 473 Process data
NZ2FTS-60AD4	—	—	4 words	—	Page 484 Process data
NZ2FTS-60DA4	—	—	—	4 words	Page 496 Process data
NZ2FTS-60RD4	—	—	4 words	—	Page 506 Process data
NZ2FTS-60TD4	—	—	4 words	—	Page 518 Process data
NZ2FTS-D62P2	—	—	8 words	8 words	Page 545 Process data
NZ2FTS-D66D1	—	—	4 words	—	Page 556 Process data
NZ2FT-C24	—	—	8 words	8 words	Page 575 Process data

Allocation of master station CPU module to device

For details on each master module, refer to the following.

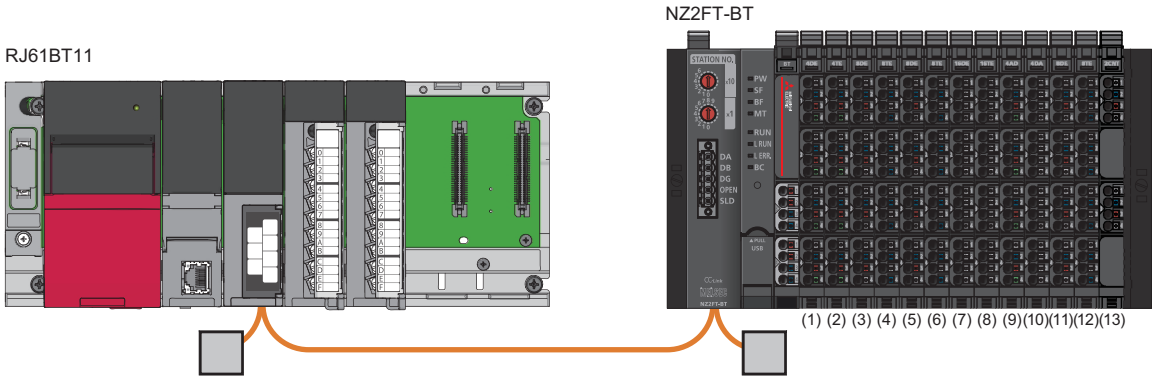
- RJ61BT11: Communication example between the master station and remote device station (MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Startup))
- QJ61BT11N: Communication example between the master station and remote device station (MELSEC-Q CC-Link System Master/Local Module User's Manual)
- FX5-CCL-MS: Communication example between the master station and intelligent device station (MELSEC iQ-F FX5 User's Manual (CC-Link))

Point

When set in the software package, data can be automatically transferred between Process data RX, Process data RY, Process data RWr, and Process data RWw of the NZ2FT-BT and the CPU module device of the master station.

Ex.

The following system configuration describes the allocation of the master station CPU module device using the RJ61BT11 and the data structure of Process data of the NZ2FT-BT.



(1) NZ2FTS4-4DE
(2) NZ2FTS4-4TE
(3) NZ2FTS3-8DE
(4) NZ2FTS2-8TE
(5) NZ2FTS3-8DE
(6) NZ2FTS2-8TE
(7) NZ2FTS1-16DE
(8) NZ2FTS1-16TE
(9) NZ2FTS-60AD4
(10) NZ2FTS-60DA4
(11) NZ2FTS3-8DE
(12) NZ2FTS2-8TE
(13) NZ2FTS-D62P2

Master station CPU module	NZ2FT-BT		
Device	**Station number**	**I/O module name**	**Process data**
X1000 to X100F	1	Status word1 (16 bits)	RX0 to RXF
X1010 to X101F		NZ2FTS4-4DE	RX10 to RX1F
X1020 to X102F		NZ2FTS3-8DE	RX20 to RX2F
X1030 to X103F		NZ2FTS3-8DE	RX30 to RX3F
X1040 to X104F		NZ2FTS1-16DE	RX40 to RX4F
X1050 to X105F		NZ2FTS3-8DE	RX50 to RX5F
X1060 to X106F		System area (16 bits)	RX60 to RX6F

Master station CPU module	NZ2FT-BT		
Device	**Station number**	**I/O module name**	**Process data**
Y1000 to Y100F	1	System area (16 bits)	RY0 to RYF
Y1010 to Y101F		NZ2FTS4-4TE	RY10 to RY1F
Y1020 to Y102F		NZ2FTS2-8TE	RY20 to RY2F
Y1030 to Y103F		NZ2FTS2-8TE	RY30 to RY3F
Y1040 to Y104F		NZ2FTS1-16TE	RY40 to RY4F
Y1050 to Y105F		NZ2FTS2-8TE	RY50 to RY5F
Y1060 to Y106F		System area (16 bits)	RY60 to RY6F

Master station CPU module	NZ2FT-BT		
Device	**Station number**	**I/O module name**	**Process data**
W0 to W2	1	System area (3 words)	RWr0 to RWr2
W3		Status word2 (1 word)	RWr3
W4 to W7		NZ2FTS-60AD4	RWr4 to RWr7
W8 to W15		NZ2FTS-D62P2	RWr8 to RWr15

Master station CPU module	NZ2FT-BT		
Device	**Station number**	**I/O module name**	**Process data**
W100 to W103	1	System area (4 words)	RWw0 to RWw3
W104 to W107		NZ2FTS-60DA4	RWw4 to RWw7
W108 to W115		NZ2FTS-D62P2	RWw8 to RWw15

Concept of data length

The data length is determined by the following three parameters.

- Parameter "Number of occupied stations"
- Parameter "Protocol version"
- Parameter "Extended-Cyclic-Messaging-Factor"

Ex.

The following describes how to calculate the data length.

1. Calculate the data length for each device according to the system configuration. (☞ Page 148 Data width used by the I/O module)

Mounting module	Data length per device			
	Process data RX	Process data RY	Process data RWr	Process data RWw
NZ2FTS4-4DE	16 bits	—	—	—
NZ2FTS4-4TE	—	16 bits	—	—
NZ2FTS3-8DE	16 bits	—	—	—
NZ2FTS2-8TE	—	16 bits	—	—
NZ2FTS3-8DE	16 bits	—	—	—
NZ2FTS2-8TE	—	16 bits	—	—
NZ2FTS1-16DE	16 bits	—	—	—
NZ2FTS1-16TE	—	16 bits	—	—
NZ2FTS-60AD4	—	—	4 words	—
NZ2FTS-60DA4	—	—	—	4 words
NZ2FTS3-8DE	16 bits	—	—	—
NZ2FTS2-8TE	—	16 bits	—	—
NZ2FTS-D62P2	—	—	8 words	8 words
NZ2FT-BT (Status word)	16 bits	—	1 words	—
NZ2FT-BT (system area)	16 bits	32 bits	3 words	4 words
Total	112 bits	112 bits	16 words	16 words

2. Decide whether to prioritize the communication speed or the number of occupied stations.

- If the communication speed is prioritized, the communication speed of cyclic transmission is prioritized by the parameter "Extended-Cyclic-Messaging-Factor" setting.
- If the number of occupied stations is prioritized, the number of remote stations that can be connected to the CC-Link system is prioritized by the parameter "Number of occupied stations" setting.

3. Determine the data length from the total data length for each device and priorities.

The communication speed becomes faster to the point of making the parameter "Number of occupied stations" setting go from 1 to 4, and the number of occupied stations increases to the point of making the parameter "Extended-Cyclic-Messaging-Factor" setting go from 1× to 8×.

Parameter "Number of occupied stations" setting	Device	CC-Link version / parameter "Extended-Cyclic-Messaging-Factor" setting			
		Ver.1.11	—	—	—
		Ver.2.00 / 1x	Ver.2.00 / 2x	Ver.2.00 / 4x	Ver.2.00 / 8x
1	RX, RY	32 bits	32 bits	64 bits	128 bits
	RWr, RWw	4 words	8 words	16 words	32 words
2	RX, RY	64 bits	96 bits	192 bits	384 bits
	RWr, RWw	8 words	16 words	32 words	64 words
3	RX, RY	96 bits	160 bits	320 bits	640 bits
	RWr, RWw	12 words	24 words	48 words	96 words
4	RX, RY	125 bits	224 bits	448 bits	896 bits
	RWr, RWw	16 words	32 words	64 words	128 words

Number of I/O modules that can be mounted per station

For each device, calculate how many I/O modules can be mounted in the NZ2FT-BT of one station. However, the total is up to 64 units.

Digital input module

Number of mountable modules = (Total data size of Process data - Status word (16 bits) - System area (16 bits)) / Data width of I/O module

Parameter "Number of occupied stations"	Device	Data width of I/O modules	Protocol version / Parameter "Extended-Cyclic-Messaging-Factor"				
			Ver.1.11	Ver.2.00 / 1x	Ver.2.00 / 2x	Ver.2.00 / 4x	Ver.2.00 / 8x
1	RX	16 bits	Cannot be mounted	Cannot be mounted	Cannot be mounted*1	2	6
2			2	2	4	10	22
3			4	4	8	18	38
4			6	6	12	26	54

*1 When an analog module, temperature input module, or absolute encoder module is installed, Status word and 32-bit system area are enabled in the RX device, but a digital input module cannot be mounted.

Digital output module

Number of mountable modules = (Total data size of Process data - system area (32 bits)) / Data width of I/O module

Parameter "Number of occupied stations"	Device	Data width of I/O modules	Protocol version / Parameter "Extended-Cyclic-Messaging-Factor"				
			Ver.1.11	Ver.2.00 / 1x	Ver.2.00 / 2x	Ver.2.00 / 4x	Ver.2.00 / 8x
1	RY	16 bits	Cannot be mounted	Cannot be mounted	Cannot be mounted	2	6
2			2	2	4	10	22
3			4	4	8	18	38
4			6	6	12	26	54

Analog input / temperature input / absolute encoder module

Number of mountable modules = (Total data size of Process data - System area (4 words)) / Data width of I/O module

Parameter "Number of occupied stations"	Device	Data width of I/O modules	Protocol version / Parameter "Extended-Cyclic-Messaging-Factor"				
			Ver.1.11	Ver.2.00 / 1x	Ver.2.00 / 2x	Ver.2.00 / 4x	Ver.2.00 / 8x
1	RWr	4 words	Cannot be mounted	Cannot be mounted	1	3	7
2			1	1	3	7	15
3			2	2	5	11	23
4			3	3	7	15	31

Analog output module

Number of mountable modules = (Total data size of Process data - System area (4 words)) / Data width of I/O module

Parameter "Number of occupied stations"	Device	Data width of I/O modules	Protocol version / Parameter "Extended-Cyclic-Messaging-Factor"				
			Ver.1.11	Ver.2.00 / 1x	Ver.2.00 / 2x	Ver.2.00 / 4x	Ver.2.00 / 8x
1	RWw	4 words	Cannot be mounted	Cannot be mounted	1	3	7
2			1	1	3	7	15
3			2	2	5	11	23
4			3	3	7	15	31

High-speed counter / serial communication module

Number of mountable modules = (Total data size of Process data - System area (4 words)) / Data width of I/O module

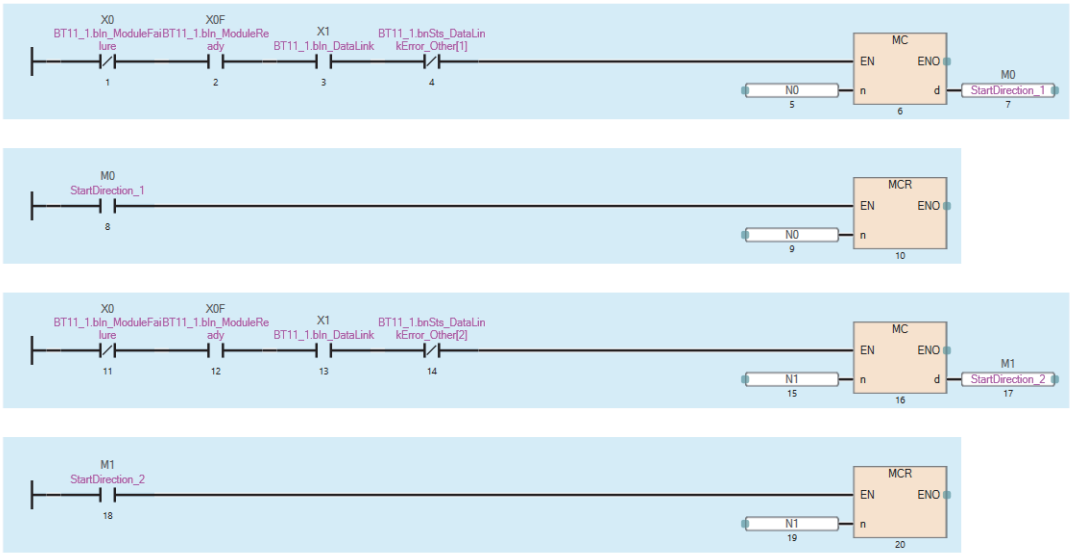
Parameter "Number of occupied stations"	Device	Data width of I/O modules	Protocol version / Parameter "Extended-Cyclic-Messaging-Factor"				
			Ver.1.11	Ver.2.00 / 1x	Ver.2.00 / 2x	Ver.2.00 / 4x	Ver.2.00 / 8x
1	RWr, RWw	8 words	Cannot be mounted	Cannot be mounted	Cannot be mounted	1	3
2			Cannot be mounted	Cannot be mounted	1	3	7
3			1	1	2	5	11
4			1	1	3	7	15

8.8 Program Example

Precautions for programming

In the CC-Link transmission program, interlock is provided with Data link status of other station (SW0080 to SW0083).
The following shows an example of interlocking between two stations.

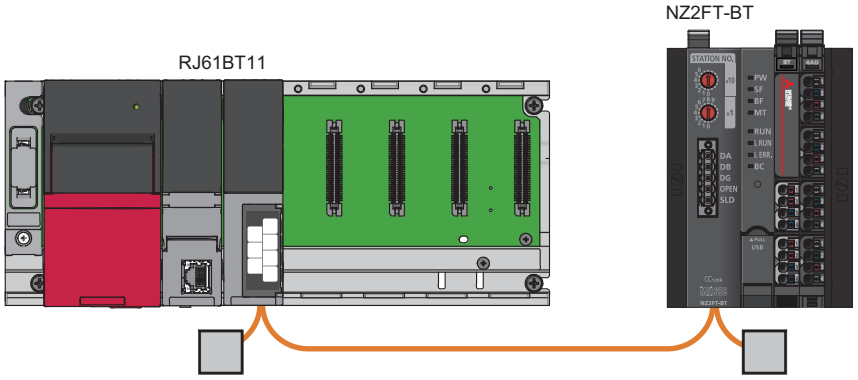
Classification	Label name	Description	Device
Module label	BT11_1.bnSts_DataLinkError_Other[1]	Data link status of other stations (station number 1)	SW0080.0
	BT11_1.bnSts_DataLinkError_Other[2]	Data link status of other stations (station number 2)	SW0080.1



Example using the NZ2FTS-60AD4

The following example is for a program to read in the master station AI values that are obtained from A/D conversion performed on AI 0 (Channel 0) to AI 3 (Channel 3) of the analog input module.

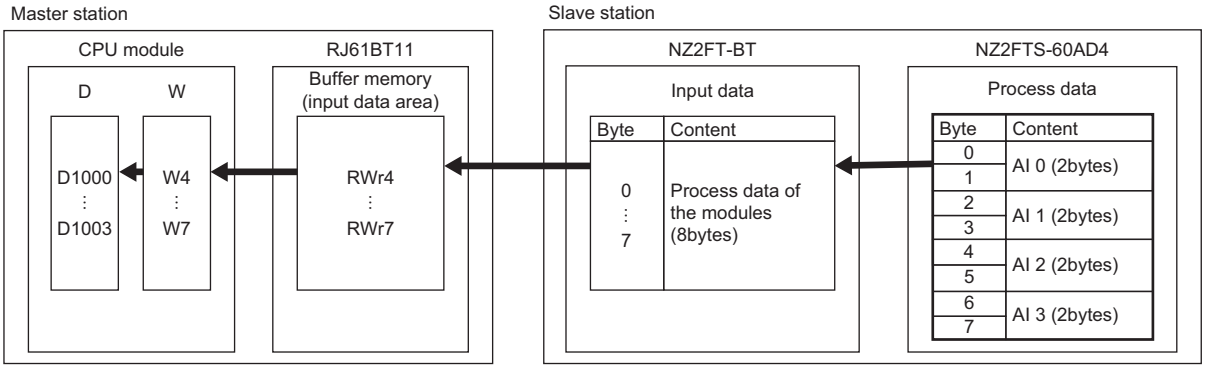
System configuration



Item		Model
Master station (station number 0)	Power supply module	R61P
	CPU module	R04CPU
	CC-Link system master/local module	RJ61BT11
Remote device station (station number 1)	CC-Link compatible coupler	NZ2FT-BT
	4ch analog input module	NZ2FTS-60AD4

Device assignment

Allocate Process data of the NZ2FT-BT to the link device of the RJ61BT11. (☞ Page 149 Allocation of master station CPU module to device



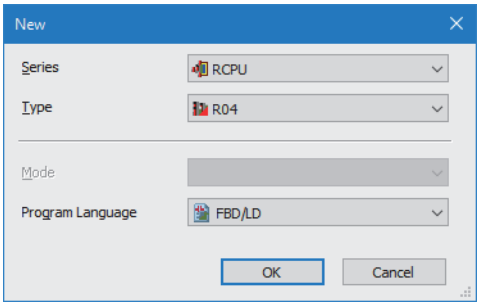
8

Master station setting

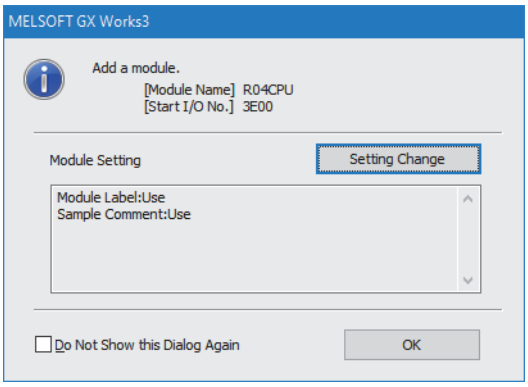
Connect the software package to the master station CPU module and set the parameters.

1. Set the CPU module as follows.

[Project] ⇨ [New]

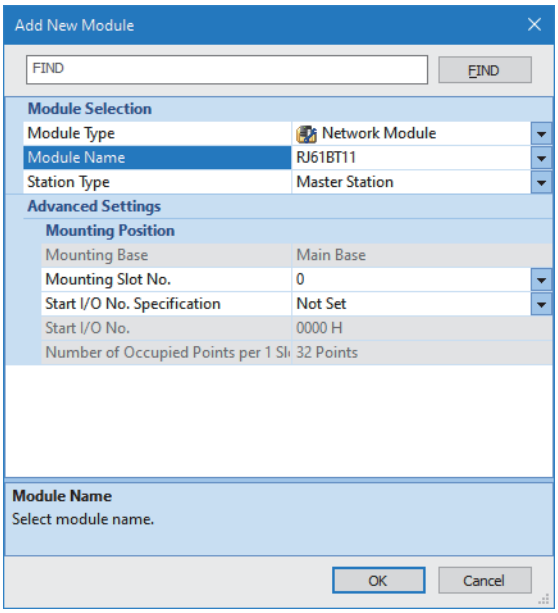


2. Click the [Setting Change] button and set to use the module label.

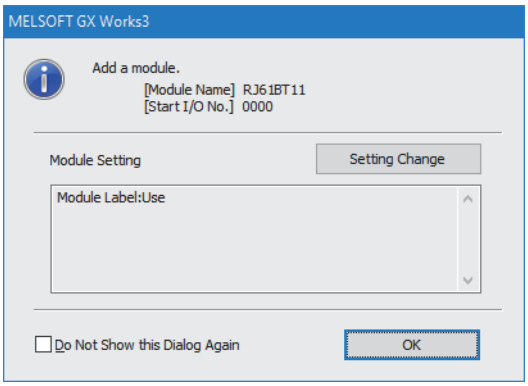


3. Set the RJ61BT11 as follows.

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

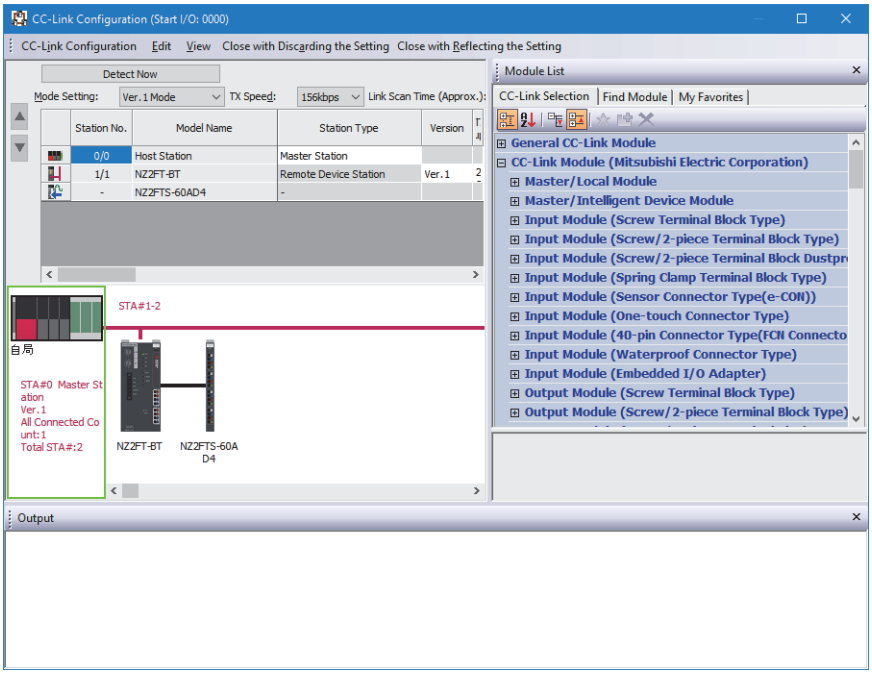


4. Click the [OK] button to add a module label of the RJ61BT11.



5. Set the network configuration as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ61BT11] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]



6. Set the link refresh settings as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ61BT11] ⇨ [Basic Settings] ⇨ [Link Refresh Settings]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1	RX	192	00000	000BF		Specify Device	X	192	01000	010BF
2	RY	192	00000	000BF		Specify Device	Y	192	01000	010BF
3	RWr	24	00000	00017		Specify Device	W	24	00000	00017
4	RWw	24	00000	00017		Specify Device	W	24	00100	00117
5										

7. Write the set parameters to the master station CPU module, and reset or power off and on the CPU module.

[Online] ⇨ [Write to PLC]

Remote device station setting

Set the parameters of the NZ2FT-BT and NZ2FTS-60AD4. (☞ Page 144 NZ2FT-BT and I/O module setting)

Set the following values for the parameters of the NZ2FTS-60AD4. (☞ Page 484 Parameter settings)

Parameter	Setting value			
	AI 0 (Channel 0)	AI 1 (Channel 1)	AI 2 (Channel 2)	AI 3 (Channel 3)
Frequency suppression	Disabled			
Data format	High resolution format			
Measurement range	0...20mA	-10...10V	0...20mA	-10...10V

Point

In the program example, default values are used for parameters that are not shown above. For the parameters of the RJ61BT11, refer to the following.

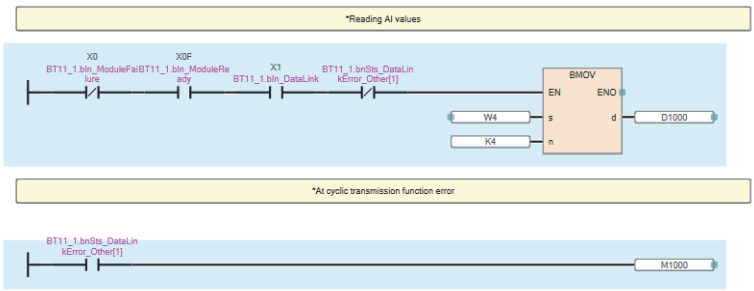
MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application)

Cyclic transmission program example

Change the master station CPU module from STOP to RUN to start cyclic transmission.

The values of AI 0 to AI 3 of the NZ2FTS-60AD4 are stored in D1000 to D1003.

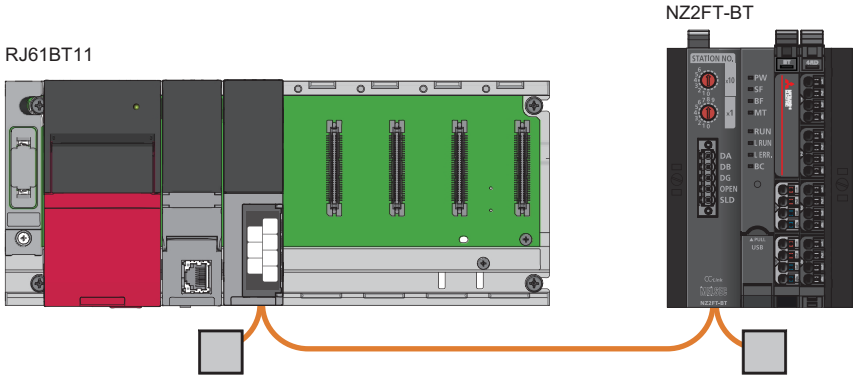
Device/label	Description	
X0	Module failure	
X1	Own station data link status	
XF	Module ready	
D1000	Cyclic transmission	AI0
D1001		AI1
D1002		AI2
D1003		AI3
BT11_1.bnSts_DataLinkError_Other[1]		Data link status of other stations
X1000 to X103F	Refresh settings	Remote input (RX0 to RX3F)
Y1000 to Y103F		Remote output (RY0 to RY3F)
W0 to W7		Remote register (RWr0 to RWr7)
W100 to W107		Remote register (RWw0 to RWw7)
BT11_1 (module label)		Link special relay (SB0 to SB1FF) Link special register (SW0 to SW1FF)



Example using the NZ2FTS-60RD4

This program reads Process alarm data when Process alarm occurs in RTD 0 (Channel 0) to RTD 3 (Channel 3) of the temperature input module.

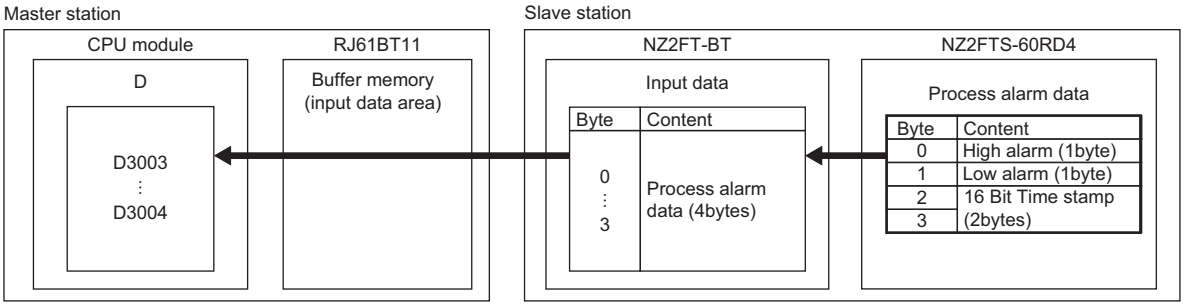
System configuration



Item		Model
Master station (station number 0)	CPU module	R04CPU
	Power supply module	R61P
	CC-Link system master/local module	RJ61BT11
Remote device station (station number 1)	CC-Link compatible coupler	NZ2FT-BT
	4ch analog temperature input module (RTD)	NZ2FTS-60RD4

Device assignment

The following figure shows the device allocation in cyclic transmission. (☞ Page 140 Checking warning output (Process alarm))



Master station setting

The parameter setting method at the master station is the same as that in the example using the NZ2FTS-60AD4. (☞ Page 156 Master station setting)

Remote device station setting

Set the parameters of the NZ2FT-BT and NZ2FTS-60RD4. (☞ Page 144 NZ2FT-BT and I/O module setting)

Set the following values for the parameters of the NZ2FTS-60RD4. (☞ Page 505 Parameter settings)

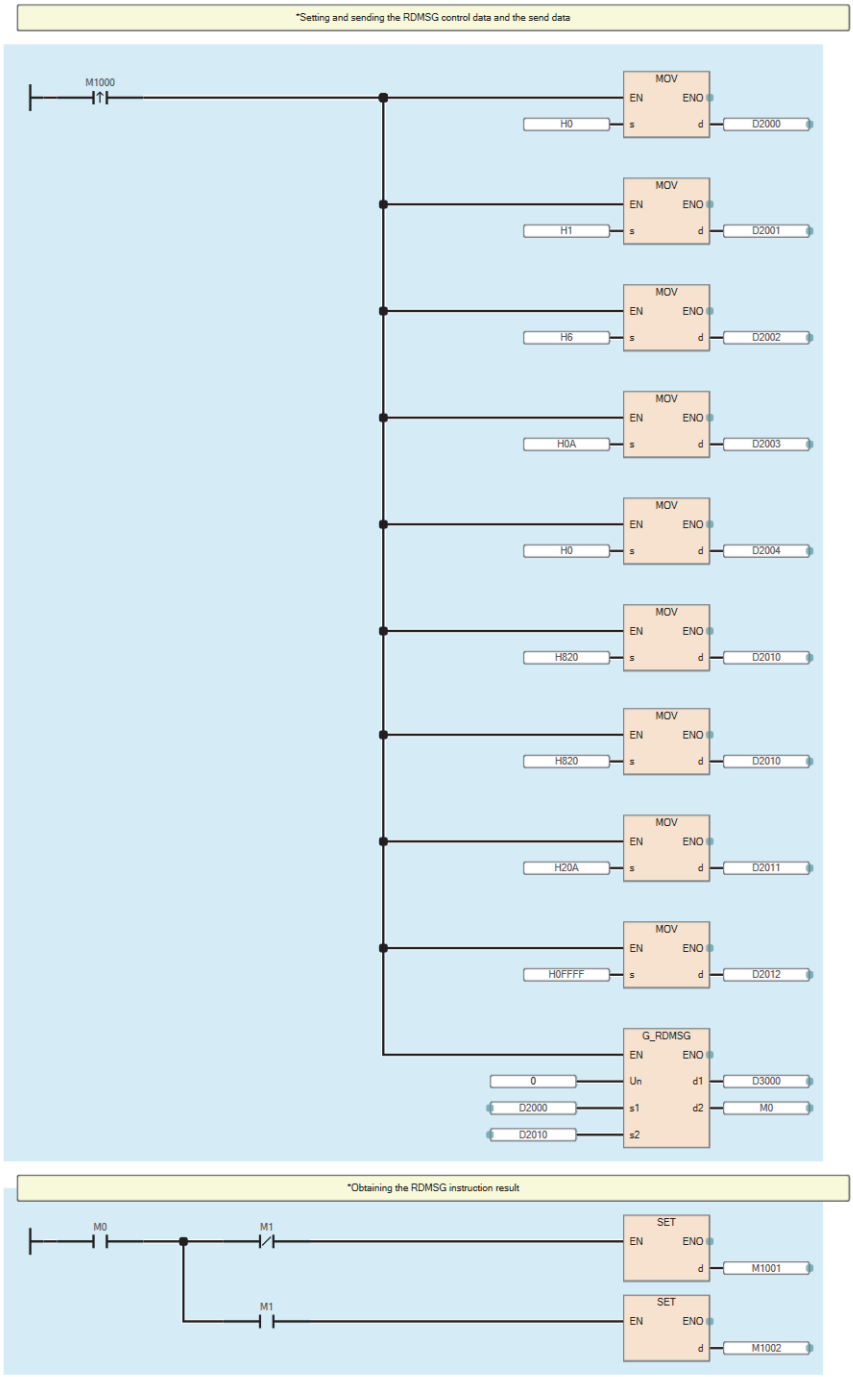
Parameter	Setting value			
	RTD 0 (Channel 0)	RTD 1 (Channel 1)	RTD 2 (Channel 2)	RTD 3 (Channel 3)
Temperature unit	Degree Celsius			
Measurement range	PT100 -200 ... 850 Degree Celsius	NI100 -60 ... 250 Degree Celsius	Cu10 -100 ... 260 Degree Celsius	Resistance 40Ω
Connection type	2-wire	2-wire	2-wire	2-wire
Conversion time	80ms	80ms	80ms	80ms
Channel diagnostics	Disabled	Disabled	Disabled	Disabled
Limit value monitoring	Enabled	Enabled	Enabled	Enabled
High limit value	200.000℃	200.000℃	200.000℃	20.000Ω
Low limit value	-200.000℃	-200.000℃	-200.000℃	-20.000Ω

Transient transmission program example

Reads Process alarm data for the remote device station specified by the station number.

High alarm and Low alarm of RTD 0 to RTD 3 of the NZ2FTS-60RD4 are stored in D3003, and 16 Bit Time stamp is stored in D3004.

Device	Description	
M0	RDMSG instructions	RDMSG instruction completion
M1		RDMSG instruction result
M1000		RDMSG instruction start command
D2000		Completion status
D2001		Station number
D2002		Send data size
D2003		Receivable data size
D2004		Receive data size
D2010 to D2012		Send data
D3003		CH0 to CH3 High alarm, Low alarm
D3004		16 Bit Time stamp
X1000 to X103F	Refresh settings	Remote input (RX0 to RX3F)
Y1000 to Y103F		Remote output (RY0 to RY3F)
W0 to W7		Remote register (RWr0 to RWr7)
W100 to W107		Remote register (RWw0 to RWw7)
BT11_1 (module label)		Link special relay (SB0 to SB1FF) Link special register (SW0 to SW1FF)


*Setting and sending the RDMSG control data and the send data
M1000
MOV
EN
ENO
H0
s
d
D2000
MOV
EN
ENO
H1
s
d
D2001
MOV
EN
ENO
H6
s
d
D2002
MOV
EN
ENO
H0A
s
d
D2003
MOV
EN
ENO
H0
s
d
D2004
MOV
EN
ENO
H820
s
d
D2010
MOV
EN
ENO
H820
s
d
D2010
MOV
EN
ENO
H20A
s
d
D2011
MOV
EN
ENO
H0FFFF
s
d
D2012
G_RDMSG
EN
ENO
0
Un
d1
D3000
D2000
s1
d2
M0
D2010
s2
*Obtaining the RDMSG instruction result
M0
M1
SET
EN
ENO
d
M1001
M1
SET
EN
ENO
d
M1002

8.9 Troubleshooting

This section describes troubleshooting of the NZ2FT-BT.

Point

If troubleshooting does not solve the problem, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Checking with LEDs

This section describes troubleshooting with LEDs of the NZ2FT-BT. (☞ Page 132 Part Names)

When the PW LED turns off

Check the following items in order from the top.

Item	Action
Is the module status LED of the I/O module on in green?	If it is on in green, repair or replace the NZ2FT-BT. The possible cause is an internal fuse failure.
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 of the external power supply within the range of performance specifications.

When the SF LED turns on in red

Check the following items in order from the top.

Item	Action
Is the electronic unit part detached?	Insert the electronic unit part.
Are the NZ2FT-BT and I/O module connected with no clearance between them?	Connect the NZ2FT-BT and the I/O module with no clearance between them.
Is the station number set to one that does not match the network configuration setting of the software package?	Set the station number to one that matches the network configuration setting.
Is the station number set outside the effective range (0 or 65 or higher)?	Set the station number within the effective range (1 to 64).
Has the rotary switch changed during operation?	Restore the rotary switch setting to its original setting.

When the SF LED is flashing in red

Check the following item.

Item	Action
Has the Force mode been selected?	The NZ2FT-BT is in Force mode. Clear the Force mode.

When the BF LED turns on in red

Check the following items in order from the top.

Item	Action
Is the CC-Link cable between the master station and the NZ2FT-BT inserted as far as it will go?	Fix the cable firmly by the screw.
Has the CC-Link cable been disconnected?	Replace the CC-Link cable.
Is the station number set to one that does not match the network configuration setting of the software package?	Set the station number to one that matches the network configuration setting.
Is the station number set outside the effective range (0 or 65 or higher)?	Set the station number within the effective range (1 to 64).
Is the set station number overlap with that in other stations?	If there are two or more station numbers that are the same, make changes so that all the station numbers are different from one another.
Are there any mistakes in the parameter settings of the master station and NZ2FT-BT?	Review the parameters of the master station and NZ2FT-BT. ■When the master module is the RJ61BT11 • Mode setting • Transmission speed setting • Network configuration setting ■When the master module is the QJ61BT11N • Mode setting • Transmission speed • Number of occupied stations • Expanded cyclic setting ■When the master module is the FX5-CCL-MS • Mode setting • Transmission speed setting • Network configuration setting ■NZ2FT-BT • Parameter "Power up baud rate" • Parameter "Protocol version" • Parameter "Number of occupied stations" • Parameter "Extended-Cyclic-Messaging-Factor"
Is the firmware version appropriate?	Check the firmware version of the master module and NZ2FT-BT. Update the firmware if necessary.
Is the RUN/STOP/RESET switch of the master station CPU module set to STOP or RESET?	Set the RUN/STOP/RESET switch of the master station CPU module to RUN.
Has an error occurred in the master station?	Follow the manual of the master station and perform troubleshooting.

When the BF LED is flashing in red

Check the following items in order from the top.

Item	Action
Has the rotary switch changed during operation?	Restore the rotary switch setting to its original setting.
Is the electronic unit part detached?	Insert the electronic unit part.
Are the NZ2FT-BT and I/O module connected with no clearance between them?	Connect the NZ2FT-BT and the I/O module with no clearance between them.
Is a firmware update in progress?	Wait for the firmware update to end.

When the MT LED turns on in yellow

Check the following item.

Item	Action
Is the I/O module mounted?	Mount the I/O module again by pressing it to the NZ2FT-BT until it clicks.

When the RUN LED turns off

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications. If the problem still persists, replace the NZ2FT-BT.

When the L RUN LED turns off

Check the following items in order from the top.

Item	Action
Is the station number set to one that does not match the network configuration setting of the software package?	Set the station number to one that matches the network configuration setting.
Is the station number set outside the effective range (0 or 65 or higher)?	Set the station number within the effective range (1 to 64).
Is the set station number overlap with that in other stations?	If there are two or more station numbers that are the same, make changes so that all the station numbers are different from one another.
Check the setting of the parameter "Power up baud rate" in the corresponding station.	Match the setting of the parameter "Power up baud rate" with the setting of the master station, or set to "Auto baud".
Check the mode setting of the master station.	Match the setting of the parameter "Protocol version" with the setting of the master station.

When the L ERR. LED is flashing in red

Check the following items in order from the top.

Item	Action
Has the rotary switch changed during operation?	Restore the rotary switch setting to its original setting.
Is the cable between the master station and NZ2FT-BT disconnected?	Replace the cable between the master station and NZ2FT-BT.
Is a terminating resistor connected at both farthest ends?	Connect a terminating resistor at both farthest ends of the CC-Link system.
Is a terminating resistor connected to any other location than the farthest ends?	Connect a terminating resistor at both farthest ends of the CC-Link system. Turn off Data link stop (SB0002).

When the L ERR. LED turns on in red

Check the following items in order from the top.

Item	Action
Is the station number set in the rotary switch within the effective range?	Please reset the station number of the corresponding station within the effective range.
Is there any noise affecting the system?	If the effect from noise is suspected, take the following actions. • Install a noise filter between the external power supply and the NZ2FT-BT. (☞ Page 43 Wiring precautions) • Note the contents described in the wiring of the network cable in this manual. (☞ Page 47 CC-Link cable)

When the BC LED turns on in red

Check the following items in order from the top.

Item	Action
Is the CC-Link cable between the master station and the NZ2FT-BT inserted as far as it will go?	Fix the cable firmly by the screw.
Has the CC-Link cable been disconnected?	Replace the CC-Link cable.

When the following LEDs turn on in red

- Power supply LED
- Input power supply LED 3.2
- Output power supply LED 4.2
- Input power supply internal protection circuit LED 3.4
- Output power supply internal protection circuit LED 4.4

Check the following item.

Item	Action
Is the voltage of the external power supply (24VDC) within the specified range?	The power supply voltage is less than 18VDC. Set the voltage value within the range of performance specifications. If the problem persists, the possible cause is an internal fuse failure. Replace the NZ2FT-BT.

Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

CC-Link diagnostics

GX Works3 or GX Works2 can be used to check the status of the CC-Link system at the master station.

Diagnostic function name	Description
Line test	Checks if the CC-Link dedicated cable is connected correctly and data link with the NZ2FT-BT is possible. During the line test, do not set the transmission speed of the NZ2FT-BT to auto-tracking, but set it to the same setting as the master station. The NZ2FT-BT responds to the request of the master station.
Check of transmission speed setting	Checks that the transmission speed setting of the NZ2FT-BT is the same as that of the master station. The NZ2FT-BT responds to the request of the master station.
Data link stop and reset	Stops and resets the NZ2FT-BT data link. The NZ2FT-BT responds to requests to stop and reset the data link of the master station.

For details on CC-Link diagnostics of each master modules, refer to the following.

- RJ61BT11: 🕮 MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application)
- QJ61BT11N: 🕮 CC-Link System Master/Local Module User's Manual (Details)
- FX5-CCL-MS: 🕮 MELSEC iQ-F FX5 User's Manual (CC-Link)

Confirmation by status information (Status word)

There are two types of data that indicate the status of the NZ2FT-BT: Status word1 and Status word2. (☞ Page 147 Data configuration)

Data configuration

Status word1 is stored in Process data (RX(n~n+3)) of each station.
Status word2 is stored in Process data (RWr(n+3)) of each station.

■Status word1

Bit	Item	Description
0	Error bit 0	System area
1	Process Alarm event notify	Indicates whether the status of Process alarm of the I/O module has changed. ■When Process alarm is Disabled 0: Process alarm is not monitored. ■When Process alarm is Enabled 0: All I/O modules are normal, Process alarm data of all I/O modules has been checked, or Process alarm of all I/O modules whose status had changed has been read. 1: There is an I/O module whose status change is not checked.
2 to 15	Error bit 4 to 15	System area

■Status word2

Bit	Item	Description
0	Error bit 0	System area
1	Station pending	0: Normal state, or one electronic unit part or I/O module removed 1: Multiple electronic unit parts and I/O modules removed
2	Error bit 2	System area
3	Systembus error	Indicates the System bus status. 0: Normal 1: Error
4 to 5	Error bit 4 to 5	System area
6	I/O-Configuration error	Indicates an I/O module configuration error. 0: Normal 1: Abnormal (There is a difference between the configuration information saved in the NZ2FT-BT and the current configuration information.) During I/O module replacement, this bit is set to 1 when the module is disconnected and is set to 0 when a new module is mounted.
7 to 9	Error bit 7 to 9	System area
10	Force mode active	0: Force mode not implemented 1: Force mode implemented
11 to 12	Error bit 11 to 12	System area
13	Voltage U_{OUT} error	Indicates the external power supply voltage for output. 0: Normal 1: Abnormal (Power supply voltage of the output current path is less than 18VDC.)
14	Voltage U_{IN} error	Indicates the external power supply voltage for input. 0: Normal 1: Abnormal (Power supply voltage of the input current path is less than 18VDC.)
15	Error bit 15	System area

How to check Status word

■GX Works3

Read the corresponding device W of "Status word2" in "Device/Buffer Memory Batch Monitor". (☞ Page 149 Allocation of master station CPU module to device)

■Web server

"Status word2" is displayed in decimal in "Coupler status" of "General information" of the NZ2FT-BT. (☞ Page 71 "Component view")

Troubleshooting by symptom

Cannot communicate with the master station

Check the following item.

Item	Action
Is the L RUN LED of the NZ2FT-BT on?	If it is not turned on, perform troubleshooting. Also, check other LEDs. (☞ Page 162 Checking with LEDs)
Is the BF LED on the NZ2FT-BT off?	If it is not turned off, perform troubleshooting. Also, check other LEDs. (☞ Page 162 Checking with LEDs)
Is the voltage of the power supply (24VDC) of the NZ2FT-BT within the specified range?	Set the voltage value within the range of performance specifications.
Is the wiring between the master station and NZ2FT-BT appropriate?	Review the wiring between the master station and NZ2FT-BT. (☞ Page 46 Wiring of network cable).
Are the parameters correct?	Check the parameters. (☞ Page 143 Parameter Setting).

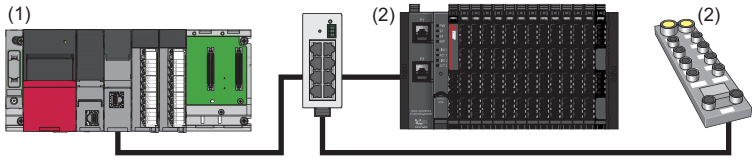
If communication is not established with the master station even after checking all of the above and checking with the LEDs of the I/O module and Web server, there is a risk of hardware failure in the NZ2FT-BT.
Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

9 NZ2FT-PN

This chapter describes the details of the PROFINET compatible coupler.

9.1 PROFINET Configuration

PROFINET consists of an RJ71PN92 (1) and IO devices (2).
The NZ2FT system using the NZ2FT-PN operates as an IO device.



Corresponding master module and software package

The master module corresponding to the NZ2FT-PN and the software package corresponding to the master module are shown.
For how to check the version, refer to the manual for each master module and software package.

Master module			Software package	
Name	**Model**	**Version**	**Product name**	**Version**
PROFINET IO controller module	RJ71PN92	Firmware version "01" or later	GX Works3	1.045X or later
			GX Configurator-PN	2.00B or later

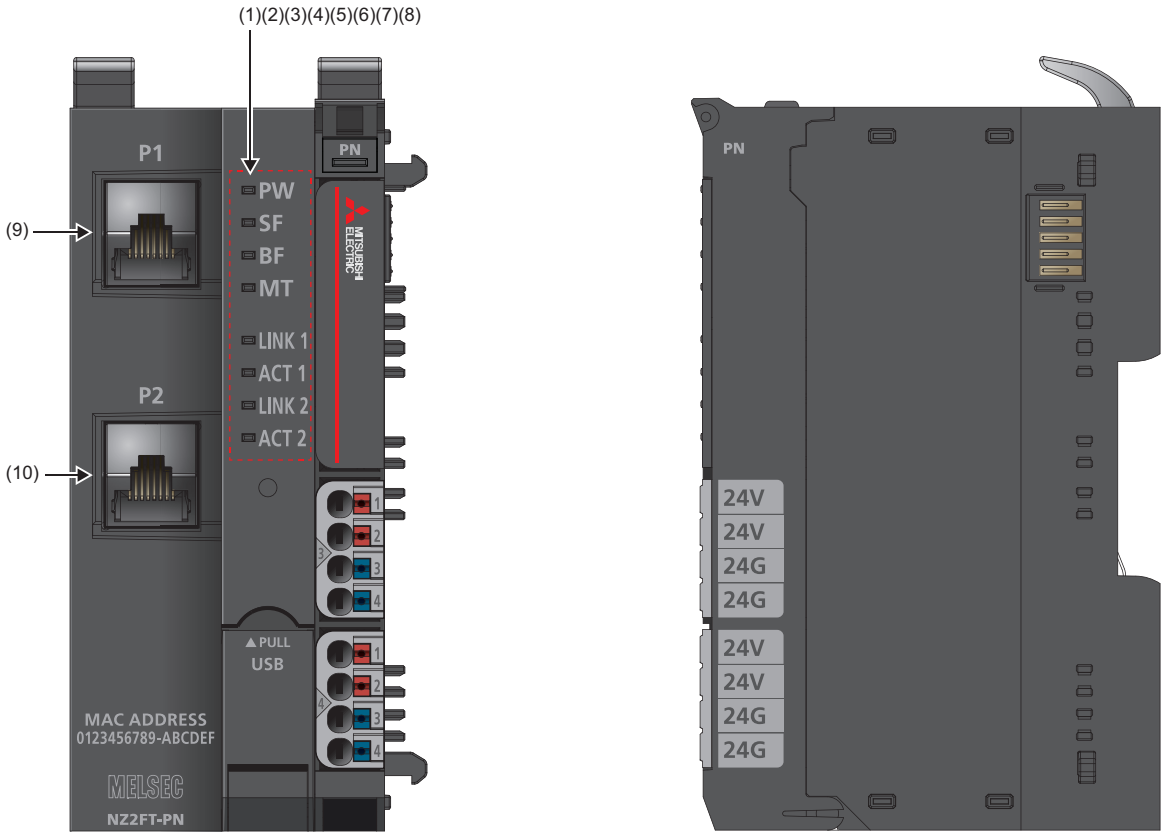
GSDML file

The GSDML file for setting the NZ2FT-PN and I/O modules must be registered in the software package. The GSDML file is included with the GX Configurator-PN.

Registration destination software package	Name	Release file name	Version
GX Configurator-PN	PROFINET GSDML file	Register the following two files together with the GSDML folder. (If it is a .zip file, unzip it in advance.) ■GSDML-[Vendor ID]-[Device ID]-NZ2FT.bmp [Vendor ID]: 021C, [Device ID]: 0161 ■GSDML-V[Major version].[Minor version]-ME-NZ2FT-PN-[YYYYMMDD].xml [Major version]: 1 to 99, [Minor version]: 0 to 99), [YYYYMMDD]: Date	2.33 or later

9.2 Part Names

This section describes the LEDs of the NZ2FT-PN. (☞ Page 94 Coupler Common Part Names)



No.	Name	Description
(1)	PW LED	Indicates the status of the module power supply. On in green: Power-on Off: Power-off
(2)	SF LED	Indicates the module status. On in red: Error (☞ Page 220 When the SF LED turns on in red) Flashing in red: Force mode Off: No error
(3)	BF LED	Indicates a communication error. On in red: Fieldbus error (☞ Page 221 When the BF LED turns on in red) Flashing in red: Error (☞ Page 221 When the BF LED is flashing in red) Off: No error
(4)	MT LED	Shows the status of the NZ2FT-PN and I/O modules. On in yellow: Error (☞ Page 221 When the MT LED turns on in yellow) Off: No error
(5)	LINK1 LED	Indicates the connection status of the fieldbus. It does not light on on the Web server window. On in green: Connection is established between P1 of the NZ2FT-PN and other field devices. Off: Connection is not established between P1 of the NZ2FT-PN and other field devices.
(6)	ACT1 LED	Indicates the operating status of the fieldbus. Flashing in yellow: Data is being exchanged at P1. (The flashing speed changes depending on the frequency of transmission and reception.) Off: Connection is not established between P1 of the NZ2FT-PN and other field devices.
(7)	LINK2 LED	Same as LINK1 LED
(8)	ACT2 LED	Same as ACT1 LED
(9)	P1 (Ethernet port)	Connect an Ethernet cable. (☞ Page 41 Wiring products for coupler that use the Ethernet cable)
(10)	P2 (Ethernet port)	

9.3 Performance Specifications

This section describes the performance specifications of the NZ2FT-PN. (☞ Page 30 General Specifications)

Item		Specifications
Connection		2×RJ45
Network		PROFINET IO (IRT, RT)
Number of NZ2FT-PN connections per RJ71PN92		20 stations maximum
Input data size		512 bytes maximum
Output data size		512 bytes maximum
Parameter data		4362 bytes maximum
Number of connectable I/O modules (excluding extension power supply modules)		64 modules maximum
Setting interface		Micro USB2.0
Communication speed	Fieldbus	100Mbps
Transfer rate	System bus	48Mbps maximum
High-speed startup		< 500ms 10 modules maximum
External power supply voltage	Input power supply	24VDC +20%/-15%
	Output power supply	24VDC +20%/-15%
Power supply rated current	Input power supply	10A
	Output power supply	10A
Module current consumption		110mA
Power cable connection method		Spring clamp terminal block
Applicable wire size		Solid wire, stranded wire 0.14 to 1.5mm² (26 to 16 AWG)
Weight		240g

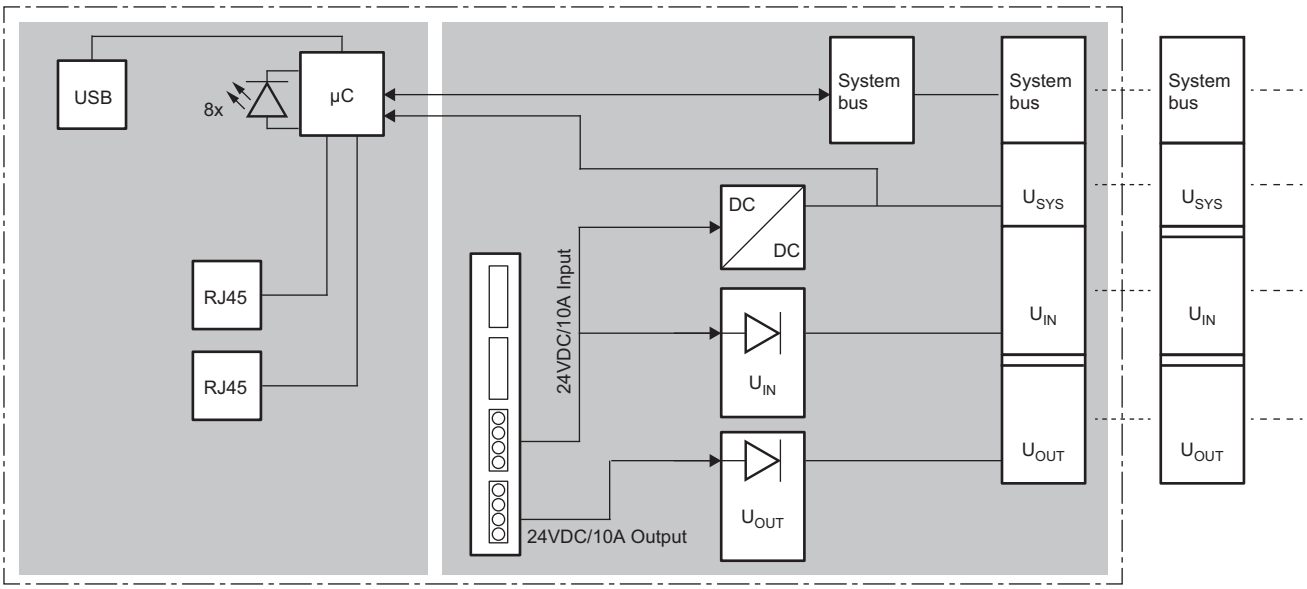
Precautions

The NZ2FT-PN supports only the following master modules.

☞ Page 168 Corresponding master module and software package

Block diagram

The following figure shows the internal block diagram of the NZ2FT-PN.



9.4 Functions

This section describes the functions of the NZ2FT-PN.

Function list

Item	Description	Reference
Fieldbus communication	The PROFINET IO protocol communicates with the RJ71PN92 as follows. • Fixed cycle communication: I/O data communication • Communication at any time: Service interface function	Page 171 Service interface function
Parameter setting	Set the parameters of the NZ2FT-PN and IO module with GX Configurator-PN and the Web server.	Page 200 Parameter Setting
Data format switching	Set the send/receive data format to big-endian or little-endian.	Page 209 GX Configurator-PN
Communication period setting	Set the communication cycle of I/O data between the RJ71PN92 and NZ2FT-PN. Set it on the GX Configurator-PN IO device setting window ("NZ2FT-PN Profinet Device" window).	📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)
Output value setting for fieldbus error	Set the output value of the I/O module for each case, such as when the CPU module status of the RJ71PN92 changes or a fieldbus error occurs.	Page 173 Output value setting for fieldbus error
I/O value setting for Hot swap	Set the I/O value of the I/O module of when replacing the I/O module while the power is on.	Page 79 I/O value setting for Hot swap
Lock force mode	Set whether to enable or disable to switch to the Force mode.	Page 209 GX Configurator-PN
Option handling	Set each I/O module to stop/operate while the NZ2FT system is operating.	Page 174 Option handling
Checking warning output (Process alarm)	This function cannot be supported.	—

Service interface function

The following services are performed at an arbitrary timing other than during I/O data communication. (Service interface function 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

The NZ2FT dedicated specifications are those that have been uniquely added to the PROFINET regulations as the NZ2FT system.

ServiceID	Service name	Description	NZ2FT dedicated specifications	Reference
0001H	Network detection	Detects the NZ2FT-PN on the same network as the RJ71PN92 and obtains the number of connected NZ2FT-PN modules. It operates between the CPU module and RJ71PN92, and the NZ2FT-PN does not operate.	Not available	—
0002H	IO device detection	Sends detailed information of the NZ2FT-PN to RJ71PN92. The details of the information are VendorID, DeviceID, IP address, Subnet mask, Gateway, MAC address, Device Name, and Type.	Not available	—
0003H	Acyclic communication - Implicit read data record	The NZ2FT-PN specified by the IP address responds to the service request (Record data read) from the RJ71PN92 and sends the service response.	Available	Page 190 Acyclic communication - Implicit read data record
0004H	Acyclic communication - Explicit write data record	The NZ2FT-PN specified by the IO device ID responds to the service request (Record data write) from the RJ71PN92 and sends the service response.	Available	Page 192 Acyclic communication - Explicit write data record
0005H	Acyclic communication - Explicit read data record	The NZ2FT-PN specified by the IO device ID responds to the service request (Record data read) from the RJ71PN92 and sends the service response.	Available	Page 193 Acyclic communication - Explicit read data record
0006H	Alarm request	Reads the alarm information accumulated in the RJ71PN92 to the CPU module. The NZ2FT-PN does not operate.	Available	Page 194 Alarm request
0007H	Alarm ACK	In response to the alarm ACK from the RJ71PN92, the alarm generated on the NZ2FT-PN is cleared and the alarm ACK response is sent to the RJ71PN92.	Not available	Page 196 Alarm ACK
0008H	IO device information acquisition	Reads the IO device information of the specific IO device. It operates between the CPU module and RJ71PN92, and the NZ2FT-PN does not operate.	Not available	—
0009H	Alarm log acquisition	Reads the alarm log accumulated in the RJ71PN92 to the CPU module. The NZ2FT-PN does not operate.	Available	Page 198 Alarm log acquisition

Web server functions

The following are the functions operated by the Web server. Set the communication parameters of the NZ2FT-PN and I/O module in the RJ71PN92 software package. (☞ Page 200 GX Configurator-PN setting procedure)

Item	Description	Reference
Web server connection	Connect from a personal computer via the USB port or Ethernet port.	Page 60 Connection with a Personal Computer
Webserver via Ethernet	Set whether to enable or disable the access to the Web server via the Ethernet port.	Page 209 Web server
Login/Logout	Authenticate/clear access to the Web server. The functions will be limited if not logged in.	Page 64 Login/Logout
HTTPS setting	Encrypts the communications between the Web server and the personal computer.	Page 67 HTTPS setting
Help display	Displays Help of the Web server.	Page 69 Window Layout
Changing the language	Changes the display language of the Web server.	Page 73 Changing the language
Force mode	Inputs/outputs an arbitrary value forcibly from the Web server without being affected by the input from an external device or by the operation result (constant periodic communications data) of the program.	Page 76 Force mode
Tag name function	Set an arbitrary character string as the channel name of the I/O module.	Page 83 Tag name function
I&M data function	Records I&M (Identification & Maintenance) data such as the installation location of the system and the installation date.	Page 85 I&M data function
Reset	Restarts the NZ2FT-PN from the Web server.	Page 85 Resetting the coupler
Initialization	Restores the NZ2FT-PN to the factory default settings from the Web server.	Page 86 Initialization of the coupler
Firmware update	Updates the firmware of the NZ2FT-PN and I/O module.	Page 87 Firmware update

Troubleshooting

Item	Description	Reference
LED indication	The status of the NZ2FT-PN is displayed in LED.	Page 169 Part Names Page 220 Checking with LEDs
Status management	Check the Status word indicating the status of the NZ2FT-PN with the RJ71PN92 or Web server.	Page 223 Confirmation by status information (Status word)
Acquisition of the service file	If troubleshooting does not solve the problem, provide the information about the problem to the service technician from the service file obtained from the NZ2FT-PN.	Page 88 Acquisition of the service file

Output value setting for fieldbus error

Set the output value of the I/O module for each case, such as when the CPU module status of the master station changes or a fieldbus error occurs.

The output value changes depending on the following two settings.

- NZ2FT-PN parameter "Output behaviour on fieldbus error"
- Parameter "Substitute value" for each I/O module

However, the data sent from the NZ2FT-C24 to the external device is not affected by the setting of the NZ2FT-PN parameter "Output behaviour on fieldbus error".

Ex.

For the digital output module

Status of master station (RJ71PN92)		**NZ2FT-PN parameter "Output behaviour on fieldbus error" setting**							
		0: All outputs off (All outputs are turned off.)		**1: Enable substitute value (A substitute value is output.)**				**2: Hold last value (The last output value is held.)**	
				The I/O module parameter "Substitute value" set to 1		**The I/O module parameter "Substitute value" set to 0**			
		Last output value is off	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
	When in CPU module stop error	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Ex.

For the NZ2FTS-60DA4

Status of master station (RJ71PN92)		**NZ2FT-PN parameter "Output behaviour on fieldbus error" setting**		
		0: All outputs off (All outputs are turned off.)	**1: Enable substitute value (A substitute value is output.)**	**2: Hold last value (The last output value is held.)**
Data link in operation	CPU module RUN state	D/A conversion value		
	CPU module: RUN → STOP			
	CPU module PAUSE state			
	When the CPU module is reset	0	A substitute value is output.	The last output value is held.
	When in CPU module stop error	0	A substitute value is output.	The last output value is held.
Disconnected (fieldbus error occurred)		0	A substitute value is output.	The last output value is held.

Option handling

Set each I/O module to stop/operate while the NZ2FT system is operating.

If I/O control is not to be performed for a specific I/O module for a certain period of time, set that I/O module to stop. By doing so, an error resulting from disconnecting the electronic unit part can be suppressed. (☞ Page 55 Removing electronic unit part)

The following operations are required to set the I/O module to stop/operate.

- Set the parameter "Option handling" to "Enabled". (☞ Page 209 GX Configurator-PN)
- Write Dataset to the NZ2FT-PN. (☞ Page 178 Dataset)

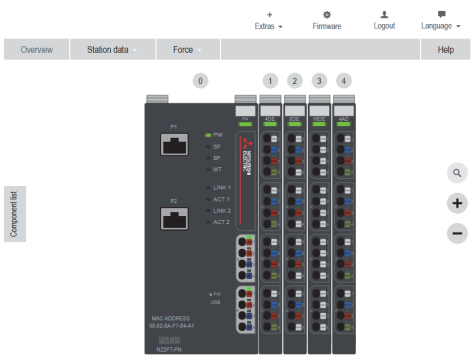
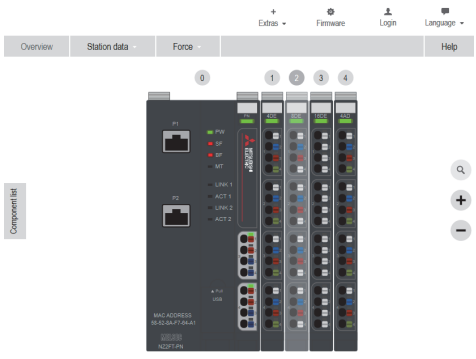
Dataset is created and written with a program. (☞ Page 182 Option handling program example)

Operation until stop

The following describes the operations to be performed to set an I/O module to stop, including those to be performed after the electronic unit part is disconnected and after Dataset is written and the stop operation is set.

Ex.

The "Overview" window of the Web server transitions as follows.

Item	"Overview" window	Window description
During operation		The modules with the following slot numbers are displayed. • Slot number 00: NZ2FT-PN • Slot number 01: NZ2FTS4-4DE • Slot number 02: NZ2FTS3-8DE (stop target) • Slot number 03: NZ2FTS1-16DE • Slot number 04: NZ2FTS-60AD4
⇩ Removing electronic unit part		
Before setting Option handling		The I/O module to be stopped (slot number 02) is displayed semi-transparently.
⇩ Write Dataset		
In stopped state		The I/O module in stopped state is hidden and the slot number display is justified to the left.

■Operation of each module

Module	Location of operation	Operation description	
		After disconnecting the electronic unit part	After writing Dataset and set to be stopped
NZ2FT-PN	SF LED	On in red (configuration error)	Off
	BF LED	Flashing in red (configuration error)	Off
	Status word	Bit 6: 1 I/O-Configuration error (There is a difference between the configuration information held by the NZ2FT-PN and the actual configuration.)	Bit 6: 0
I/O module to be stopped	Module status LED	(No display because the electronic unit is disconnected.)	(No display because the electronic unit is disconnected.)
	Input value	All OFF	All OFF
	Output value	All OFF	All OFF
	Slot number specified by the program	No change	No change
	Web server "Overview" window	The I/O module to be stopped is displayed semi-transparently (Empty Slot state).	The I/O module in stopped state is hidden.
I/O modules that are not subject to be stopped	Module status LED	On in green	On in green
	Input value	Follow the setting of the parameter "Module behavior on hot swap" of the NZ2FT-PN (☞ Page 209 GX Configurator-PN).	Normal input control is possible.
	Output value	Follow the setting of the parameter "Module behavior on hot swap" of the NZ2FT-PN (☞ Page 209 GX Configurator-PN).	Normal output control is possible.
	Slot number specified by the program	No change	No change
	Web server "Overview" window	No change	The I/O module in stopped state is hidden and the slot number display is justified to the left.
		Status LED: On in green	Status LED: On in green
		Channel status LED: Displays the input/output status.	Channel status LED: Displays the input/output status.

Point

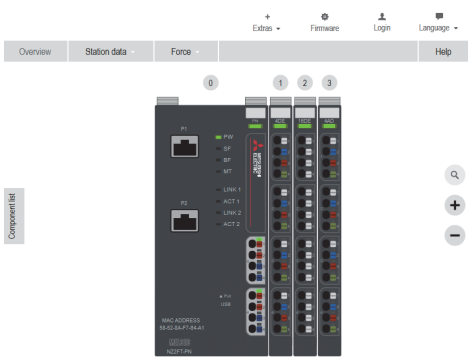
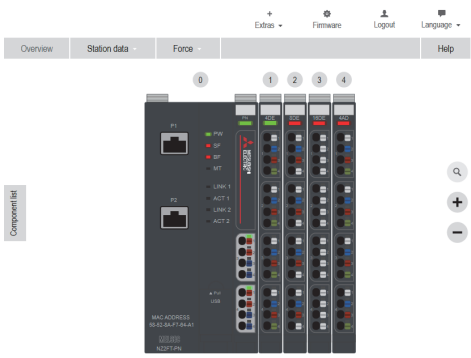
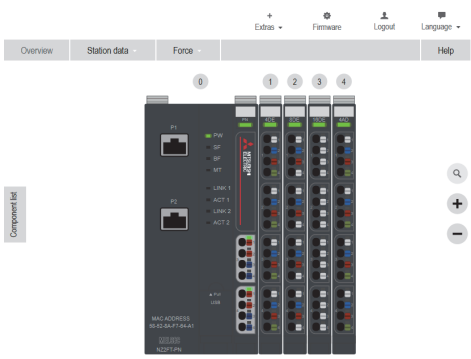
In the "Overview" window of the Web server, because the I/O module that was stopped is hidden, the slot number display of the I/O modules in operation changes. Even in that case, the slot numbers specified by the program do not change, so there is no need to change the program.

Operation until restart

The following describes the operations to be performed to restart the I/O module in stopped state, including those to be performed after the electronic unit part is connected and after Dataset is written and the operation is set. (☞ Page 57 Mounting electronic unit part)

Ex.

The "Overview" window of the Web server transitions as follows.

Item	"Overview" window	Window description
In stopped state		The modules with slot numbers 00 to 03 are displayed. The NZ2FTS3-8DE in stopped state is hidden. (☞ Page 174 Operation until stop)
⇩ Mounting electronic unit part		
Before setting Option handling		The I/O module to be restarted is added to and displayed in slot number 02, and the slot number display of the module to the right of the restart target changes.
⇩ Write Dataset		
During restart		In this state, the slot numbers are called as follows. • Slot number 01: Module to the left of the restart target • Slot number 02: I/O module to be restarted (restarting) • Slot number 03 to 04: Module to the right of the restart target

■Operation of each module

Module	Location of operation	Operation description	
		After disconnecting the electronic unit part	**After writing Dataset and set to be stopped**
NZ2FT-PN	SF LED	On in red (configuration error)	Off
	BF LED	Flashing in red (configuration error)	Off
	Status word	Bit 6: 1 I/O-Configuration error (There is a difference between the configuration information held by the NZ2FT-PN and the actual configuration.)	Bit 6: 0
I/O module to be restarted	Module status LED	Flashing in red	On in green
	Input value	All OFF	Input data can be sent.
	Output value	All OFF	Output data can be received.
	Slot number specified by the program	No change	No change
	Web server "Overview" window	I/O module normally displayed Status LED: flashing in red	I/O module normally displayed Status LED: On in green
I/O modules that are not subject to restart	Module status LED	• Module(s) to the left of the restart target: On in green • Module(s) to the right of the restart target: Flashing in red	On in green
	Input value	• Module(s) to the left of the restart target: Follow the setting of the parameter "Module behavior on hot swap". (☞ Page 209 GX Configurator-PN) • Module(s) to the right of the restart target: Holds the previous I/O value.	Input data can be sent.
	Output value	• Module(s) to the left of the restart target: Output data can be received. • Module(s) to the right of the restart target: OFF	Output data can be received.
	Slot number specified by the program	No change	No change
	Web server "Overview" window	I/O module normally displayed	I/O module normally displayed
		Status LED: • Module(s) to the left of the restart target: On in green • Module(s) to the right of the restart target: Flashing in red	Status LED: On in green
		Channel Status LED: Shows the channel status LED that corresponds to the input and output values.	Channel Status LED: Shows the channel status LED that corresponds to the input and output values.

Dataset

The following is the configuration information for sorting the I/O modules to be set to stop/operate.

Address	Data length	Description	Setting value
0	1 byte	Dataset length	Number of fixed areas (4 bytes) + number of connected I/O modules
1	1 byte	—	C4H (fixed)
2	1 byte	Version number	01H (fixed)
3	1 byte	Version number	00H (fixed)
4	1 byte	I/O Module 01	Stopped: 00H In operation: Set serial numbers such as 01H, 02H, and 03H. However, I/O modules in stopped state are excluded. (☞ Page 178 List of setting values)
5	1 byte	I/O Module 02	
⋮			
67 (maximum)	1 byte	I/O Module 64	

Precautions

■List of setting values

Set the number after address 4 of Dataset in ascending order (I/O module 01, I/O module 02, and so on).

If Dataset is written in descending order or random order, the following errors will occur in the NZ2FT-PN.

- SF LED: On in red
- BF LED: Flashing in red

Also, set serial numbers (no numbers to be skipped).

If Dataset is written with skipped numbers, the following errors will occur in the NZ2FT-PN.

- BF LED: Flashing in red

■Difference from the actual I/O module configuration

If the number of I/O module settings in Dataset is different from that in the actual I/O module configuration, the following will result.

- If it is higher in the actual I/O module configuration: Stop/Operate operation will be applied only for the number of I/O module settings in Dataset, and the rest will operate as-is.
- If it is lower in the actual I/O module configuration: Stop/Operate operation will be applied for the actual I/O module configuration.

■Save

After being written from the NZ2FT-PN, Dataset will remain saved until it is updated or deleted.

Dataset can be deleted by setting the NZ2FT-PN parameter "Option handling" to "Disabled" or by initializing the NZ2FT-PN on the Web server. When Dataset is deleted, all I/O modules will return to the state of operation.

■Read

By reading Dataset from the NZ2FT-PN, written Dataset can be checked.

However, if Dataset is not written before being read, an error notification will be returned. (Dataset can be written even if an error notification is returned.)

The following describes the error notifications that are returned when Dataset is read using the service request area 1 (C350H to CB77H) while Dataset is not written.

Service response area 1	Item	Stored value
DEABH	Status	0008H (PROFINET error)
DEAFH	ErrorDecode	0080H (PNIORW)
DEB0H	ErrorCode1	00C0H (resource: read constrain conflict)
DEB1H	ErrorCode2	0000H (User specific)

Stop procedure and setting example

The following case is described.

- NZ2FT-PN IO device ID: 1
- Buffer memory address: Service request area 1 (C350H to CB77H) of the service interface function

Precautions

■Reverse procedure

Disconnect the electronic unit part before writing Dataset.

Conversely, if the electronic unit part is disconnected after Dataset is written, the SF LED turns on in red, the BF LED flashes in red, and the I/O module will continue to operate.

If the above procedure is performed reversely, the I/O module will stop operating when the NZ2FT-PN is reset.

■Changing parameters

If the NZ2FT-PN parameter "Option handling" is changed from "Enabled" to "Disabled", all modules in stopped state will recognize it as the instruction to restart the operation. (If the electronic unit part is disconnected, an I/O-Configuration error will occur.)

Operating procedure

In the system configuration below, the NZ2FT3-8DE with slot number 02 will be set to stop its operation. (☞ Page 174 Operation until stop)

1. Disconnect the electronic unit part from the NZ2FT3-8DE to be stopped. (☞ Page 55 Removing electronic unit part)

2. Create Dataset containing slot number 02 to be stopped.

Byte	Description	I/O module	Setting value	Status
1	Dataset length	—	08H	—
2	Fixed C4H	—	C4H	—
3	Version number 01H (fixed)	—	01H	—
4	Version number 00H (fixed)	—	00H	—
5	I/O module 01 (slot number 01)	NZ2FTS4-4DE	01H	In operation
6	I/O module 02 (slot number 02)	NZ2FTS3-8DE	00H	Stop target
7	I/O module 03 (slot number 03)	NZ2FTS4-4DE	02H	In operation
8	I/O module 04 (slot number 04)	NZ2FTS1-16DE	03H	In operation

3. Write Dataset to the NZ2FT-PN based on the setting value in procedure 2.

To write Dataset, use the service interface function "Acyclic communication - Explicit write data record". (📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

Buffer memory address	Item		Setting value	Description
Un\50000	RequestID		0000H	Set the number to be specified to associate the service request with the response.
Un\50001			0000H	
Un\50002	ServiceID		0004H	Set ServiceID for the Acyclic communication-disconnected Record data write.
Un\50003	Status		0055H	Set the status of the service request (fixed value 0055H).
Un\50004	DeviceID		0001H	Set the target IO device ID.
Un\50005			0000H	
Un\50006	API		0000H	Set the Option handling API number.
Un\50007			0000H	
Un\50008	SlotNumber		0000H	Set the Option handling slot number.
Un\50009	SubslotNumber		0001H	Set the Option handling sub-slot number.
Un\50010	Index		00C4H	Set the Option handling index number.
Un\50011	Data Length (byte)		0008H	Set the size of Dataset to be written (in bytes).
Un\50012	PnDeviceID		0000H	Set DeviceID (fixed to 0000H).
Un\50013	PNVendorID		0000H	Set VendorID (fixed to 0000H).
⋮	⋮		⋮	⋮
Un\50030	C4H (fixed)	Dataset length	C408H	Set Dataset to be written to the NZ2FT-PN.
Un\50031	Version number 00H (fixed)	Version number 01H (fixed)	0001H	
Un\50032	I/O module 02 [Stopped]	I/O Module 01	0001H	
Un\50033	I/O Module 04	I/O Module 03	0302H	

4. When Dataset is written, the NZ2FT-PN is reset and the NZ2FT3-8DE stops its operation. (☞ Page 175 Operation of each module)

Restart procedure and setting example

The following case is described.

- NZ2FT-PN IO device ID: 1
- Buffer memory address: Service request area 1 (C350H to CB77H) of the service interface function

Precautions

■Installation and Dataset write

Connect the electronic unit part before writing Dataset.

Conversely, if the electronic unit part is connected after Dataset is written, the SF LED turns on in red, the BF LED flashes in red, and the I/O module will not restart the operation.

If the above procedure is performed reversely, the I/O module will restart operating when the NZ2FT-PN is reset.

■Model name and mounting position

For the I/O module to be restarted, mount the model with the same model name as the stopped I/O module and in the same position.

Operating procedure

In the system configuration below, the NZ2FT3-8DE with slot number 02 will be set to restart its operation. (☞ Page 176 Operation until restart)

1. Connect the electronic unit part to the NZ2FT3-8DE to be restarted. (☞ Page 57 Mounting electronic unit part)

2. Create Dataset containing slot number 02 to be restarted.

Byte	Description	I/O module	Setting value	Status
1	Dataset length	—	08H	—
2	Fixed C4H	—	C4H	—
3	Version number 01H (fixed)	—	01H	—
4	Version number 00H (fixed)	—	00H	—
5	I/O module 01 (slot number 01)	NZ2FTS4-4DE	01H	In operation
6	I/O module 02 (slot number 02)	NZ2FTS3-8DE	02H	Target for restart
7	I/O module 03 (slot number 03)	NZ2FTS4-4DE	03H	In operation
8	I/O module 04 (slot number 04)	NZ2FTS1-16DE	04H	In operation

3. Write Dataset to the NZ2FT-PN based on the setting value in procedure 2.

The method of writing Dataset is the same as that in the operation stop procedure and procedure 3 of the setting example. (☞ Page 179 Stop procedure and setting example)

4. When Dataset is written, the NZ2FT-PN is reset and the NZ2FT3-8DE restarts its operation. (☞ Page 177 Operation of each module)

Option handling program example

The following shows an example of a program that executes Option handling for general purposes.
Set the slot number (1 to 64) whose operation is to be stopped or restarted to D100, and turn on M10 to read, create, and write Dataset.

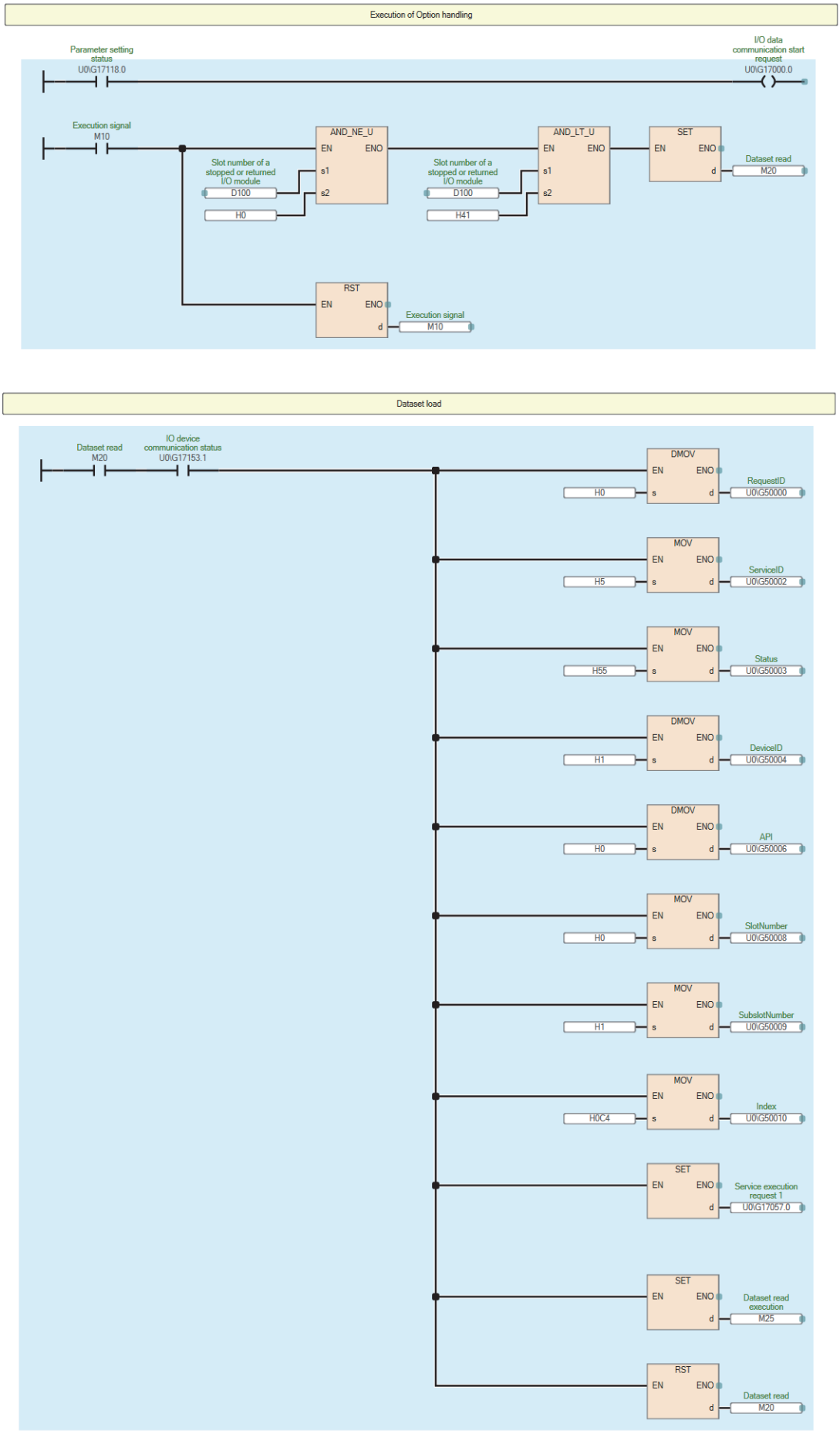
Operating procedure

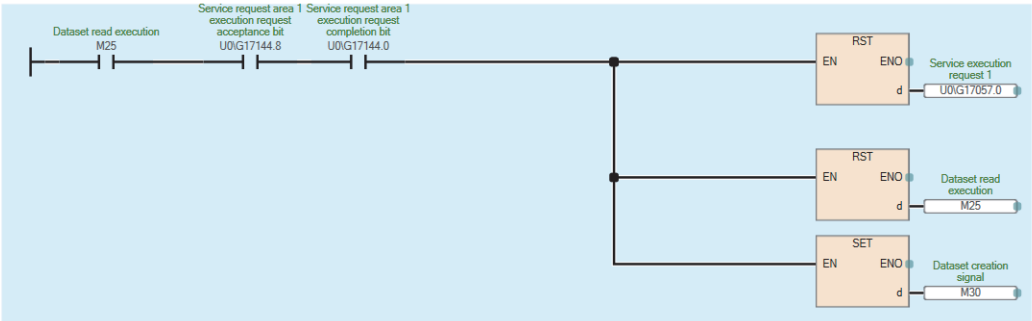
1. Read Dataset from the NZ2FT-PN. (☞ Page 183 Program example of Dataset read)
2. For the read Dataset, create Dataset that includes the I/O module(s) whose operation is to be stopped or restarted. If Dataset cannot be read in procedure 1, create Dataset that makes slot numbers 1 to 64 operational but one that excludes I/O modules whose operation is to be stopped. (☞ Page 185 Program example of Dataset creation)
3. Write Dataset to the NZ2FT-PN. (☞ Page 189 Program example of Dataset write)

■Device to be used

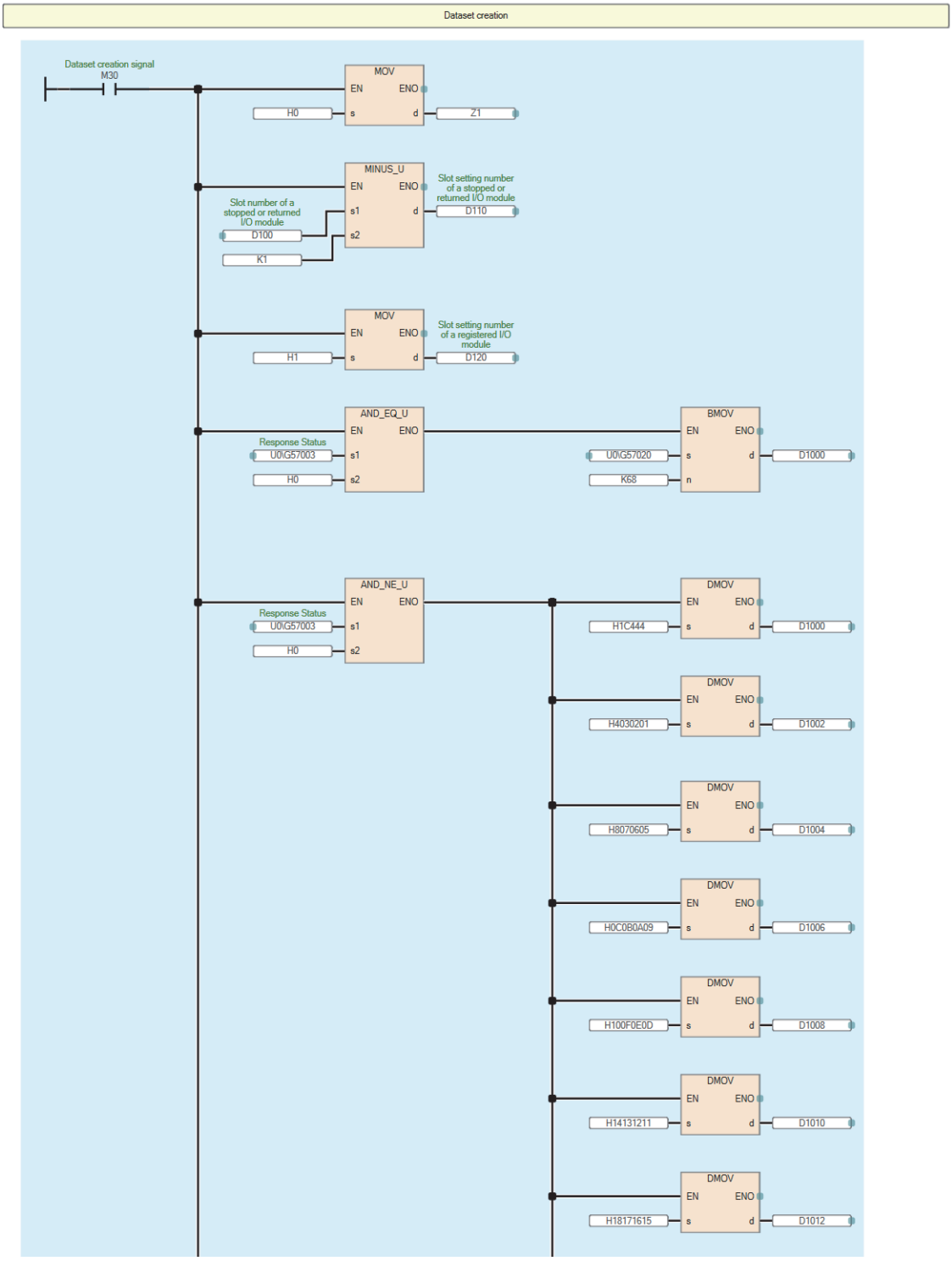
Device	Description
M10	Execution signal
M20	Dataset read
M25	Dataset read execution
M30	Dataset creation signal
M40	Dataset creation signal (stop or return)
M50	Dataset creation signal (remaining slot setting)
M60	Dataset write
M65	Dataset write execution
D100	Slot number of a stopped or returned I/O module (Enter the slot number of the stopped/restarted I/O module.)
D110	Slot setting number of a stopped or returned I/O module
D120	Slot setting number of a registered I/O module
D1000	Dataset storage location (1)
D2000	Dataset storage location (2)
D3000	Dataset storage location (3)
Z1	For address specification
U0\G17000.0	I/O data communication start request
U0\G17118.0	Parameter setting status
U0\G17153.1	IO device communication status
U0\G17057.0	Service execution request 1
U0\G17144.0	Service request area 1 execution request completion bit
U0\G17144.8	Service request area 1 execution request acceptance bit
U0\G50000	Service request area 1: RequestID
U0\G50002	Service request area 1: ServiceID
U0\G50003	Service request area 1: Status
U0\G50004	Service request area 1: DeviceID
U0\G50006	Service request area 1: API
U0\G50008	Service request area 1: SlotNumber
U0\G50009	Service request area 1: SubslotNumber
U0\G50010	Service request area 1: Index
U0\G50011	Service request area 1: Data length
U0\G50030	Service request area 1: Dataset to be written to the NZ2FT-PN
U0\G57003	Service response area 1: Status
U0\G57020	Service response area 1: Dataset read from the NZ2FT-PN

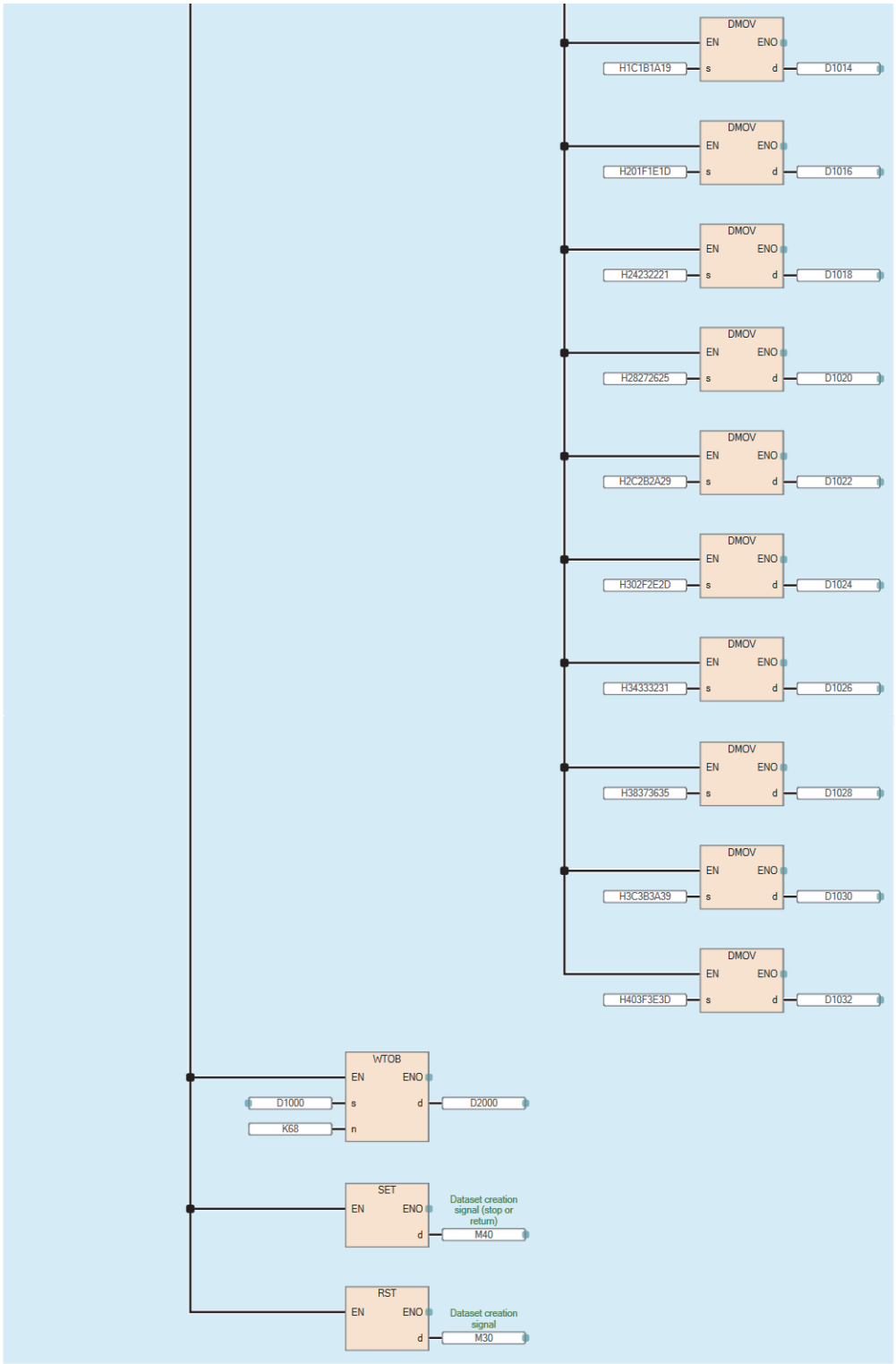
■Program example of Dataset read

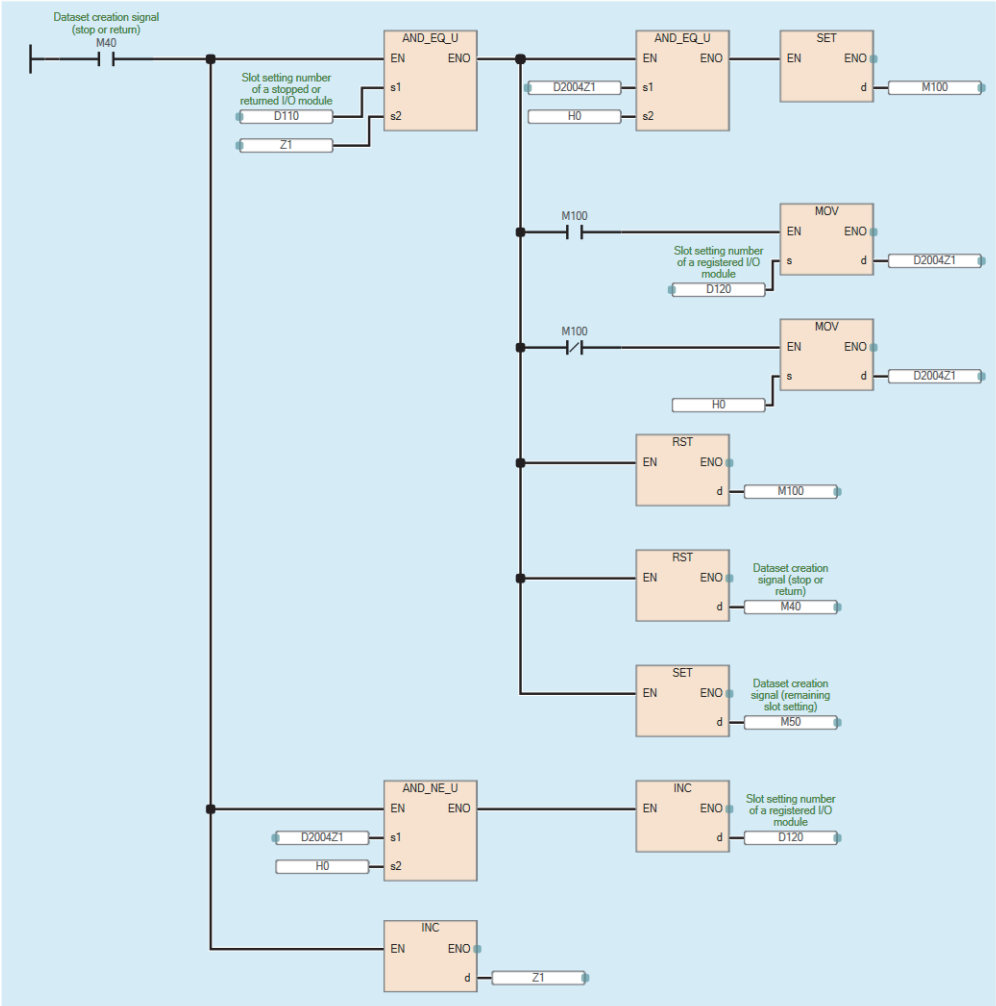


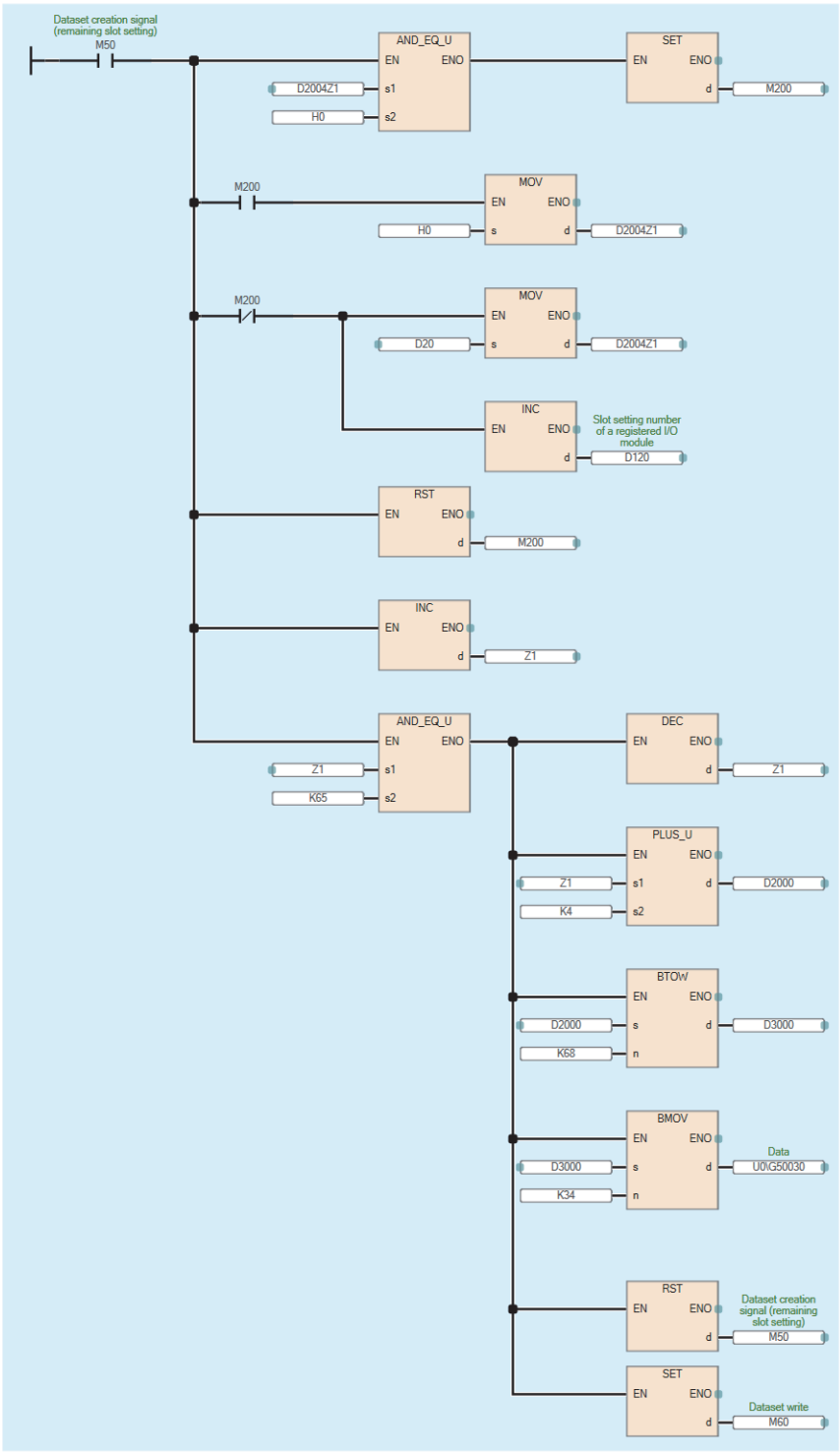

Dataset read execution
M25
Service request area 1 execution request acceptance bit
U0\G17144.8
Service request area 1 execution request completion bit
U0\G17144.0
RST
EN
ENO
d
Service execution request 1
U0\G17057.0
RST
EN
ENO
d
Dataset read execution
M25
SET
EN
ENO
d
Dataset creation signal
M30

■Program example of Dataset creation

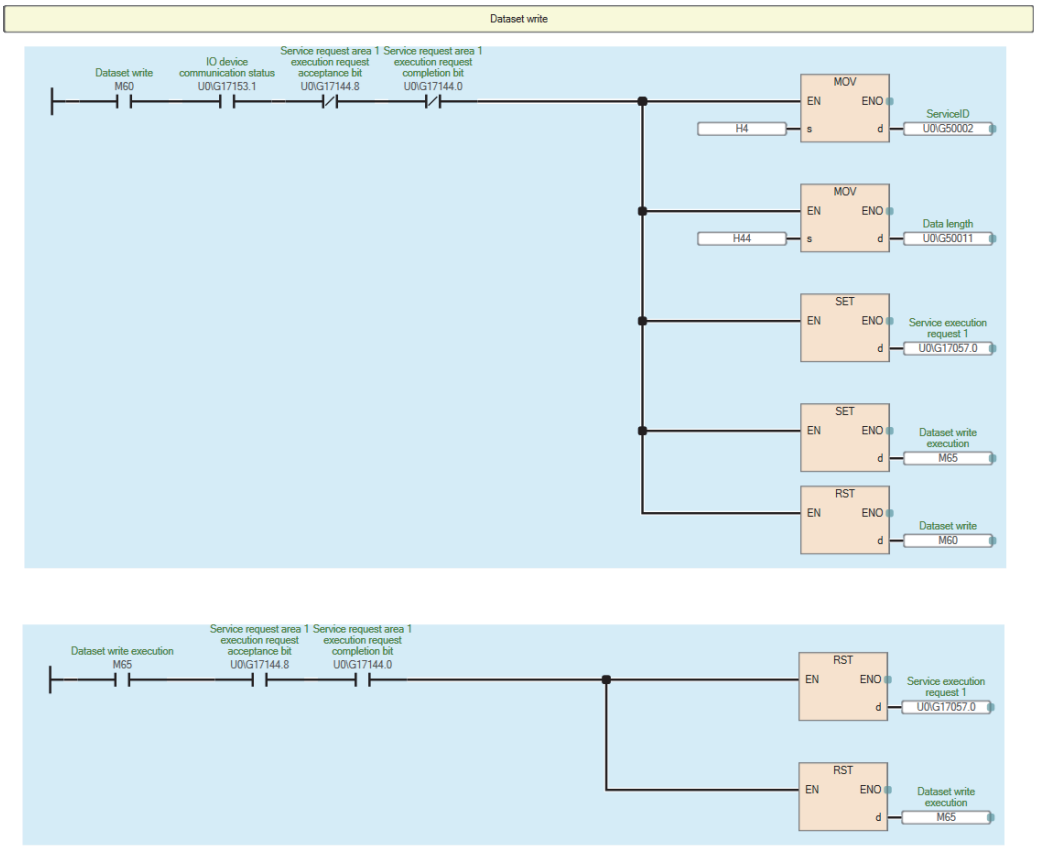



DMOV
EN
ENO
H1C1B1A19
s
d
D1014
DMOV
EN
ENO
H201F1E1D
s
d
D1016
DMOV
EN
ENO
H24232221
s
d
D1018
DMOV
EN
ENO
H28272625
s
d
D1020
DMOV
EN
ENO
H2C2B2A29
s
d
D1022
DMOV
EN
ENO
H302F2E2D
s
d
D1024
DMOV
EN
ENO
H34333231
s
d
D1026
DMOV
EN
ENO
H38373635
s
d
D1028
DMOV
EN
ENO
H3C3B3A39
s
d
D1030
DMOV
EN
ENO
H403F3E3D
s
d
D1032
WTOB
EN
ENO
D1000
s
d
D2000
K68
n
SET
EN
ENO
Dataset creation signal (stop or return)
d
M40
RST
EN
ENO
Dataset creation signal
d
M30


Dataset creation signal (stop or return)
M40
AND_EQ_U
EN
ENO
Slot setting number of a stopped or returned I/O module
s1
D110
s2
Z1
AND_EQ_U
EN
ENO
D2004Z1
s1
H0
s2
SET
EN
ENO
d
M100
M100
MOV
EN
ENO
Slot setting number of a registered I/O module
s
d
D120
D2004Z1
M100
MOV
EN
ENO
s
d
H0
D2004Z1
RST
EN
ENO
d
M100
RST
EN
ENO
Dataset creation signal (stop or return)
d
M40
SET
EN
ENO
Dataset creation signal (remaining slot setting)
d
M50
AND_NE_U
EN
ENO
D2004Z1
s1
H0
s2
INC
EN
ENO
Slot setting number of a registered I/O module
d
D120
INC
EN
ENO
d
Z1


Dataset creation signal (remaining slot setting)
M50
AND_EQ_U
EN
ENO
D2004Z1
s1
H0
s2
SET
d
M200
M200
MOV
s
D2004Z1
M200
D20
INC
Slot setting number of a registered I/O module
D120
RST
INC
Z1
AND_EQ_U
DEC
K65
PLUS_U
K4
D2000
BTOW
K68
D3000
BMOV
K34
Data
U0\G50030
Dataset creation signal (remaining slot setting)
Dataset write
M60

■Program example of Dataset write



Acyclic communication - Implicit read data record

The NZ2FT-PN specified by the IP address responds to the service request (Record data read) from the RJ71PN92 and sends the service response. The data that can be read is as follows.

- Dataset used in Option handling
- PROFINET common specification data

Service request format

The following describes the request format of the Acyclic communication-disconnected Record data read from the RJ71PN92 to NZ2FT-PN. Set the following values in the service request area.

Classification	Item	Size	Description	Setting value
Header	RequestID	4 bytes	Set the number to associate the service request with the response.	—*1
	ServiceID	2 bytes	Set ServiceID of the service interface function.	0003H
	Status	2 bytes	Set the status of the service request.	0055H
	DeviceID	4 bytes	Set the IP address of the target NZ2FT-PN.	—*1
	API	4 bytes	Set the API number of the NZ2FT dedicated specifications.	☞ Page 191 Details of read/write data
	SlotNumber	2 bytes	Set the slot number of the NZ2FT dedicated specifications.	
	SubslotNumber	2 bytes	Set the sub-slot number of the NZ2FT dedicated specifications.	
	Index	2 bytes	Set the index number of the NZ2FT dedicated specifications.	
	Data length (byte)	2 bytes	Set 0000H.	0000H
	PnDeviceID	2 bytes	Set DeviceID of the NZ2FT dedicated specifications.	0161H
	PNVendorID	2 bytes	Set VendorID of the NZ2FT dedicated specifications.	021CH
	ARUUID	8 bytes	Set the value stored in "ObjectUUID_LocalIndex" of the GSDML file.	—*1

*1 Service interface function 🕮 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Service response format

The following describes the response format for the Acyclic communication-disconnected Record data read. It is sent from the NZ2FT-PN to RJ71PN92 and stored in the service response area.

Classification	Item	Size	Description	Stored value
Header	RequestID	4 bytes	RequestID set in the service request format is stored.	—*1
	ServiceID	2 bytes	ServiceID set in the service request format is stored.	0003H
	Status	2 bytes	The execution result of the service request is stored. 0008H is a PROFINET error notification, and the contents are stored in ErrorDecode, ErrorCode1, and ErrorCode2.	—*1
	DeviceID	4 bytes	DeviceID set in the service request format is stored.	
	Data length (byte)	2 bytes	The size of the read data is stored in bytes.	
	ErrorDecode	2 bytes	A value other than 0000H is stored when a PROFINET error occurs.	☞ Page 190 Details of ErrorDecode, ErrorCode1 and ErrorCode2
	ErrorCode1	2 bytes	A value other than 0000H is stored when a PROFINET error occurs.	
	ErrorCode2	2 bytes	A value other than 0000H is stored when a PROFINET error occurs.	
Data	Read Data	2068 bytes	The data read from the NZ2FT-PN is stored.	☞ Page 191 Details of read/write data

*1 Service interface function 🕮 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

■Details of ErrorDecode, ErrorCode1 and ErrorCode2

Classification	Item	Invalid index access	Invalid slot access	Invalid API access	Incorrect data write (access denied)
Header	ErrorDecode	0080H	0080H	0080H	0080H
	ErrorCode1	00B0H	00B2H	00B4H	0000H
	ErrorCode2	0000H	0008H	0000H	0000H

■Details of read/write data

Classification	Item	Setting value when reading/writing Dataset used in Option handling
Header	API	00000000H
	SlotNumber	0000H
	SubslotNumber	0001H
	Index	00C4H
Data	Data	If Dataset is not written, addresses 0 to 3 of Dataset are read. (☞ Page 178 Dataset)

Acyclic communication - Explicit write data record

The NZ2FT-PN specified by the IO device ID responds to the service request (Record data write) from the RJ71PN92 and sends the service response. The data that can be written is as follows.

- Dataset used in Option handling
- PROFINET common specification data

Service request format

The following describes the request format of the Acyclic communication-disconnected Record data write from the RJ71PN92 to NZ2FT-PN. Set the following values in the service request area.

Classification	Item	Size	Description	Setting value
Header	RequestID	4 bytes	Set the number to associate the service request with the response.	—*1
	ServiceID	2 bytes	Set ServiceID of the service interface function.	0004H
	Status	2 bytes	Set the status of the service request.	0055H
	DeviceID	4 bytes	Set the IO device ID of the target NZ2FT-PN.	—*1
	API	4 bytes	Set the API number of the NZ2FT dedicated specifications.	☞ Page 191 Details of read/write data
	SlotNumber	2 bytes	Set the slot number of the NZ2FT dedicated specifications.	
	SubslotNumber	2 bytes	Set the sub-slot number of the NZ2FT dedicated specifications.	
	Index	2 bytes	Set the index number of the NZ2FT dedicated specifications.	
	Data length (byte)	2 bytes	Set the size of the write data in bytes.	—*1
	PnDeviceID	2 bytes	Set 0000H.	0000H
	PNVendorID	2 bytes	Set 0000H.	0000H
Data	Write Data	2058 bytes	Set the data to be written to the NZ2FT-PN.	☞ Page 191 Details of read/write data

*1 Service interface function 🕮 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Service response format

The following describes the response format for the Acyclic communication-disconnected Record data write. It is sent from the NZ2FT-PN to RJ71PN92 and stored in the service response area.

Classification	Item	Size	Description	Stored value
Header	RequestID	4 bytes	RequestID set in the service request format is stored.	—*1
	ServiceID	2 bytes	ServiceID set in the service request format is stored.	0004H
	Status	2 bytes	The execution result of the service request is stored. 0008H is a PROFINET error notification, and the contents are stored in ErrorDecode, ErrorCode1, and ErrorCode2.	—*1
	DeviceID	4 bytes	DeviceID set in the service request format is stored.	
	Data length (byte)	2 bytes	The size of the write data is stored in bytes.	
	ErrorDecode	2 bytes	A value other than 0000H is stored when a PROFINET error occurs.	☞ Page 190 Details of ErrorDecode, ErrorCode1 and ErrorCode2
	ErrorCode1	2 bytes	A value other than 0000H is stored when a PROFINET error occurs.	
	ErrorCode2	2 bytes	A value other than 0000H is stored when a PROFINET error occurs.	

*1 Service interface function 🕮 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Acyclic communication - Explicit read data record

The NZ2FT-PN specified by the IO device ID responds to the service request (Record data read) from the RJ71PN92 and sends the service response. The data that can be read is as follows.

- Dataset used in Option handling
- PROFINET common specification data

Service request format

The following describes the request format of the Acyclic communication-connected Record data read from the RJ71PN92 to NZ2FT-PN. Set the following values in the service request area.

Classification	Item	Size	Description	Setting value
Header	RequestID	4 bytes	Set the number to associate the service request with the response.	—*1
	ServiceID	2 bytes	Set ServiceID of the service interface function.	0005H
	Status	2 bytes	Set the status of the service request.	0055H
	DeviceID	4 bytes	Set the IO device ID of the target NZ2FT-PN.	—*1
	API	4 bytes	Set the API number of the NZ2FT dedicated specifications.	☞ Page 191 Details of read/write data
	SlotNumber	2 bytes	Set the slot number of the NZ2FT dedicated specifications.	
	SubslotNumber	2 bytes	Set the sub-slot number of the NZ2FT dedicated specifications.	
	Index	2 bytes	Set the index number of the NZ2FT dedicated specifications.	
	Data length (byte)	2 bytes	Set 0000H.	0000H
	PnDeviceID	2 bytes	Set 0000H.	0000H
	PNVendorID	2 bytes	Set 0000H.	0000H

*1 Service interface function 🕮 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Service response format

The following describes the response format for the Acyclic communication-connected Record data read. It is sent from the NZ2FT-PN to RJ71PN92 and stored in the service response area.

Classification	Item	Size	Description	Stored value
Header	RequestID	4 bytes	RequestID set in the service request format is stored.	—*1
	ServiceID	2 bytes	ServiceID set in the service request format is stored.	0005H
	Status	2 bytes	The execution result of the service request is stored. 0008H is a PROFINET error notification, and the contents are stored in ErrorDecode, ErrorCode1, and ErrorCode2.	—*1
	DeviceID	4 bytes	DeviceID set in the service request format is stored.	
	Data length (byte)	2 bytes	The size of the read data is stored in bytes.	
	ErrorDecode	2 bytes	A value other than 0000H is stored when a PROFINET error occurs.	☞ Page 190 Details of ErrorDecode, ErrorCode1 and ErrorCode2
	ErrorCode1	2 bytes	A value other than 0000H is stored when a PROFINET error occurs.	
	ErrorCode2	2 bytes	A value other than 0000H is stored when a PROFINET error occurs.	
Data	Read Data	2068 bytes	The data read from the NZ2FT-PN is stored.	☞ Page 191 Details of read/write data

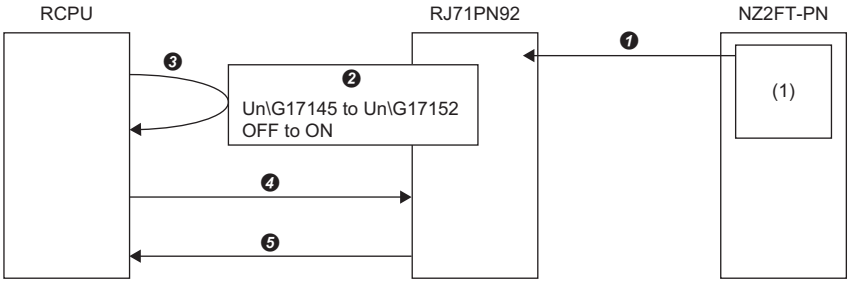
*1 Service interface function 🕮 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Alarm request

This function reads the alarm information accumulated in the RJ71PN92 to the CPU module.

To execute the alarm request, set the corresponding IO device to manual alarm processing in the 'IO device alarm management area' (Un\G17025 to Un\G17032) of the RJ71PN92 in advance. (Alarm acquisition function 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

If the alarm request is executed in a state where no alarm has occurred, the error response is sent from the RJ71PN92 to the CPU module.



❶ When an alarm occurs in the NZ2FT-PN, alarm information (1) is sent.
❷ The bit of the corresponding IO device ID (station number) in the IO device alarm notification area is turned off and on.
❸ ❷ is checked by the program.
❹ The alarm request is executed by the program.
❺ The response data for the alarm request is stored in the service response area.

Service request format

The following describes the request format of the alarm request from the CPU module to RJ71PN92. Set the following values in the service request area.

Classification	Item	Size	Description	Setting value
Header	RequestID	4 bytes	Set the number to associate the service request with the response.	—*1
	ServiceID	2 bytes	Set ServiceID of the service interface function.	0006H
	Status	2 bytes	Set the status of the service request.	0055H
	DeviceID	4 bytes	Set the IO device ID of the target NZ2FT-PN.	—*1
	API	4 bytes	Set 00000000H.	00000000H
	SlotNumber	2 bytes	Set 0000H.	0000H
	SubslotNumber	2 bytes	Set 0000H.	0000H
	Index	2 bytes	Set 0000H.	0000H
	Data length (byte)	2 bytes	Set 0000H.	0000H
	PnDeviceID	2 bytes	Set 0000H.	0000H
	PNVendorID	2 bytes	Set 0000H.	0000H

*1 Service interface function 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Service response format

The following describes the response format for alarm requests. It is sent from the RJ71PN92 to the CPU module and stored in the service response area.

Classification	Item	Size	Description	Stored value
Header	RequestID	4 bytes	RequestID set in the service request format is stored.	—*1
	ServiceID	2 bytes	ServiceID set in the service request format is stored.	0006H
	Status	2 bytes	The execution result of the service request is stored.	—*1
	DeviceID	4 bytes	DeviceID set in the service request format is stored.	
	Data length (byte)	2 bytes	The size of the read data is stored in bytes.	
	ErrorDecode	2 bytes	A value other than 0000H is stored when the service request fails.	
	ErrorCode1	2 bytes	A value other than 0000H is stored when the service request fails.	
	ErrorCode2	2 bytes	A value other than 0000H is stored when the service request fails.	
Data	API	4 bytes	The API number of the NZ2FT dedicated specifications is stored.	00000000H
	Priority	2 bytes	The alarm priority is stored.	—*1
	Type	2 bytes	The alarm type of the NZ2FT dedicated specifications is stored.	☞ Page 195 Details of Type
	SlotNumber	2 bytes	The slot number of the NZ2FT dedicated specifications is stored. Example: 0002H for the second I/O module	I/O module numbers in order of mounting position proximity to the NZ2FT-PN
	SubslotNumber	2 bytes	The sub-slot number of the NZ2FT dedicated specifications is stored.	• When the Type value is 0003H: 0000H • When the Type value is other than 0003H: 0001H
	Specifier	2 bytes	The alarm specifier is stored.	—*1
	Module Ident number	4 bytes	The module ID of the NZ2FT dedicated specifications is stored.	☞ Page 591 Module ID list
	Submodule Ident number	4 bytes	The sub-module ID of the NZ2FT dedicated specifications is stored.	• For the NZ2FT-PN and I/O module devices: 0001H • For the NZ2FT-PN interface: 0002H • For the NZ2FT-PN Ethernet port: 0003H
	Data length (byte)	2 bytes	The size of the read data is stored in bytes.	—*1
	Read Data	2056 bytes	The data read from the NZ2FT-PN is stored.	The stored value differs depending on the Type value. • When the Type value is 0003H, 0004H, 000AH, 000BH: No data

*1 Service interface function 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

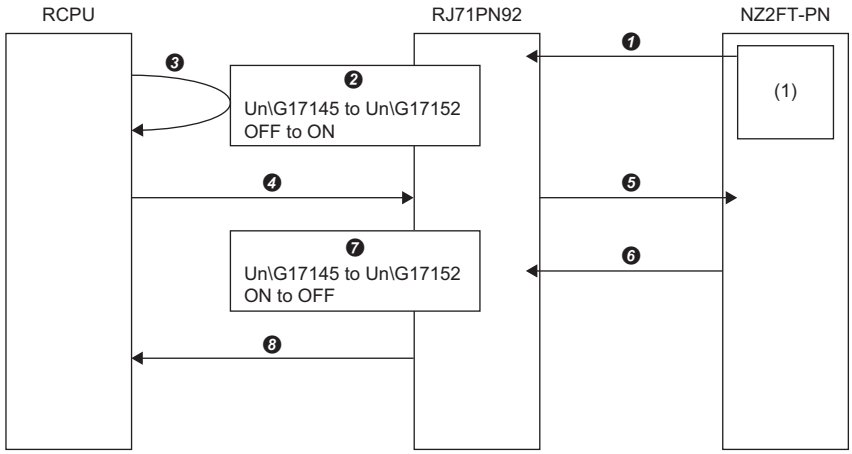
■Details of Type

Alarm type name	Type value	Description
Drawing	0003H	When pulling out the electronic unit part of the I/O module
Insertion	0004H	When inserting the electronic unit part of the I/O module
Sub module mounted incorrectly	000AH	When inserting the electronic unit part of a different I/O module
Sub module restored	000BH	When clearing an alarm associated with pulling out, inserting, or sub-module inserting

Alarm ACK

In response to the alarm ACK from the RJ71PN92, the alarm generated on the NZ2FT-PN is cleared and the alarm ACK response is sent to the RJ71PN92. Also, alarm information accumulated in the RJ71PN92 is cleared.

To execute the alarm ACK, set the corresponding IO device ID (station number) to manual alarm processing in the 'IO device alarm management area' (Un\G17025 to Un\G17032) of the RJ71PN92 in advance. (Alarm acquisition function 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))



❶ When an alarm occurs in the NZ2FT-PN, alarm information (1) is sent.
❷ The bit of the corresponding IO device ID in the IO device alarm notification area is turned off and on.
❸ ❷ is checked by the program.
❹ The alarm ACK is executed by the program.
❺ The alarm that occurred on the NZ2FT-PN is cleared.
❻ Alarm ACK response data is sent and alarm information (1) accumulated in the RJ71PN92 is cleared.
❼ The bit of the corresponding IO device ID in the IO device alarm notification area is turned on and off.
❽ The response data for the alarm ACK is stored in the service response area.

Alarm ACK format

The following describes the request format of the alarm ACK from the RJ71PN92 to NZ2FT-PN. Set the following values in the service request area.

The alarm ACK service does not have a setting value unique to the NZ2FT.

Classification	Item	Size	Description	Setting value
Header	RequestID	4 bytes	Set the number to associate the service request with the response.	—*1
	ServiceID	2 bytes	Set ServiceID of the service interface function.	0007H
	Status	2 bytes	Set the status of the service request.	0055H
	DeviceID	4 bytes	Set the IO device ID of the target NZ2FT-PN.	—*1
	API	4 bytes	Set the API number read by the alarm request.	
	SlotNumber	2 bytes	Set the slot number read by the alarm request.	
	SubslotNumber	2 bytes	Set the sub-slot number read by the alarm request.	
	Index	2 bytes	Set the alarm priority read by the alarm request.	
	Data length (byte)	2 bytes	Set 0000H.	0000H
	PnDeviceID	2 bytes	Set 0000H.	0000H
	PNVendorID	2 bytes	Set 0000H.	0000H

*1 Service interface function 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Alarm ACK response format

The following describes the response format for the alarm ACK. It is sent from the NZ2FT-PN to RJ71PN92 and stored in the service response area.

The alarm ACK service does not have a stored value unique to the NZ2FT.

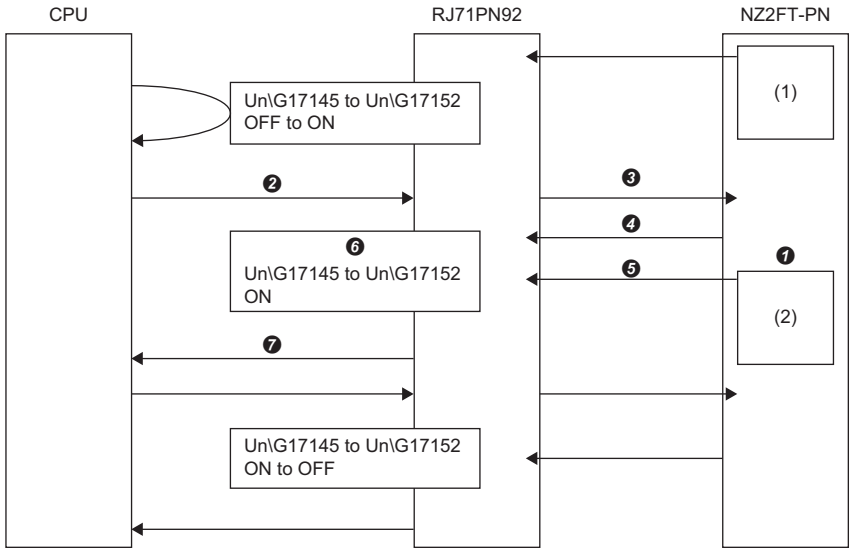
Classification	Item	Size	Description	Stored value
Header	RequestID	4 bytes	RequestID set in the service request format is stored.	—*1
	ServiceID	2 bytes	ServiceID set in the service request format is stored.	0007H
	Status	2 bytes	The execution result of the service request is stored.	—*1
	DeviceID	4 bytes	DeviceID set in the service request format is stored.	
	Data length (byte)	2 bytes	The size of the read data is stored in bytes.	
	ErrorDecode	2 bytes	A value other than 0000H is stored when the service request fails.	
	ErrorCode1	2 bytes	A value other than 0000H is stored when the service request fails.	
	ErrorCode2	2 bytes	A value other than 0000H is stored when the service request fails.	

*1 Service interface function 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Handling multiple alarms

If multiple alarms occur in the same NZ2FT-PN, only the first alarm information is sent to the RJ71PN92, and the second and subsequent alarm information is accumulated in the NZ2FT-PN.

When the alarm ACK is executed and the first alarm is cleared, the second alarm information accumulated in the NZ2FT-PN is sent to the RJ71PN92.



❶ Even if the second alarm occurs in NZ2FT-PN, alarm information (2) is not sent and is accumulated in the NZ2FT-PN.
❷ The alarm ACK is executed by the program.
❸ The first alarm that occurred in the NZ2FT-PN is cleared.
❹ Alarm ACK response data is sent and the first alarm accumulated in the RJ71PN92 is cleared.
❺ After the first alarm is cleared, the second alarm information (2) accumulated in the NZ2FT-PN is sent to the RJ71PN92.
❻ Since the second alarm information (2) was sent, the bit of the corresponding IO device ID in the IO device alarm notification area remains ON.
❼ The response data for the alarm ACK of the first alarm is stored in the service response area.

After that, when the alarm ACK is executed and the second alarm is cleared, the bit in the IO device alarm notification area turns on and off, and the response data for the alarm ACK is stored in the service response area.

Alarm log acquisition

This function reads the alarm log accumulated in the RJ71PN92 to the CPU module. If multiple alarms occur in the same NZ2FT-PN, acquire the alarm log multiple times also.

Service request format

The following describes the request format of the alarm log acquisition from the CPU module to RJ71PN92. Set the following values in the service request area.

Classification	Item	Size	Description	Setting value
Header	RequestID	4 bytes	Set the number to associate the service request with the response.	—*1
	ServiceID	2 bytes	Set ServiceID of the service interface function.	0009H
	Status	2 bytes	Set the status of the service request.	0055H
	DeviceID	4 bytes	Set the IO device ID of the target NZ2FT-PN.	—*1
	API	4 bytes	Set 00000000H	00000000H
	SlotNumber	2 bytes	Set 0000H.	0000H
	SubslotNumber	2 bytes	Set 0000H.	0000H
	Index	2 bytes	Set 0000H.	0000H
	Data length (byte)	2 bytes	Set 0000H.	0000H
	PnDeviceID	2 bytes	Set 0000H.	0000H
	PNVendorID	2 bytes	Set 0000H.	0000H

*1 Service interface function 🕮 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Service response format

The following describes the response format for the alarm log acquisition. It is sent from the RJ71PN92 to the CPU module and stored in the service response area.

Classification	Item	Size	Description	Stored value
Header	RequestID	4 bytes	RequestID set in the service request format is stored.	—*1
	ServiceID	2 bytes	ServiceID set in the service request format is stored.	0009H
	Status	2 bytes	The execution result of the service request is stored.	—*1
	DeviceID	4 bytes	DeviceID set in the service request format is stored.	
	Data length (byte)	2 bytes	The size of the read data is stored in bytes.	
	ErrorDecode	2 bytes	A value other than 0000H is stored when the service request fails.	
	ErrorCode1	2 bytes	A value other than 0000H is stored when the service request fails.	
	ErrorCode2	2 bytes	A value other than 0000H is stored when the service request fails.	
Data	Date	4 bytes	The alarm acquisition date is stored.	—*1
	Time	4 bytes	The alarm acquisition time is stored.	
	Type	2 bytes	The alarm type of the NZ2FT dedicated specifications is stored.	☞ Page 195 Details of Type
	API	4 bytes	The API number of the NZ2FT dedicated specifications is stored.	00000000H
	Priority	2 bytes	The alarm priority is stored.	—*1
	Module Ident number	4 bytes	The module ID of the NZ2FT dedicated specifications is stored.	☞ Page 591 Module ID list
	Submodule Ident number	4 bytes	The sub-module ID of the NZ2FT dedicated specifications is stored.	• For the NZ2FT-PN and I/O module devices: 0001H • For the NZ2FT-PN interface: 0002H • For the NZ2FT-PN Ethernet port: 0003H
	SlotNumber	2 bytes	The slot number of the NZ2FT dedicated specifications is stored. Example: 0002H for the second I/O module	I/O module numbers in order of mounting position proximity to the NZ2FT-PN
	SubslotNumber	2 bytes	The sub-slot number of the NZ2FT dedicated specifications is stored.	0001H
	Specifier	2 bytes	The alarm specifier is stored.	—*1

*1 Service interface function 🕮 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

9.5 Procedures Before Operation

1. Installation

Attach the NZ2FT system to the DIN rail and install it in a suitable environment. (☞ Page 36 Installation Environment and Installation Position of Module, Page 38 Installation)

2. Wiring

Connect the power cable and Ethernet cable to the NZ2FT-PN. (☞ Page 45 Wiring of power cable and I/O cable, ☞ Page 46 Ethernet cable)

Connect the I/O cables to the I/O module. (☞ Page 45 Wiring of power cable and I/O cable)

3. Master station setting

Set the parameters of the RJ71PN92 and IO device (NZ2FT-PN and I/O module). (☞ Page 200 Parameter Setting)

4. Start operation

Turn on I/O data communication start request (Un\G17000.0).

9.6 Parameter Setting

The parameters for the RJ71PN92 and IO device (NZ2FT-PN and I/O module) are set using GX Works3 and GX Configurator-PN. (Parameter setting procedure 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

GX Works3 setting

The parameters of the RJ71PN92 (other than communication parameters) are set in GX Works3. (☞ Page 215 GX Works3 setting)
For use with GX Configurator-PN, set the IP address of the RJ71PN92 in advance and write it to the CPU module.

Precautions

The NZ2FT-PN does not support "Autorefresh Settings" and "Update PROFINET Label" of GX Works3, so no setting is required.

GX Configurator-PN setting procedure

Use GX Configurator-PN to set the communication parameters of the RJ71PN92 and the slave parameters of the NZ2FT-PN and I/O module. (IO device registration procedure 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

1. Launch GX Configurator-PN from GX Works3.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71PN92] ⇨ [PROFINET Module Setting]

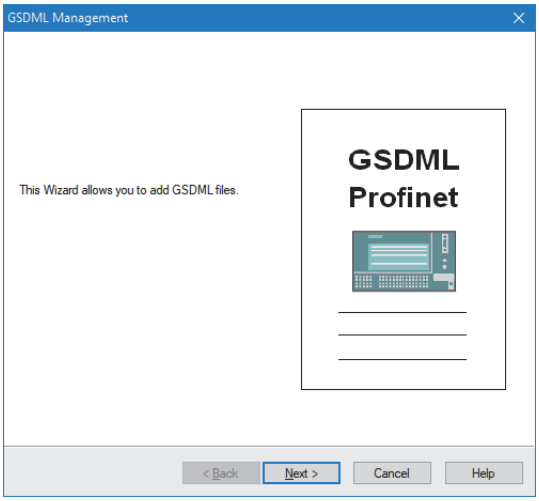
2. ☞ Page 200 Add the GSDML file.
3. ☞ Page 202 Device Name setting
4. ☞ Page 203 Network configuration setting
5. ☞ Page 207 Slave parameter setting
6. ☞ Page 208 Saving and writing

Add the GSDML file.

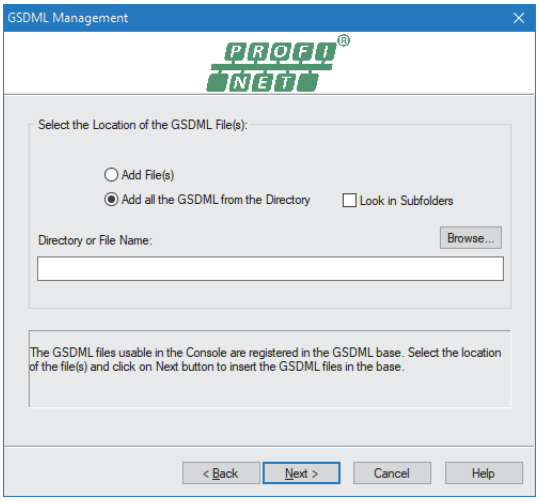
Register the GSDML file in GX Configurator-PN. (☞ Page 168 GSDML file)

1. Open the "GSDML Management" window and click the [Next] button.

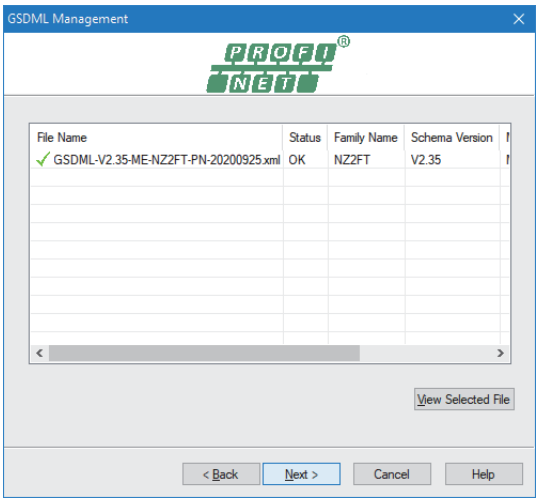
[Library] ⇨ [Add]



2. Select "Add all the GSDML from the Directory" with the radio button, click the [Browse] button, specify the GSDML folder, and click the [Next] button.

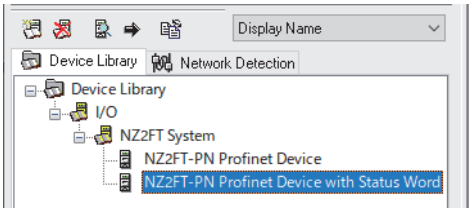


3. The result of the GSDML file addition to "Device Library" is displayed. Click the [Next] button.



4. Click the [Finish] button on the displayed window to close the "GSDML Management" window.

5. In the tree on the [Device Library] tab, "NZ2FT-PN Profinet Device" and "NZ2FT-PN Profinet Device with Status Word" are added.



■Device Library

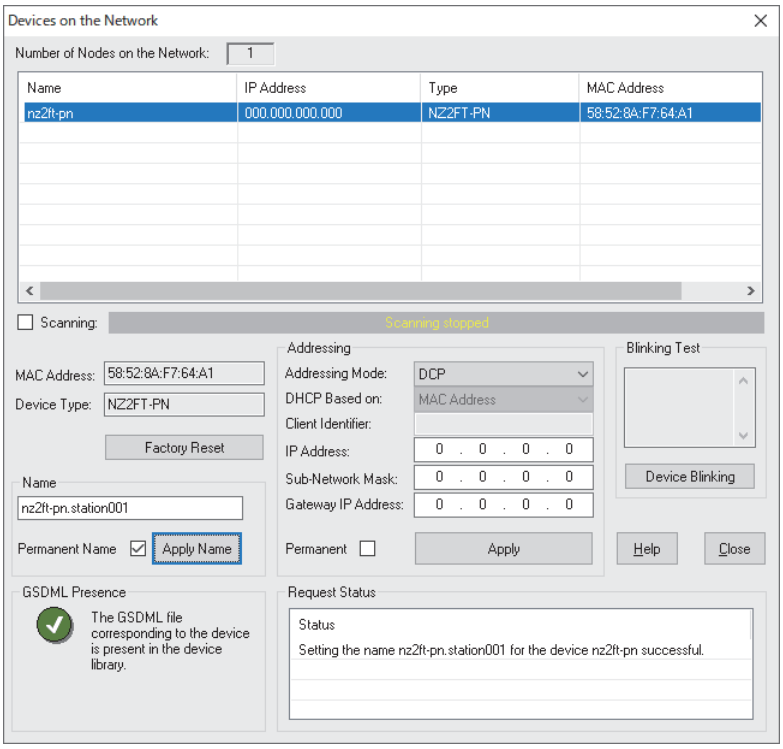
In the tree on the [Device Library] tab, select whether to add Status Word to Process data of the NZ2FT-PN. (☞ Page 203 NZ2FT-PN, ☞ Page 223 Confirmation by status information (Status word))

Item	Description
NZ2FT-PN Profinet Device	I/O data communication is performed only for Process data.
NZ2FT-PN Profinet Device with Status Word	I/O data communication is performed by adding a 1-word Status Word to the start of Input data of Process data. (☞ Page 211 Input data)

Device Name setting

In PROFINET, set Device Name corresponding to the station number on the "Devices on the Network" window. (Window layout MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

[Network Detection] tab ⇨ Right click on "Network" ⇨ [Network] ⇨ [Online Action]



1. When the "Devices on the Network" window is opened, IO device detection starts automatically. If it does not start, check "Scanning".
2. When the NZ2FT-PN to be set is displayed in the list of IO devices (at the top of the window), uncheck "Scanning".
3. Select the NZ2FT-PN to be set from the list of IO devices, and edit the name (default: nz2ft-pn) displayed in the "Name" text box (center of the window) so that it becomes Device Name. Device Name should be a unique character string for each individual with the following conditions. (Example: nz2ft-pn.station001)

- The number of characters is 240 alphanumeric characters or less, and the following characters can be used: a to z, 0 to 9, period, hyphen.
- A period cannot be used at the beginning or the end. A period cannot be used consecutively.
- A period can be used as a separator. The delimiter must be 63 characters or less, and a hyphen cannot be used at the beginning and end of the delimiter.

4. Check "Permanent Name".
5. Click the [Apply Name] button.
6. Click the [Close] button or [×] button to to close the "Devices on the Network" window.
7. Unplug the Ethernet cable of the connected personal computer (GX Configurator-PN).

Point

If a failure message is displayed in "Request Status", check the following.

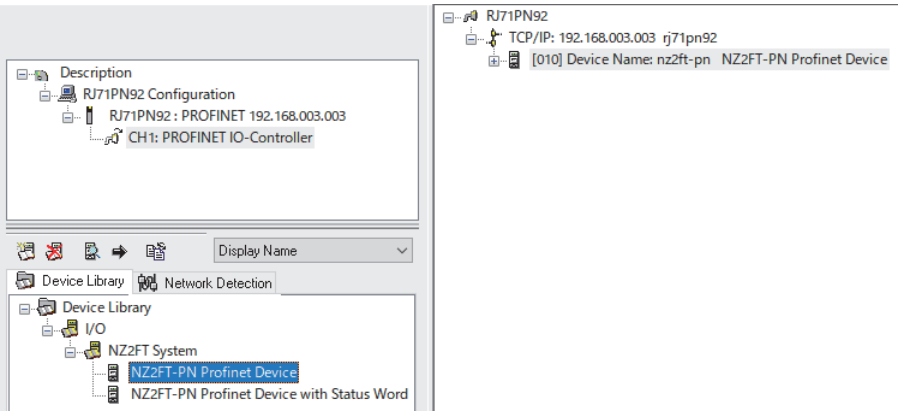
- Is the power of the connected NZ2FT-PN turned off?
- Is the Ethernet cable disconnected?
- Does the edited Device Name meet the character conditions?

Do not set "IP Address", "Sub-Network Mask", or "Gateway IP Address" on the "Device on the Network" window. When communication with the RJ71PN92 is started, the contents set in the RJ71PN92 are overwritten.

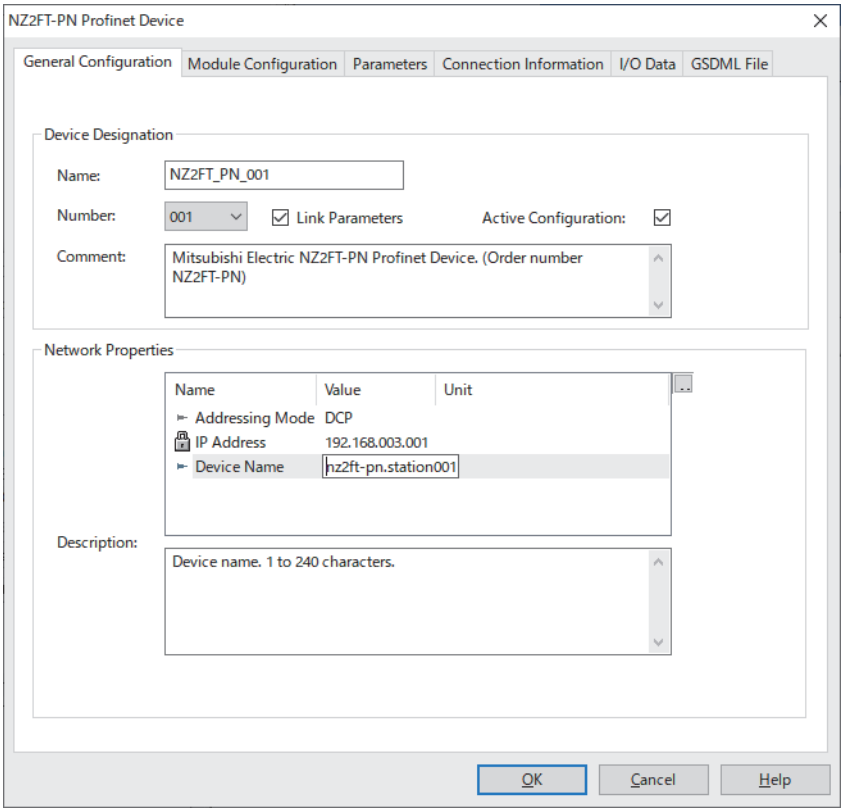
Network configuration setting

Set the NZ2FT-PN and I/O module in the "RJ71PN92" tree of the network configuration setting. (Window layout 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

■NZ2FT-PN



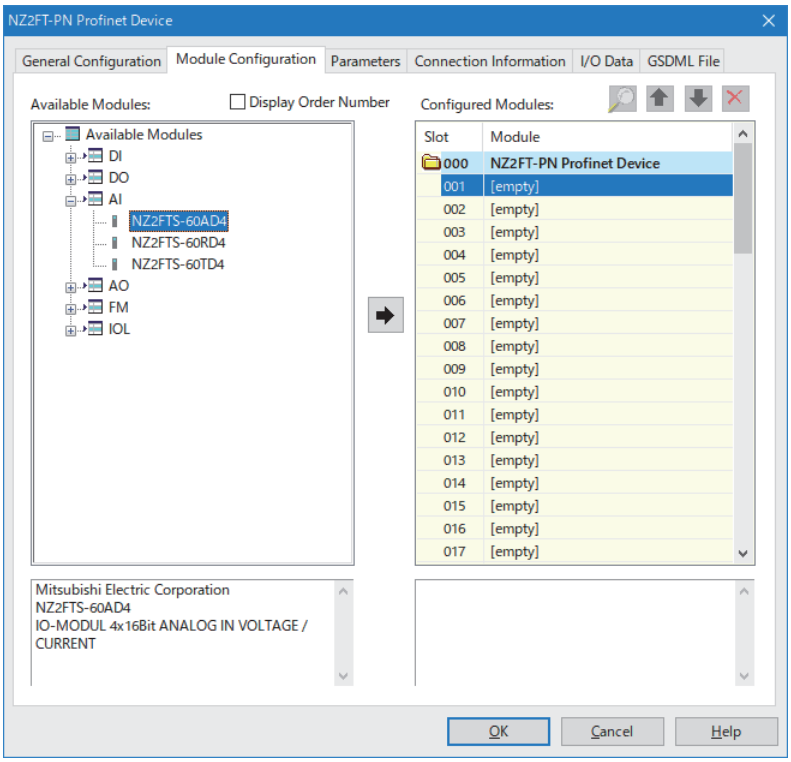
1. On the [Device Library] tab, right-click either "NZ2FT-PN Profinet Device" or "NZ2FT-PN Profinet Device with Status Word" and select "Insert in Configuration". (☞ Page 201 Device Library)
2. The "NZ2FT-PN Profinet Device" window will be displayed. Set the communication parameters of the NZ2FT-PN on the [General Configuration] tab.



Item		Description
Device Designation	Name	Set a name for each IO device to be used in GX Configurator-PN. The same name cannot be set for multiple IO devices. Use a unique string such as NZ2FT_PN_001. (Default: NZ2FT_PN)
	Number	Select the IO device ID. IO device IDs are numbers used by the RJ71PN92 to manage IO devices. They are used to distinguish IO devices by specifying the buffer memory bits. ■When checking "Link Parameters" • IO device IDs are also used in the 4th octet of the NZ2FT-PN IP address. Therefore, select the IP address in the range of "001" to "127" so that it does not overlap with the IP address of another IO device. • When "000" is selected, the 4th octet of the IP address becomes 0, error code: FDH occurs in the RJ71PN92, and communication cannot be performed. ■If "Link Parameters" is not checked Select the IP address in the range of "000" to "127" so that it does not overlap with the IP address of another IO device.
	Link Parameters	Check the check box. To set the 4th octet of the IP address in the range of 128 to 254, uncheck it.
	Active Configuration	Check the check box.
Network Properties	IP Address	If "Link Parameters" is checked, it is automatically generated. The 1st to 3rd octets are the same value as those of the RJ71PN92, and the 4th octet is the IO device ID set in "Number".
	Device Name	Since "nz2ft-pn" is displayed, change it to Device Name set in the "Name" text box on the "Devices on the Network" window. (☞ Page 202 Device Name setting) Note that this is different from "Name" of "Device Designation" above.

■I/O module

1. Open the [Module Configuration] tab on the "NZ2FT-PN Profinet Device" window.

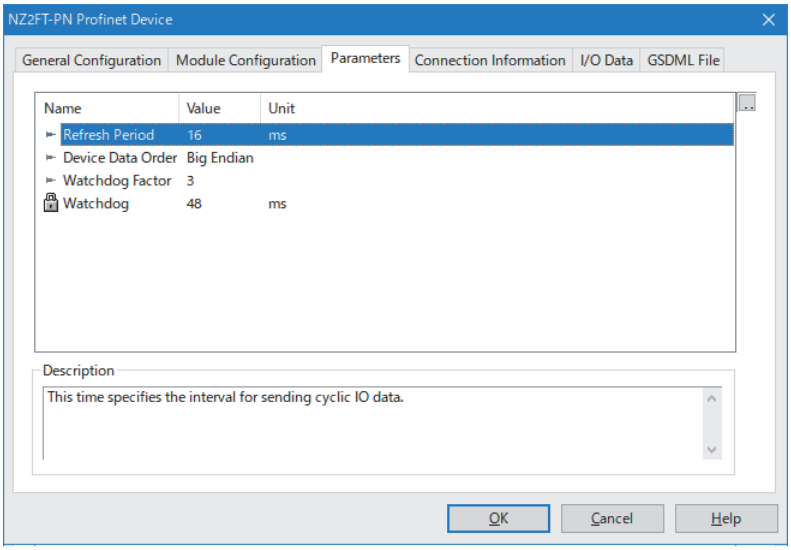


2. Select the I/O module installed in the NZ2FT-PN from "Available Modules" and click the [→] button.

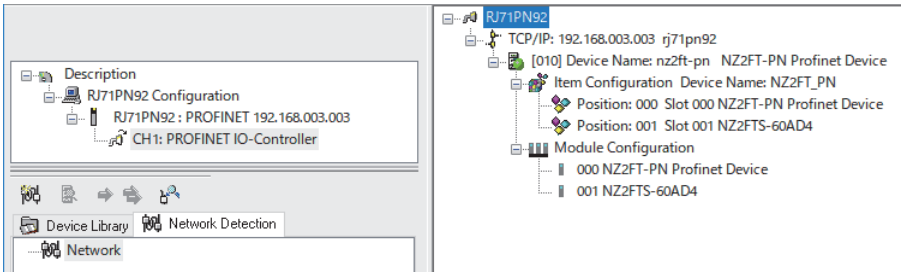
3. The selected I/O module is added to "Configured Modules". When the I/O module is deleted, the segment becomes [empty]. Move the segment to the top.

■RJ71PN92

1. In the [Parameters] tab of the "NZ2FT-PN Profinet Device" window, set "Refresh Period", "Device Data Order", and "Watchdog Factor".



2. Click the [OK] button to register the NZ2FT-PN and I/O module in "Module Configuration" in the "RJ71PN92" tree of the network configuration setting.



3. Select "Save" from the "File" menu to save the network configuration setting.

Slave parameter setting

Set the parameters of the NZ2FT-PN and I/O module in the RJ71PN92.

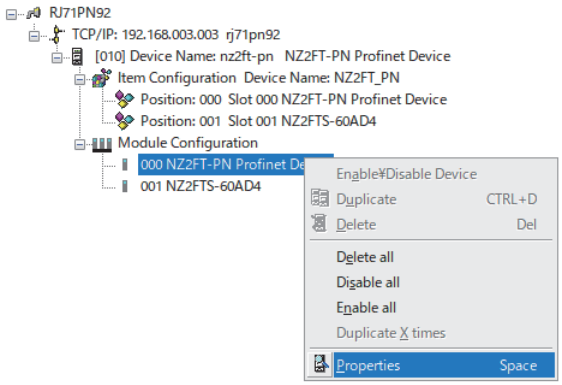
After setting, when the RJ71PN92 and NZ2FT-PN start I/O data communication, the parameters are reflected in the NZ2FT-PN and I/O module.

■NZ2FT-PN

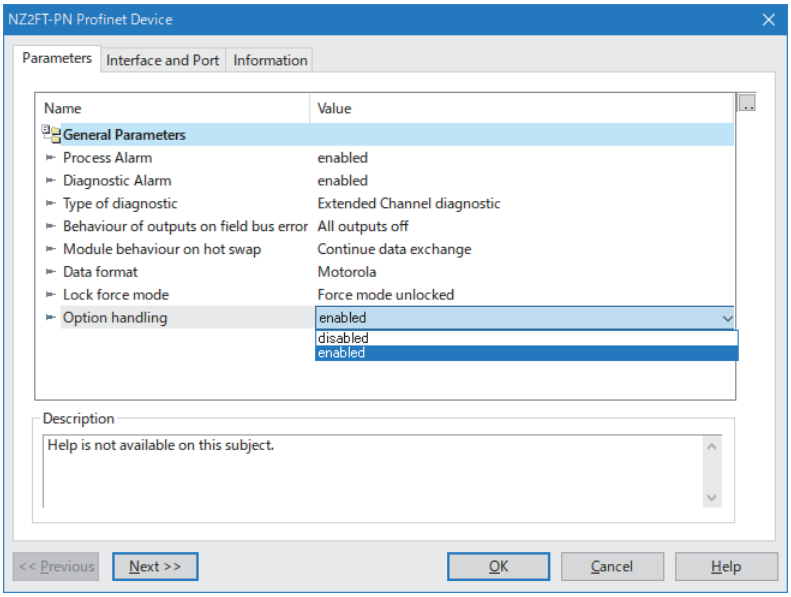
1. Set the parameters of the NZ2FT-PN with the software package of the RJ71PN92.

Parameter item	Software package	Setting location	Reference
IP address	GX Configurator-PN	"NZ2FT-PN Profinet Device" window	Page 203 Network configuration setting
Subnet mask	GX Works3	"Own Node Setting" window	Basic setting (MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))
Default gateway	GX Works3	"Own Node Setting" window	Basic setting (MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

2. In "Module Configuration" in the "RJ71PN92" tree of the network configuration setting, right-click "000 NZ2FT-PN Profinet Device" and select "Properties".

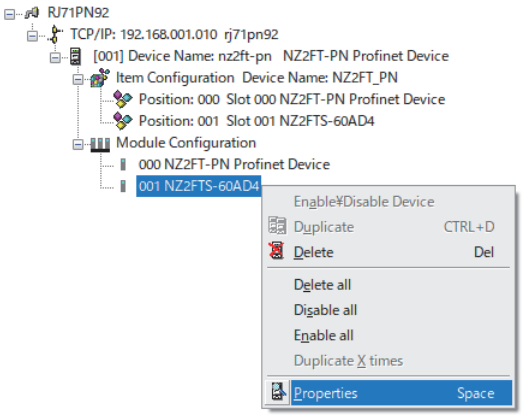


3. The "NZ2FT-PN Profinet Device" window opens. Select the parameter to be set from the [Parameters] tab and click the [OK] button.

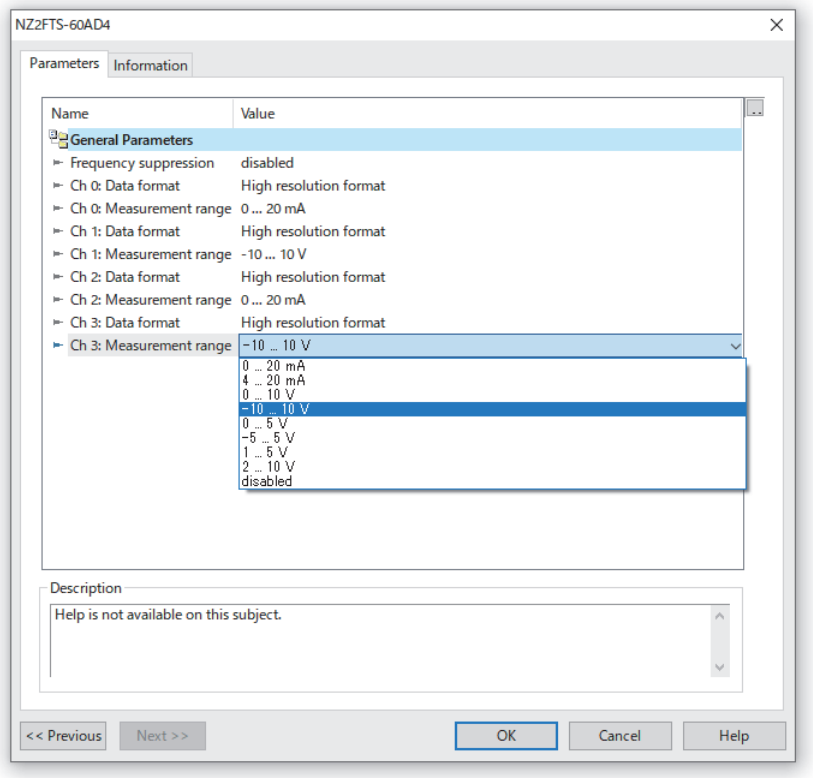


■I/O module

1. In "Module Configuration" in the "RJ71PN92" tree of the network configuration setting, right-click "000 NZ2FT-PN Profinet Device" and select "Properties".



2. The "NZ2FT-PN Profinet Device" window opens. Select the parameter to be set from the [Parameters] tab and click the [OK] button.



Saving and writing

1. Select "Save" from the "File" menu to save the parameter settings of the NZ2FT-PN and I/O module.

2. In GX Works3, check the "PROFINET unit setting" check box and write the parameters to the CPU module and RJ71PN92.

[Online] ⇨ [Write to PLC]

3. The settings are reflected when the CPU module is reset or turned off and on.

Parameter list

The following shows the parameters that can be set for the NZ2FT-PN.

Web server

The following are parameters to be set on the Web server. (☞ Page 74 Parameter setting)
Parameters other than the following are set by GX Configurator-PN of the RJ71PN92, so do not set them by the Web server.

Item	Description	Setting range	Default
Webserver via Ethernet	Set whether to enable or disable the access to the Web server via the Ethernet port. The NZ2FT-PN must be reset after the setting.	• Disabled • Enabled	Enabled
HTTPS setting	Set this parameter when encrypting the communications with the Web server. (☞ Page 67 HTTPS setting) • HTTP & HTTPS concurrent operation: HTTP and HTTPS communications are possible. • only HTTPS; no HTTP: Only HTTPS communications are possible.	• HTTP & HTTPS concurrent operation • only HTTPS; no HTTP	HTTP & HTTPS concurrent operation

Configure the settings while communications are not being performed with the RJ71PN92. Use any of the following methods to stop communications.

- Turn off the CPU module and RJ71PN92. (Communication does not stop by changing RUN to STOP in the CPU module.)
- Turn off I/O data communication start request (Un\G17000.0).

GX Configurator-PN

The following parameters are set by GX Configurator-PN of the RJ71PN92.

Item	Description	Setting range	Default
Device Name	Set on the "Devices on the Network" window. (☞ Page 202 Device Name setting) A period cannot be used at the beginning or the end. A period cannot be used consecutively.	• 1 to 240 characters in total • Half-width alphanumeric characters, period, hyphen	nz2ft-pn
IP Address	Set the IP address of the NZ2FT-PN from the [General Configuration] tab of the "NZ2FT-PN Profinet Device" window. Do not set the values out of the setting range.	1.0.0.0 to 223.255.255.254	0.0.0.0
Sub-Network mask	The subnet mask of the NZ2FT-PN has the same setting value as the subnet mask of the RJ71PN92. Do not set the values out of the setting range.	128.0.0.0 to 255.255.255.248	255.255.255.0
Gateway IP Address	The gateway of the NZ2FT-PN has the same setting value as the default gateway of the RJ71PN92. Do not set the values out of the setting range.	0.0.0.1 to 223.255.255.254	0.0.0.0
IP address USB port	Set the IP address of the USB port.	• 192.168.1.202 • 192.168.2.202 • 192.168.3.202 • 192.168.4.202 • 192.168.5.202	192.168.1.202
Process Alarm	Set it to "Disabled".	• Disabled • Enabled	Disabled
Diagnostic Alarm	Set it to "Disabled".	• Disabled • Enabled	Disabled
Type of diagnostic alarm	Setting is not required.		
Output behaviour on fieldbus error	Set the output operation when a fieldbus error occurs. (☞ Page 207 Slave parameter setting) • All outputs off: All outputs are turned off. • Enable substitute value: Output is produced according to the substitute value of the output module. • Hold last value: The output status is maintained.	• All outputs off • Enable substitute value • Hold last value	All outputs off
Module behaviour on hot swap	Set the I/O module operation during Hot swap. (☞ Page 207 Slave parameter setting) • Continue data exchange: The operation of the output module is maintained. • Behaviour like on fieldbus error: The output module is operated according to the setting of "Output behaviour on fieldbus error".	• Continue data exchange • Behaviour like fieldbus error	Continue data exchange
Data format	Set the format of communication data. (☞ Page 207 Slave parameter setting) • Motorola: Big endian • Intel: Little endian	• Motorola • Intel	Motorola

Item	Description	Setting range	Default
Lock force mode	Set whether to enable or disable to switch to the Force mode. (☞ Page 207 Slave parameter setting) • Force mode unlocked: Switch to the Force mode is enabled. • Force mode locked: Switch to the Force mode is disabled.	• Force mode unlocked • Force mode locked	Force mode unlocked
Option handling	Set each I/O module to stop/operate while the system is operating. (☞ Page 207 Slave parameter setting) • Option handling available • Option handling disabled	• disabled • enabled	disabled

9.7 Access to Process Data

The I/O data of the I/O module is stored in Process data of the NZ2FT-PN and data communication is performed with the RJ71PN92.

Data configuration

For each IO device, Process data and Status word are placed in Output data and Input data.

Status word is data indicating the status of the NZ2FT-PN. (☞ Page 223 Confirmation by status information (Status word))

Item	IO device ID	Item	Data size	Description
Output data	1	Process data (Output)	Variable length (byte)	The output data of the I/O module mounted on the NZ2FT-PN whose IO device ID is 1 is stored.
	⋮			
	20 (maximum)	Process data (Output)	Variable length (byte)	The output data of the I/O module mounted on the NZ2FT-PN whose IO device ID is 20 is stored.
Input data	1	Status word	2 bytes	Data indicating the status of the NZ2FT-PN whose IO device ID is 1 is stored.
		Process data (Input)	Variable length (byte)	The input data of the I/O module mounted on the NZ2FT-PN whose IO device ID is 1 is stored.
	⋮			
	20 (maximum)	Status word	2 bytes	Data indicating the status of the NZ2FT-PN whose IO device ID is 20 is stored.
		Process data (Input)	Variable length (byte)	The output data of the I/O module mounted on the NZ2FT-PN whose IO device ID is 20 is stored.

Output data

- In Process data (Output) of each I/O device ID, Process data of each I/O module is arranged in order of mounting position proximity to the NZ2FT-PN and with no clearance.
- The size of Process data (Output) depends on the type and number of I/O modules. (☞ Page 212 Data width used by the I/O module)

Input data

- Whether to add Status word to Input data is set in advance with GX Configurator-PN. (☞ Page 201 Device Library)
- In Input data of each I/O device ID, Status word is placed at the start followed by Process data (Input) of each I/O module, in order of mounting position proximity to the NZ2FT-PN and with no clearance.
- The size of Process data (Input) depends on the type and number of I/O modules. (☞ Page 212 Data width used by the I/O module)

Point

- Process data can be checked from the Web server. (☞ Page 72 "Process data")
- The communication data format can be changed to little-endian or big-endian by setting the parameter. (☞ Page 209 Parameter list)

Data width used by the I/O module

The following table shows the data width used by each I/O module in the NZ2FT-PN during I/O data communication (constant periodic communications).

I/O module	Process data		Reference
	Input	Output	
NZ2FTS4-4DE	16 bits	—	Page 420 Process data
NZ2FTS3-8DE	16 bits	—	Page 425 Process data
NZ2FTS1-16DE	16 bits	—	Page 429 Process data
NZ2FTS4-4D	16 bits	—	Page 433 Process data
NZ2FTS3-8D	16 bits	—	Page 437 Process data
NZ2FTS1-16D	16 bits	—	Page 440 Process data
NZ2FTS2-4A	16 bits	—	Page 444 Process data
NZ2FTS4-4TE	—	16 bits	Page 449 Process data
NZ2FTS2-8TE	—	16 bits	Page 453 Process data
NZ2FTS1-16TE	—	16 bits	Page 457 Process data
NZ2FTS4-4T	—	16 bits	Page 461 Process data
NZ2FTS2-8T	—	16 bits	Page 465 Process data
NZ2FTS1-16T	—	16 bits	Page 469 Process data
NZ2FTS3-4R	—	16 bits	Page 473 Process data
NZ2FTS-60AD4	4 words	—	Page 484 Process data
NZ2FTS-60DA4	—	4 words	Page 496 Process data
NZ2FTS-60RD4	4 words	—	Page 506 Process data
NZ2FTS-60TD4	4 words	—	Page 518 Process data
NZ2FTS-D62P2	6 words	6 words	Page 545 Process data
NZ2FTS-D66D1	3 words	—	Page 556 Process data
NZ2FT-C24	8 words	8 words	Page 575 Process data

Assignment of the RJ71PN92 to the buffer memory

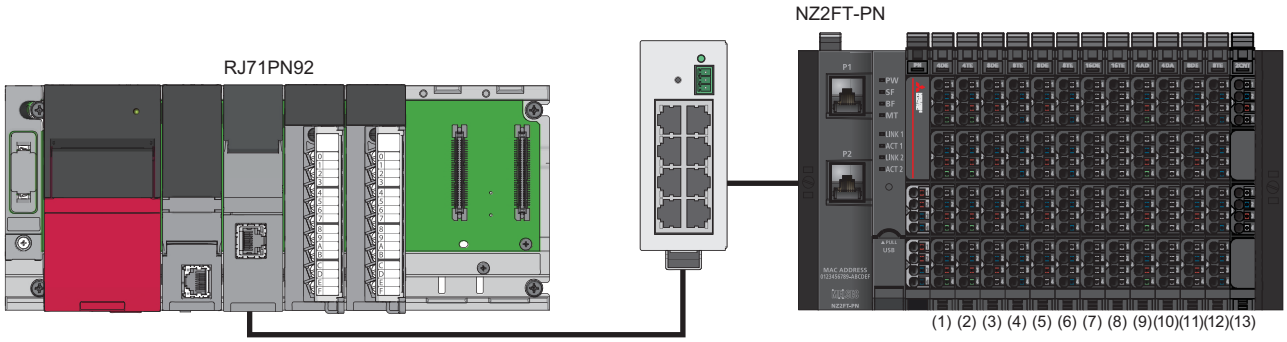
Output data and Input data of the NZ2FT-PN are stored in the following buffer memory of the RJ71PN92 by I/O data communication. (Buffer memory 📖 MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application))

Item	Buffer memory address	Description
I/O data communication output data area	Un\G31000 to Un\G35095	This area stores Output data to be sent to each IO device.
I/O data communication input data area	Un\G36000 to Un\G40095	This area stores Input data received from each IO device.

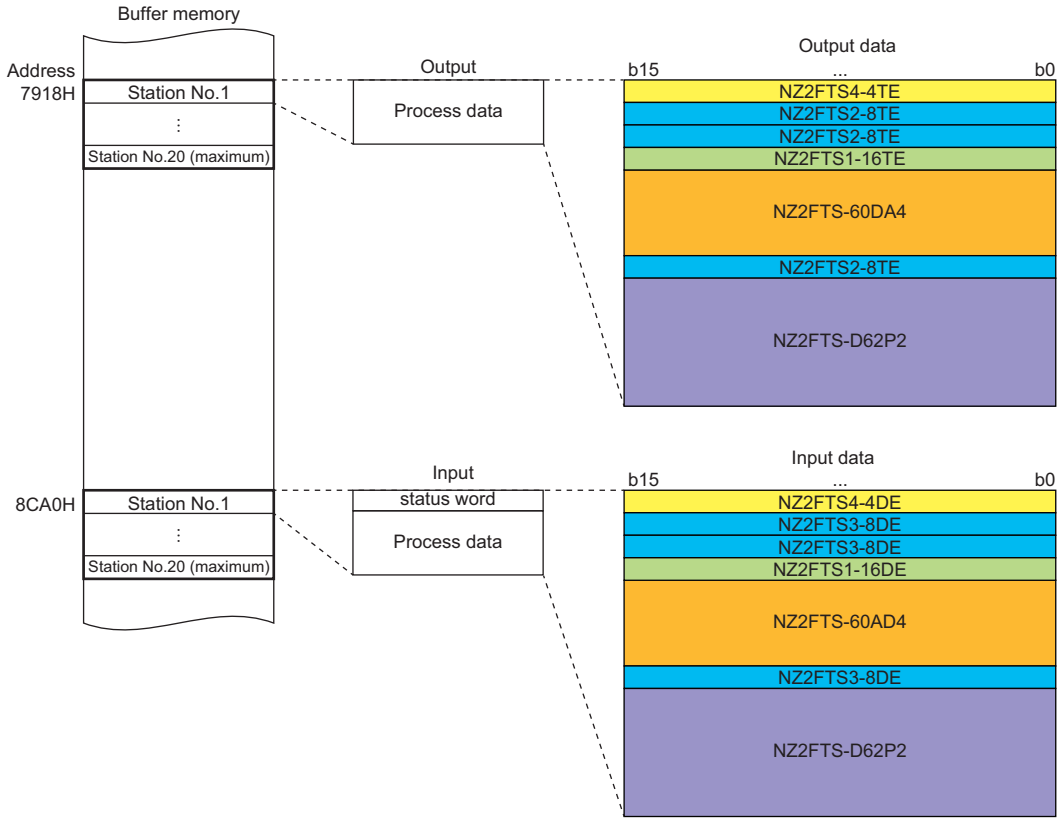
In the buffer memory of the RJ71PN92, Process data is assigned to each IO device in the order of IO device ID.
Since the size of Process data of each IO device differs depending on the type and number of I/O modules, the start address of Process data with IO device ID 2 or later is not fixed.

Ex.

The following system configuration describes the assignment of the RJ71PN92 to the buffer memory and the data structure of Process data of the NZ2FT-PN.



(1) NZ2FTS4-4DE
(2) NZ2FTS4-4TE
(3) NZ2FTS3-8DE
(4) NZ2FTS2-8TE
(5) NZ2FTS3-8DE
(6) NZ2FTS2-8TE
(7) NZ2FTS1-16DE
(8) NZ2FTS1-16TE
(9) NZ2FTS-60AD4
(10) NZ2FTS-60DA4
(11) NZ2FTS3-8DE
(12) NZ2FTS2-8TE
(13) NZ2FTS-D62P2



9.8 Program Example

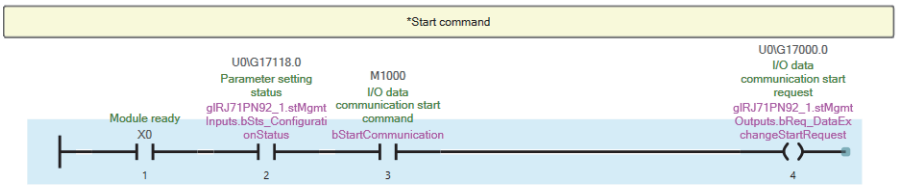
Precautions for programming

In PROFINET transmission programs, interlock is provided in a communication program with the following device.

- I/O data communication function start command (M1000)
- Service interface execution signal (M2000)

Ex.

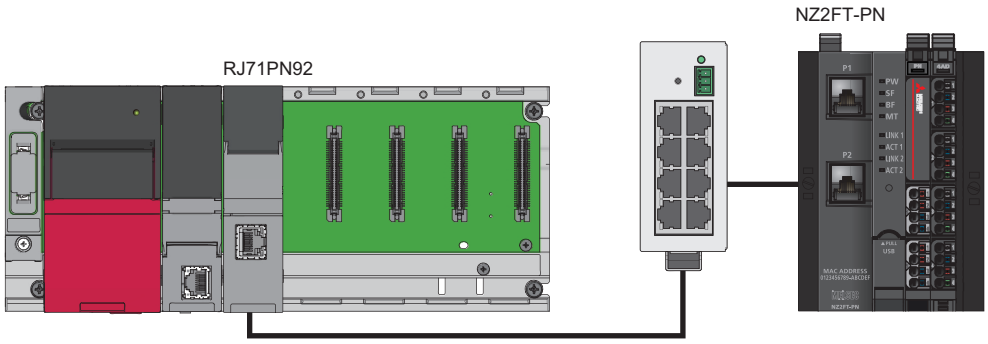
When the I/O data communication function start command (M1000) of the NZ2FT-PN turns on, I/O data communication is executed.



Example using the NZ2FTS-60AD4

The following example is for a program to read AI values that are obtained from A/D conversion performed on AI 0 (Channel 0) to AI 3 (Channel 3) of the analog input module.

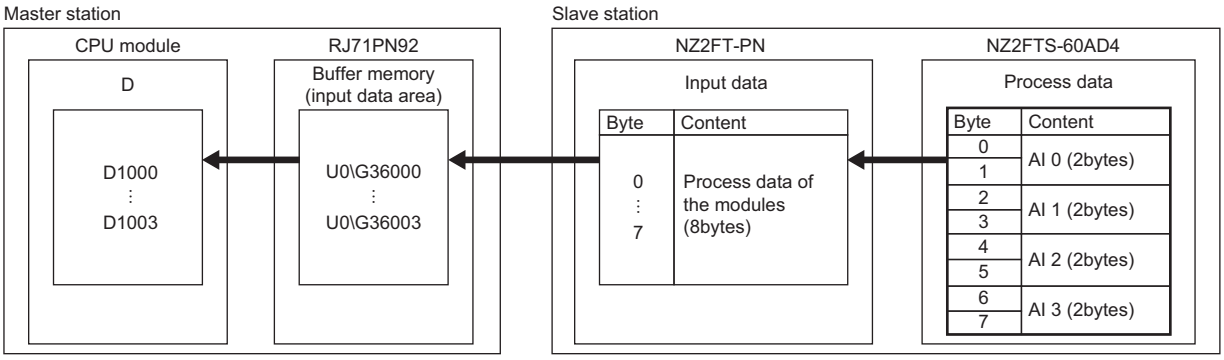
System configuration



Item		Model
RJ71PN92 (IP address: 192.168.1.10)	CPU module	R04CPU
	Power supply module	R61P
	PROFINET IO controller module	RJ71PN92
NZ2FT-PN (IO device ID: 1, IP address: 192.168.001.200)	PROFINET compatible coupler	NZ2FT-PN
	4ch analog input module	NZ2FTS-60AD4

Device assignment

The following figure shows the device allocation for I/O data communication. (☞ Page 212 Data width used by the I/O module)



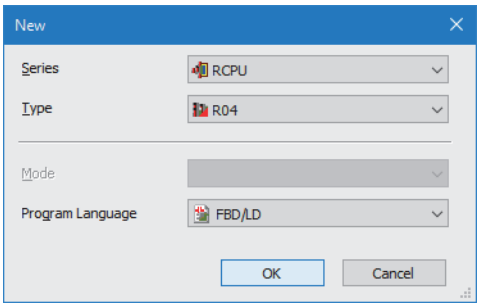
GX Works3 setting

The parameters of the RJ71PN92 (other than communication parameters) are set in GX Works3.

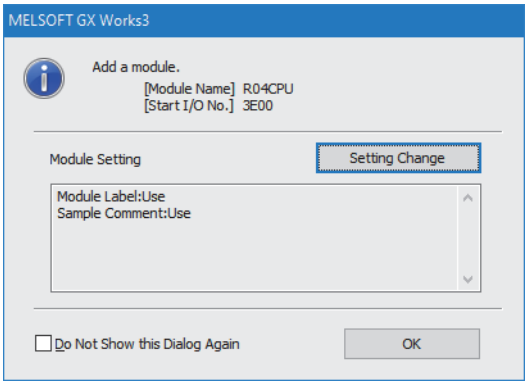
Connect the engineering tool to the CPU module of the RJ71PN92 and start GX Works3.

1. Set the CPU module as follows.

[Project] ⇨ [New]

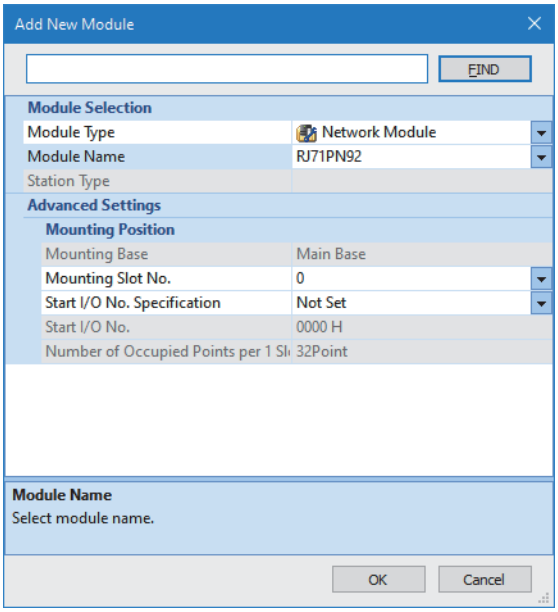


2. Click the [Setting Change] button and set to use the module label.



3. Set the RJ71PN92 as follows.

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



4. Set the items in "Basic Setting" as follows.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71PN92] ⇨ [Module Parameter] ⇨ [Basic Setting]

Item	
Various Operations Settings	
Mode Settings	Online
Own Node Setting	Set the information of the own node such as IP address.
IP Address Setting	Set the IP address, subnet mask, and default gateway for the own node.
IP Address	192.168.1.10
Subnet Mask	255.255.255.0
Default Gateway	
Controller Name	Set the Controller Name.
Name	rj71pn92

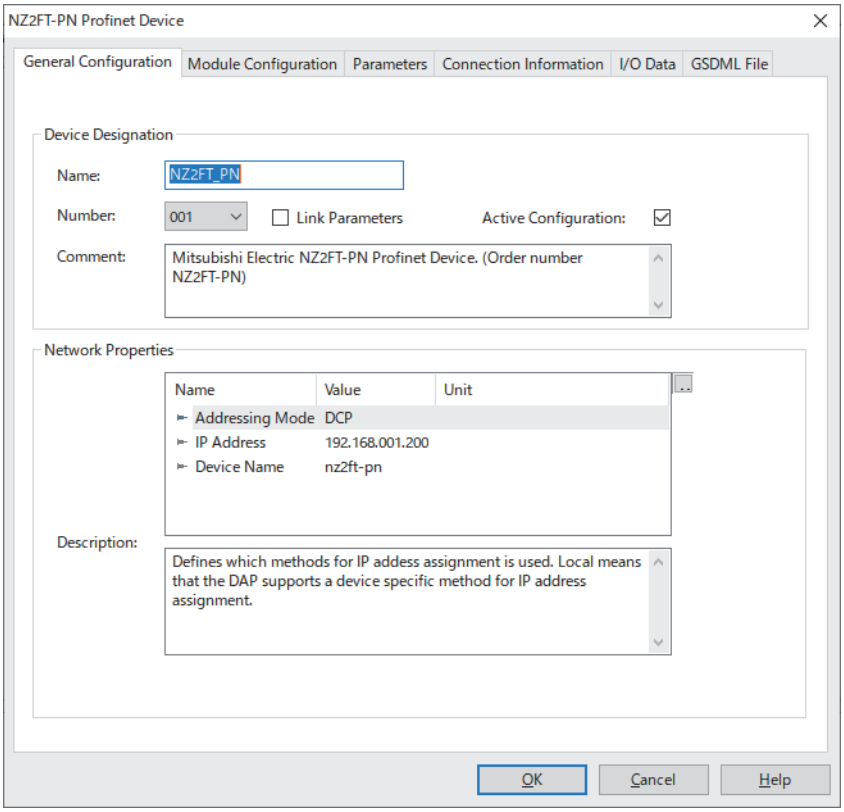
GX Configurator-PN setting

The parameters of the NZ2FT-PN and NZ2FTS-60AD4 are set with GX Configurator-PN of the master station. (☞ Page 200 GX Configurator-PN setting procedure)

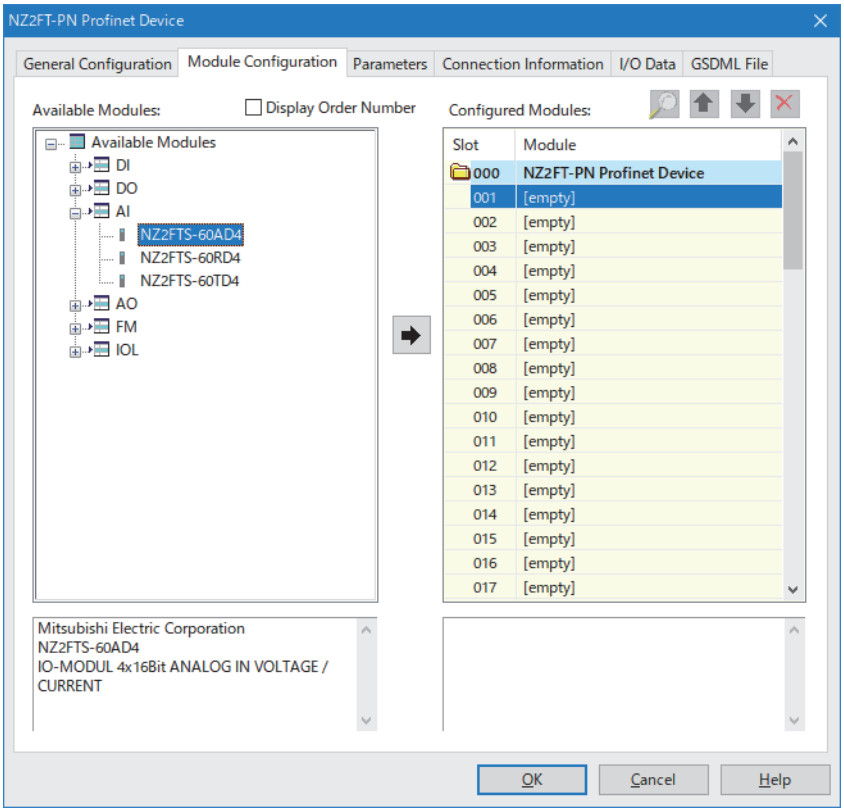
1. Start GX Configurator-PN from GX Works3.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71PN92] ⇨ [PROFINET Module Setting]

2. Set Device Name of the RJ71PN92 to "nz2ft-pn". (☞ Page 202 Device Name setting)
3. On the [Device Library] tab, right-click "NZ2FT-PN Profinet Device" and select "Insert in Configuration". (☞ Page 203 Network configuration setting)
4. On the [General Configuration] tab of the "NZ2FT-PN Profinet Device" window, uncheck "Link Parameters" and set "IP Address" as shown below.



5. On the [Module Configuration] tab of the "NZ2FT-PN Profinet Device" window, select the I/O module from "Available Modules" and click the [→] button.



6. Set the parameters of the NZ2FTS-60AD4 as follows. (☞ Page 207 Slave parameter setting)

Parameter	Setting value			
	AI 0 (Channel 0)	AI 1 (Channel 1)	AI 2 (Channel 2)	AI 3 (Channel 3)
Frequency suppression	Disabled			
Data format	High resolution format			
Measurement range	0...20mA	-10...10V	0...20mA	-10...10V

7. Write the set parameters to the CPU module and the RJ71PN92, and reset or power off and on the CPU module.

[Online] ⇨ [Write to PLC]

Point

In the program example, default values are used for parameters other than those shown above.
For the parameters of the RJ71PN92 other than those shown above, refer to the following.
MELSEC iQ-R PROFINET IO Controller Module User's Manual (Application)

Program example

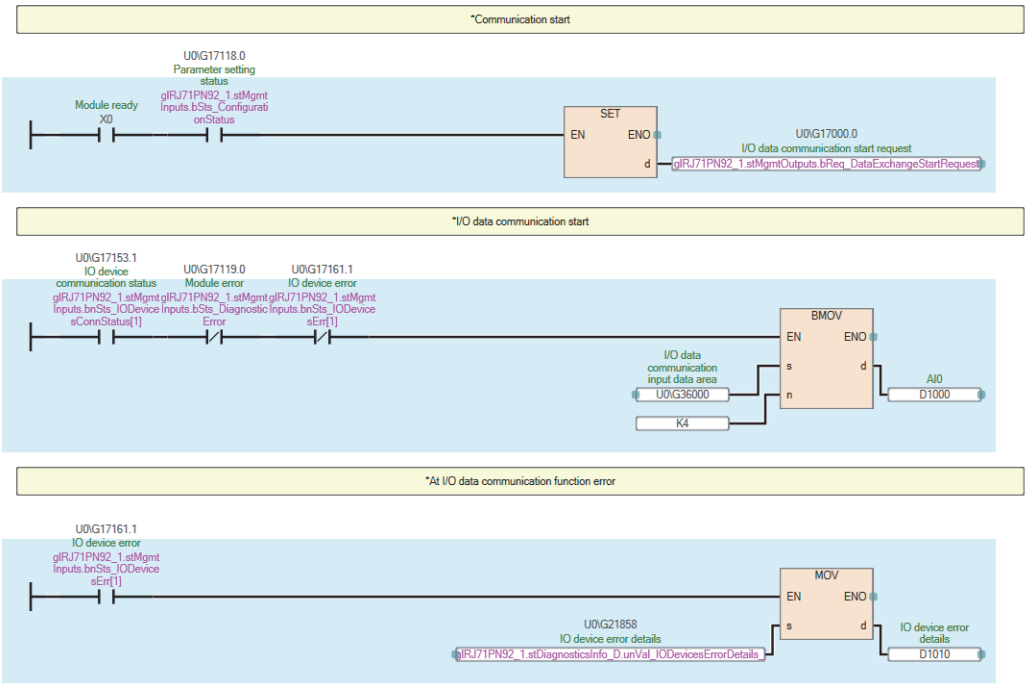
■Device/label to be used

Device	Description	
X0	Module Ready	
U0\G17000.0	I/O data communication start request	
U0\G17118.0	Parameter setting status	
U0\G17119.0	Module error	
U0\G17153.1	IO device communication status	
U0\G17161.1	IO device error	
D1000	I/O data communication	AI0
D1001		AI1
D1002		AI2
D1003		AI3
D1010		IO device error details

■Program example of I/O data communication function

Changing the CPU module status STOP to RUN executes I/O data communication.

The values of AI 0 to AI 3 of the NZ2FTS-60AD4 are stored in D1000 to D1003.



9.9 Troubleshooting

This section describes troubleshooting of the NZ2FT-PN.

Point

If troubleshooting does not solve the problem, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Checking with LEDs

The status of the NZ2FT-PN is displayed in LED. (☞ Page 169 Part Names)

When the PW LED turns off

Check the following items in order from the top.

Item	Action
Is the module status LED of the I/O module on in green?	Repair or replace the NZ2FT-PN. The possible cause is an internal fuse failure.
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 of the external power supply within the range of performance specifications.

When the SF LED turns on in red

Check the following items in order from the top.

Item	Action
Is the latest GSDML file in use?	Update to the latest GSDML file (NZ2FT-PN profile).
Are the station settings matched with the actual settings?	Match the station settings with the actual settings.
Is the I/O module that is set to stop in Option handling installed?	Disconnect the electronic unit part of the I/O module set to stop in Option handling. (☞ Page 174 Option handling)
Is the information (Dataset) of the I/O module set to stop/operate in Option handling written?	Write the information (Dataset) of the I/O module set to stop/operate in Option handling.
Is the information of the I/O module set to stop/operate in Option handling deleted by initializing the NZ2FT-PN?	Set the parameter "Option handling" to "Enabled" and write the information of the I/O module set to stop/operate to the NZ2FT-PN.
Is the electronic unit part detached?	Insert the electronic unit part. Or, write the information of the I/O module set to stop/operate to the NZ2FT-PN.
Are the NZ2FT-PN and I/O module connected with no clearance between them?	Connect the NZ2FT-PN and the I/O module with no clearance between them.

When the SF LED is flashing in red

Check the following item.

Item	Action
Has the Force mode been selected?	The NZ2FT-PN is in Force mode. Clear the Force mode.

When the BF LED turns on in red

Check the following items in order from the top.

Item	Action
Is the Ethernet cable between the RJ71PN92, hub, and NZ2FT-PN inserted as far as it will go?	Push in the Ethernet cable of each connection section until it clicks.
Has the Ethernet cable been disconnected?	Replace the Ethernet cable.
Are there any mistakes in the parameter settings of the RJ71PN92 and NZ2FT-PN?	Review the IP address setting of the RJ71PN92 and the following of the NZ2FT-PN. • Parameter "IP address" • Parameter "Subnet mask" • Parameter "Gateway"
Are the IO device names correct?	Check if the name of the IO device in the PROFINET module settings matches the name of the actual IO device. Use GX Configurator-PN to match the following contents. • "Name" on the "Devices on the Network" window • "Device Name" on the [General Configuration] tab of the "NZ2FT-PN Profinet Device" window
Is the firmware version appropriate?	Check the firmware version of the RJ71PN92 and NZ2FT-PN. Update the firmware if necessary.
Is the I/O data communication start request of the RJ71PN92 operating?	Check the I/O data communication start request.
Has an error occurred in the RJ71PN92?	Follow the manual of the RJ71PN92 and perform troubleshooting.

When the BF LED is flashing in red

Check the following items in order from the top.

Item	Action
Is the latest GSDML file in use?	Update to the latest GSDML file (NZ2FT-PN profile).
Are the station settings matched with the actual settings?	Match the station settings with the actual settings.
Is the I/O module that is set to stop in Option handling installed?	Disconnect the electronic unit part of the I/O module set to stop in Option handling. (☞ Page 174 Option handling)
Is the information of the I/O module set to stop/operate in Option handling deleted by initializing the NZ2FT-PN?	Set the parameter "Option handling" to "Enabled" and write the information of the I/O module set to stop/operate to the NZ2FT-PN.
Is the electronic unit part detached?	Insert the electronic unit part. Or, write the information of the I/O module set to stop/operate to the NZ2FT-PN.
Are the NZ2FT-PN and I/O module connected with no clearance between them?	Connect the NZ2FT-PN and the I/O module with no clearance between them.
Is a firmware update in progress?	Wait for the firmware update to end.

When the MT LED turns on in yellow

Check the following item.

Item	Action
Is the I/O module mounted?	Mount the I/O module again by pressing it to the NZ2FT-PN until it clicks.

When the LINK1 LED and LINK2 LED turn off

Check the following items in order from the top.

Item	Action
Is the Ethernet cable between the RJ71PN92, hub, and NZ2FT-PN inserted as far as it will go? (Between the RJ71PN92 and NZ2FT-PN if the hub is not used)	Push in the Ethernet cable of each connection section until it clicks.
Has the Ethernet cable been disconnected?	Replace the Ethernet cable.
Is the power of the connection destination (RJ71PN92 and hub) turned off?	Turn on the power of the connection destination (RJ71PN92 and hub).
Is there any noise affecting the system?	• Install a noise filter between the external power supply and the NZ2FT-PN. • Attach a ferrite core to the Ethernet cable.

When the following LEDs turn on in red

- Power supply LED
- Input power supply LED 3.2
- Output power supply LED 4.2
- Input power supply internal protection circuit LED 3.4
- Output power supply internal protection circuit LED 4.4

Check the following item.

Item	Action
Is the voltage of the external power supply (24VDC) within the specified range?	The power supply voltage is less than 18VDC. Set the voltage value within the range of performance specifications. If the problem persists, the possible cause is an internal fuse failure. Replace the NZ2FT-PN.

Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

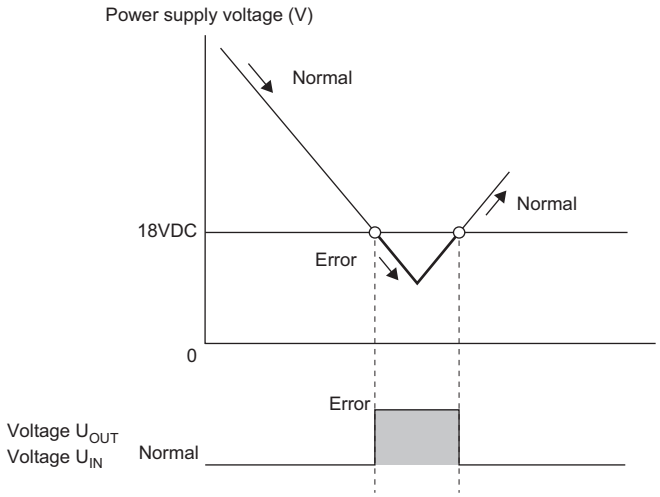
Confirmation by status information (Status word)

Check the Status word indicating the status of the NZ2FT-PN with the RJ71PN92 or Web server. (☞ Page 211 Input data)

Data configuration

The Status word is added to the start of Input data of each IO device by the GX Configurator-PN setting. (☞ Page 201 Device Library)

Bit	Item	Description
0	Error bit 0	System area
1 to 2	System area	
3	Systembus error	Indicates the System bus status. 0: Normal 1: Error
4	Port 1 Link active	0: P1 link-down state 1: P1 link-up status
5	Port 2 Link active	0: P2 link-down state 1: P2 link-up status
6	I/O-Configuration error	Displays the NZ2FT-PN configuration error. 0: Normal 1: Abnormal (There is a difference between the configuration information saved in the NZ2FT-PN and the current configuration information.) During I/O module replacement, this bit is set to 1 when the module is disconnected and is set to 0 when a new module is mounted.
7	Master configuration error	Displays a configuration error. 0: Normal 1: Abnormal (one of the following states) • At the start of exchange, the pieces of I/O module configuration information in the actual I/O module configuration is less than or does not match those held by the RJ71PN92. (The value remains at 0 if the pieces of I/O module configuration information in the actual I/O module configuration is higher even after those held by the RJ71PN92 is included.) • During operation, two pieces or more of I/O module configuration information were lacking in the actual I/O module configuration compared to those held by the RJ71PN92. Since the NZ2FT-PN does not support safety standards, mounting an I/O module that supports safety standards will cause an error.
8	MRP enabled	Not used (fixed to 1)
9	MRP role	Not used (fixed to 0)
10	Force mode active	0: Unexecuted 1: Force mode implemented
11 to 12	System area	
13	Voltage U_{OUT} error	Displays an error detected for the external power supply voltage for output/input. 0: Normal 1: Abnormal (Power supply voltage is less than 18VDC.)
14	Voltage U_{IN} error	
15	Error bit 15	System area



How to check Status word

■GX Works3

Check Un\G36000 of "Status word" on the monitor. (☞ Page 212 Assignment of the RJ71PN92 to the buffer memory)

■Web server

It is displayed in decimal in "Coupler status" of "General information" of the NZ2FT-PN. (☞ Page 71 "Component view")

Troubleshooting by symptom

Cannot communicate with the RJ71PN92

Check the following items.

Item	Action
Are the LINK1 LED and LINK2 LED of the NZ2FT-PN on?	If it is not turned on, perform troubleshooting. Also, check other LEDs. (☞ Page 221 When the LINK1 LED and LINK2 LED turn off)
Is the BF LED on the NZ2FT-PN off?	If it is not turned off, perform troubleshooting. Also, check other LEDs. (☞ Page 221 When the BF LED turns on in red, Page 221 When the BF LED is flashing in red)
Is the voltage of the power supply (24VDC) of the NZ2FT-PN within the specified range?	Set the voltage value within the range of performance specifications.
Is the wiring between the RJ71PN92 and NZ2FT-PN appropriate?	Review the wiring between the RJ71PN92 and NZ2FT-PN. (☞ Page 46 Wiring of network cable)
Are the parameters correct?	Check the parameters. (☞ Page 200 Parameter Setting)
Are the IP address and subnet mask set correctly?	Review the IP address and subnet mask settings. If the settings have been changed, turn off and on the NZ2FT-PN.

GX Configurator-PN cannot detect the RJ71PN92

Check the following items.

Item	Action
Is the personal computer on which GX Configurator-PN is installed, RJ71PN92, and the target NZ2FT-PN wired with an Ethernet cable?	Wire the personal computer on which GX Configurator-PN is installed, RJ71PN92, and the target NZ2FT-PN with an Ethernet cable.
Is the IP address segment of the personal computer on which GX Configurator-PN is installed and the RJ71PN92 different?	Have it so that the IP address of the personal computer on which GX Configurator-PN is installed and the RJ71PN92 are in the same segment.
From the "Task Manager" window of Windows, under the [Services] tab, is the status for "m2mLauncher" "Running"?	From the "Task Manager" window in Windows, under the [Services] tab, right-click "m2mLauncher" and select "Start".
Is communication blocked by the firewall of the personal computer?	Check if the firewall settings of your personal computer are correct. Example: Windows Defender m2mDriverLauncher

If communication is not established with the RJ71PN92 even after checking all of the above and checking with the LEDs of the I/O module and Web server, there is a risk of hardware failure in the NZ2FT-PN.

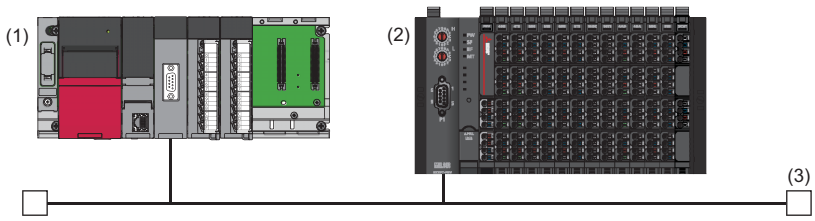
Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

10 NZ2FT-PBV

This chapter describes the details of the PROFIBUS-DP compatible coupler.

10.1 PROFIBUS-DP configuration

PROFIBUS-DP consists of a DP-Master (1), DP-Slave (2), and terminating resistor (3).
The NZ2FT system using the NZ2FT-PBV operates as a DP-Slave.



Corresponding master module and software package

The master module corresponding to the NZ2FT-PBV and the software package corresponding to each master module are shown.
For how to check the version, refer to the manual for each master module and software package.

Master module			Software package	
Name	Model	Version	Product name	Version
PROFIBUS-DP module	RJ71PB91V	Firmware version "03" or later	GX Works3	1.045X or later
			PROFIBUS Configuration Tool	1.00A or later
PROFIBUS-DP master module	QJ71PB92V	The serial number (first five digits) of 17112 or later	GX Works2	1.568S or later
			GX Configurator-DP	7.12N or later

Point

In this manual, the RJ71PB91V is mainly explained as the master module, but it can be replaced with the QJ71PB92V. However, the dedicated instructions are different.

GSD file

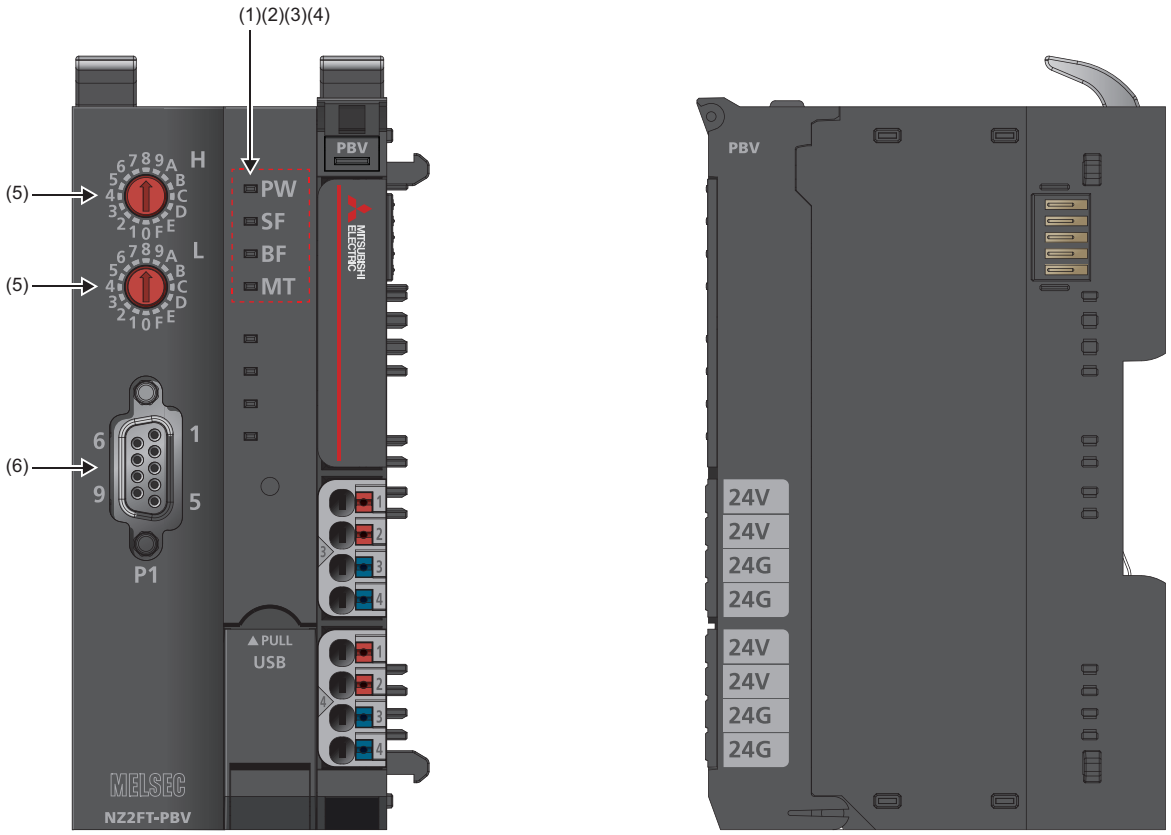
The GSD file for setting the NZ2FT-PBV and I/O modules must be registered in the software package.

- The GSD file is included with the PROFIBUS Configuration Tool.
- For information on how to obtain the GSD file to be registered in GX Configurator-DP, contact your local Mitsubishi representative.

Registration destination software package	Profiles		
	Name	Release file name	Version
GX Configurator-DP	GSD file (PROFIBUS profile)	NZFT10FB.gsd.zip	1.00 or later

10.2 Part Names

This section describes the LEDs of the NZ2FT-PBV. (☞ Page 94 Coupler Common Part Names)



No.	Name	Description
(1)	PW LED	Indicates the status of the module power supply. On in green: Power-on Off: Power-off
(2)	SF LED	Indicates the module status. On in red: Error (☞ Page 253 When the SF LED turns on in red) Flashing in red: Force mode Off: No error
(3)	BF LED	Indicates a communication error. On in red: Fieldbus error (☞ Page 254 NZ2FTS-60RD4) Flashing in red: Error (☞ Page 254 NZ2FTS-60RD4) Off: No error
(4)	MT LED	Shows the status of the NZ2FT-PBV and I/O modules. On in yellow: Error (☞ Page 254 NZ2FTS-60RD4) Off: No error
(5)	Rotary switch	Sets the FDL address of the PROFIBUS-DP. (☞ Page 228 Rotary switch)
(6)	PROFIBUS interface	Connect the PROFIBUS cable. (☞ Page 42 Wiring products for NZ2FT-PBV)

Rotary switch

Use the rotary switch to set the FDL address of the NZ2FT-PBV. When setting the FDL address, turn off the NZ2FT-PBV. Rotary switch H indicates the 16s place in 2-digit hexadecimal, and rotary switch L indicates the 1s place in 2-digit hexadecimal.

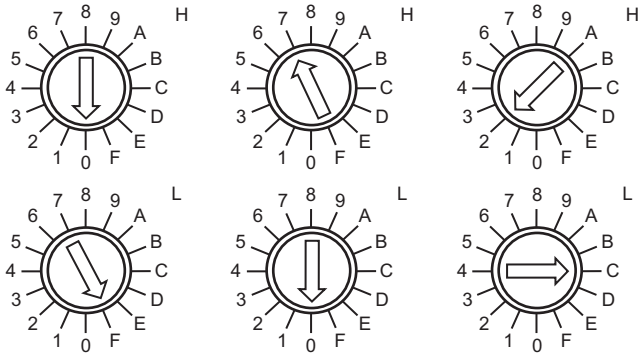
Set the FDL address to 1 to 125. It cannot be set to 0 or 126 or more.

Ex.

FDL address 15: H = 0, L = F

FDL address 122: H = 7, L = 0

FDL address 44: H = 2, L = C



15 112 44

Precautions

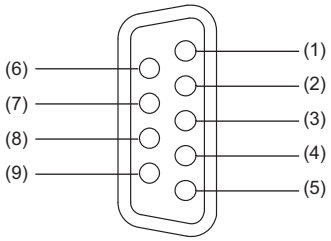
- Depending on the status of the FDL address, the LED of the NZ2FT-PBV will be as follows.

FDL address status	PW LED	SF LED	BF LED	MT LED
It is normal.	On in green	Off	Off	Off
Data link cannot be performed because the FDL address of the DP-Slave set in the software package of the master module does not match.	On in green	On in red	Flashing in red	Off
Data link cannot be performed because the FDL address is out of the setting range (0 or 126 or more).	On in green	On in red	Flashing in red	Off
The LED indication when the rotary switch is changed during operation. Data link continues with the FDL address before the change, and when the rotary switch is returned to the correct FDL address, the LED indication before the change is restored.	On in green	On in red	On in red	Off
There are DP-Slaves with the same FDL address, and the input data is the same. The NZ2FT-PBV does not detect duplicate FDL addresses.	On in green	Off	Off	Off
Since there are DP-Slaves with the same FDL address and the input data is different, an error occurs and recovery is repeated.	On in green	Off	Flashing irregularly in red	Off

- When an FDL address is set to 0 or 126 or more, the FDL address 8 is displayed on the Web server window but communication cannot be performed.

PROFIBUS interface

Use a PROFIBUS compatible cable. (☞ Page 42 Wiring products for NZ2FT-PBV)

Pin layout	No.	Name	Application
	(1)	SHIELD	Shield, protection ground
	(2)	—	—
	(3)	Data B	Receive/send data-P
	(4)	—	—
	(5)	DGND	Data ground
	(6)	VP +5V	Voltage+
	(7)	—	—
	(8)	Data A	Receive/send data-N
	(9)	—	—

10.3 Performance Specifications

This section describes the performance specifications of the NZ2FT-PBV. (☞ Page 30 General Specifications)

Item		Specifications
Connection		D-Sub9 pin connector
Network		PROFIBUS-DP V0, PROFIBUS DP-V1
Number of connectable stations per DP-Master		20 stations maximum
Input data width		244 bytes maximum
Output data width		
Parameter data		
Number of connectable I/O modules (excluding extension power supply modules)		64 modules maximum
Setting interface		Micro USB 2.0
Communication speed	Fieldbus	12Mbps maximum
Transfer rate	System bus	48Mbps maximum
External power supply voltage	Input power supply	24VDC +20%/-15%
	Output power supply	24VDC +20%/-15%
Power supply rated current	Input power supply	10A
	Output power supply	10A
Module current consumption		85mA
Power cable connection method		Spring clamp terminal block
Applicable wire size		Solid wire, stranded wire 0.14 to 1.5mm² (26 to 16 AWG)
Weight		242g

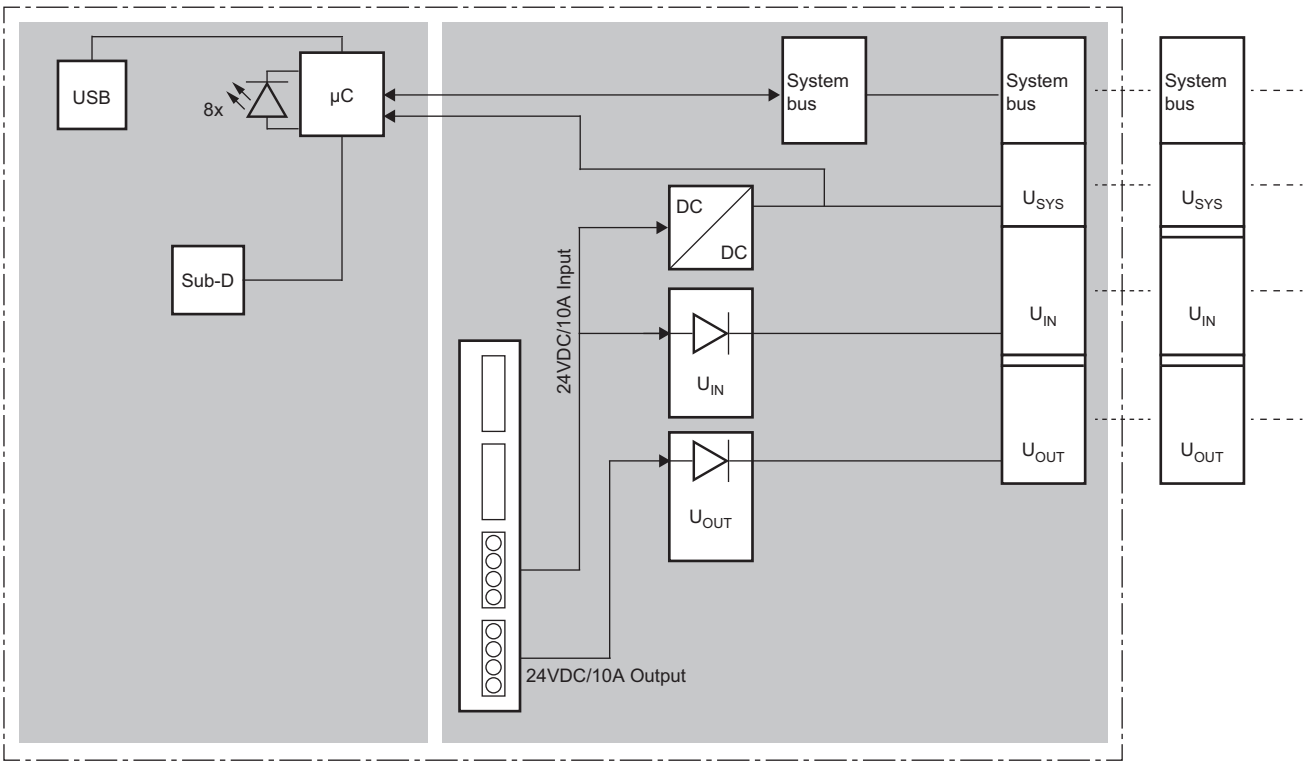
Precautions

The NZ2FT-PBV supports only the following master modules.

☞ Page 226 Corresponding master module and software package

Block diagram

The following figure shows the internal block diagram of the NZ2FT-PBV.



10.4 Functions

This section describes the functions of the NZ2FT-PBV.

Function list

Item	Description	Reference
Fieldbus communication	The PROFIBUS-DP protocol is used to communicate with the master module as follows. • Fixed cycle communication: I/O data communication • Communication at any time: Acyclic communication	Page 226 PROFIBUS-DP configuration
FDL address setting	Sets the FDL address by two rotary switches. FDL address: 01H to 7DH (1 to 125)	Page 228 Rotary switch
Parameter setting	Set the parameters of the NZ2FT-PBV and I/O module from the software package setting window.	Page 238 Parameter Setting
Data format switching	Set the send/receive data format for the master module to big endian or little endian.	Page 241 Parameter list
Output value setting for fieldbus error	Set the output value of the I/O module for each case, such as when the CPU module status of the DP-Master changes or a fieldbus error occurs.	Page 233 Output value setting for fieldbus error
I/O value setting for Hot swap	Set the I/O value of the I/O module of when replacing the I/O module while the power is on.	Page 79 I/O value setting for Hot swap
Checking warning output (Process alarm)	Check whether Process alarm has occurred from the I/O module corresponding to the warning output, and read Process alarm data of the content.	Page 234 Checking warning output (Process alarm)

Web server functions

Item	Description	Reference
Web server connection	Access the Web server via the USB port.	Page 60 Connection with a Personal Computer
Login/Logout	Authenticate/clear access to the Web server. The functions will be limited if not logged in.	Page 64 Login/Logout
HTTPS setting	Encrypts the communications with the Web server.	Page 67 HTTPS setting
Help display	Displays Help of the Web server.	Page 69 Window Layout
Changing the language	Changes the display language of the Web server window.	Page 73 Changing the language
Force mode	Inputs/outputs an arbitrary value forcibly from the Web server without being affected by the input from an external device or by the operation result (cyclic data) of the program.	Page 76 Force mode
Tag name function	Set an arbitrary character string as the channel name of the I/O module.	Page 83 Tag name function
I&M data function	Records I&M data (Identification & Maintenance) such as the installation location of the system and the installation date.	Page 85 I&M data function
Reset	Restarts the NZ2FT-PBV from the Web server.	Page 85 Resetting the coupler
Initialization	Restores the NZ2FT-PBV to the factory default settings from the Web server.	Page 86 Initialization of the coupler
Firmware update	Updates the firmware of the NZ2FT-PBV and I/O module.	Page 87 Firmware update

Troubleshooting

Item	Description	Reference
LED indication	Indicates the status of the NZ2FT-PBV with LED.	Page 227 Part Names Page 253 Checking with LEDs
Status management	Manages the status of NZ2FT-PBV.	Page 255 Confirmation by status information (Standard/ Extended Diagnosis)
DP alarm mode switching	Sets the alarm mode of PROFIBUS-DP to either of V0 or V1.	Page 232 DP alarm mode switching
Acquisition of the service file	If troubleshooting does not solve the problem, analyze the failure by acquiring the service file.	Page 88 Acquisition of the service file

DP alarm mode switching

This function switches the DP alarm mode of PROFIBUS-DP between "V0" and "V1".

Set in the parameter "DP alarm mode" of the software package of the master module.

- When "V0" is set, the alarm trigger is set with the parameter. The parameter "Process alarm" can be set to enable (default) or disable, and is valid only in V0 mode. The generated Diagnostic messages need not be checked from the DP-Master.
- When "V1" is set, the alarm trigger is set in the engineering environment. The parameter "Process alarm" can be set to enable (default) or disable, and the setting in V0 mode is invalid. The generated Diagnostic messages must be checked from the DP-Master.

Output value setting for fieldbus error

Set the output value of the I/O module for each case, such as when the CPU module status of the DP-Master changes or a fieldbus error occurs.

The output value changes depending on the following two settings.

- NZ2FT-PBV parameter "Output behaviour on fieldbus error"
- Parameter "Substitute value" for each I/O module

However, the data sent from the NZ2FT-C24 to the external device is not affected by the setting of the NZ2FT-PBV parameter "Output behaviour on fieldbus error".

Ex.

For the digital output module

Status of DP-Master (RJ71PB91V or QJ71PB92V)		NZ2FT-PBV parameter "Output behaviour on fieldbus error" setting							
		0: All outputs off (All outputs are turned off.)		1: Enable substitute value (A substitute value is output.)				2: Hold last value (The last output value is held.)	
				The I/O module parameter "Substitute value" set to 1		The I/O module parameter "Substitute value" set to 0			
		Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
	When in CPU module stop error	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Ex.

For the NZ2FTS-60DA4

Status of DP-Master (RJ71PB91V or QJ71PB92V)		NZ2FT-PBV parameter "Output behaviour on fieldbus error" setting		
		0: All outputs off (All outputs are turned off.)	1: Enable substitute value (A substitute value is output.)	2: Hold last value (The last output value is held.)
Data link in operation	CPU module RUN state	D/A conversion value		
	CPU module: RUN → STOP	0	A substitute value is output.	The last output value is held.
	CPU module PAUSE state	D/A conversion value		
	When the CPU module is reset	0	A substitute value is output.	The last output value is held.
	When in CPU module stop error	0	A substitute value is output.	The last output value is held.
Disconnected (fieldbus error occurred)		0	A substitute value is output.	The last output value is held.

Checking warning output (Process alarm)

Check whether Process alarm has occurred from the I/O module corresponding to the warning output, and read Process alarm data of the content.

The I/O modules that support the warning output and their details are as follows.

- NZ2FTS-60RD4: ☞ Page 504 Warning output (Process alarm)
- NZ2FTS-60TD4: ☞ Page 516 Warning output (Process alarm)
- NZ2FTS-D62P2: ☞ Page 535 Warning output (Process alarm)

Process alarm cannot be checked from the Web server.

Process alarm data can be checked by reading alarms after the alarm detection in the slave status area (alarm detection) of the buffer memory of the master module.

Process alarm data cannot be assigned to the buffer memory automatically.

How to check Process alarm

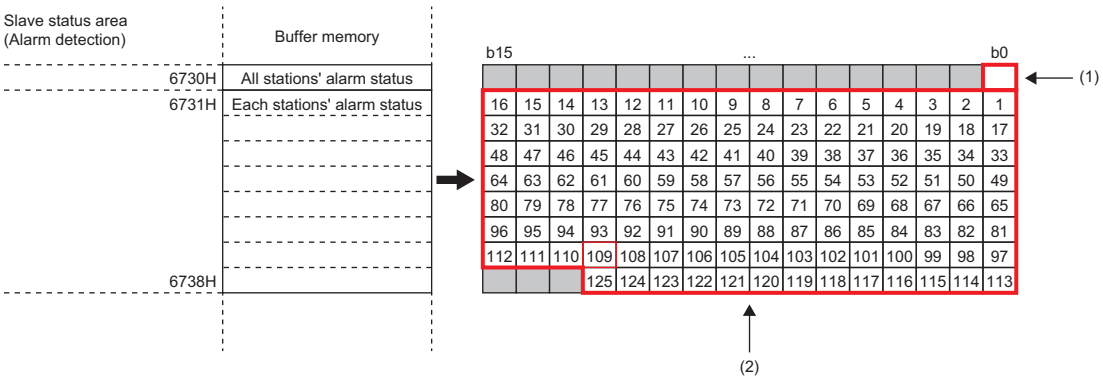
Process alarm can be checked by reading alarms from the DP-Slave that notifies Process alarm.

■Checking for the presence of Process alarm

Check the DP-Slave that is notifying Process alarm in the buffer memory of the master module.

When the master module detects Process alarm, the corresponding bit of each station alarm status in 'Slave status area (Alarm detection)' (Un\G26416 to Un \ G26424) becomes 1.

Buffer memory address		Item		Description
Decimal	Hexadecimal			
26416	6730H	Slave status area (Alarm detection)	All stations' alarm status	The alarm detection status of all DP-Slaves is stored. 0: No alarm detected 1: Alarm detected When an alarm has been detected even on one station in each station's alarm status area, 1 is stored in all stations' alarm status area.
26417 to 26424	6731H to 6738H		Each station's alarm status	The alarm detection status of each DP-Slave is stored. 0: No alarm detected (including reserved stations, temporarily reserved stations, not-configured stations, and alarm-unsupported stations) 1: Alarm detected in



(1) When an alarm has been detected even on one station in each station's alarm status, 1 is stored.

(2) The corresponding number of the DP-Slave is shown.

For details on the buffer memory of the master module, refer to the following.

RJ71PB91V: 🕮 MELSEC iQ-R PROFIBUS-DP Module User's Manual (Application)

QJ71PB92V: 🕮 PROFIBUS-DP Master Module User's Manual (Details)

■Reading Process alarm data

The following describes the example where the master module is the RJ71PB91V.

1. Check if Process alarm has been detected. (☞ Page 234 Checking for the presence of Process alarm).

2. Use the alarm read request (with ACK) to read Process alarm data.

When the alarm read (with ACK) request code and FDL address are set in the buffer memory of the RJ71PB91V and the alarm read request signal (Y18) is turned off and on, Process alarm data of each DP-Slave is stored in the alarm response area.

Buffer memory address		Item	Description	Setting value
Decimal	Hexadecimal			
26432	6740H	Alarm read (with ACK) request code	Set the code that synchronizes the alarm read and ACK return.	1502H
26433	6741H	FDL address	Set the FDL address of the DP-Slave for the alarm read destination.	1 to 125
26434	6742H	Fixed to 0	—	—
26446 to 26768	674EH to 6890H	Alarm response area	Process alarm data is stored as the execution result of alarm read. For the data structure, refer to Process alarm data on each I/O module.	—

After reading alarms, turn on and off the alarm read request signal (Y18).

3. Check if there is any unacknowledged Process alarm.

Every time the alarm read request signal (Y18) is turned off and on, Process alarm held by the NZ2FT-PBV is read in order. When there is no more Process alarm held by the NZ2FT-PBV, E506H is stored in the alarm read (with ACK) abnormal response code, and E521H is stored in the alarm details status code 2.

The following table lists the alarm response areas when there is no more Process alarm held by the NZ2FT-PBV.

Buffer memory address		Item	Description	Value
Decimal	Hexadecimal			
26446	674EH	Alarm read (with ACK) abnormal response code	Check detailed status codes 1 to 3 and take action.	E506H
26447	674FH	FDL address	—	1 to 125
26448	6750H	Completed status ACK	—	0
26449	6751H	Alarm details status code 1	A physical execution error was detected.	E510H
26450	6752H	Alarm details status code 2	No alarm is available to the DP-Slave.	E521H
26451	6753H	Alarm details status code 3	The alarm is not available.	E530H

Point

For details such as the response format when the alarm is read (with ACK), refer to the following.

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

📖 PROFIBUS-DP Master Module User's Manual (Details)

Ex.

When alarms are read and Process alarm data is stored in the alarm response area (for the RJ71PB91V)

Device Name	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	
U0\G26446	1	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0	(1)
U0\G26447	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	(2)
U0\G26448	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	(3)
U0\G26449	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	(4)
U0\G26450	1	0	1	0	0	1	0	1	0	0	0	1	0	0	0	1	(5)
U0\G26451	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	(6)
U0\G26452	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	(7)
U0\G26453	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	(8)
U0\G26454	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

(1) The response code when an alarm read (with ACK) request is completed successfully: A502H
(2) FDL address of the DP-Slave
(3) Completed status
(4) Alarm data length: 4
(5) Process alarm: A511H
(6) Mounting position of the I/O module (4th I/O module in the above figure)
(7) Alarm details
(8) Acquired Process alarm data is stored.

Precautions

Process alarm data cannot be read by Acyclic communication.

Point

If the second Process alarm is detected on the same channel of the same I/O module before reading Process alarm data, the second Process alarm data will not be stored correctly.
If Process alarm is detected, read Process alarm data.

10.5 Procedures Before Operation

1. FDL address setting

Set the FDL address of the NZ2FT-PBV. (☞ Page 228 Rotary switch)

2. Installation

Attach the NZ2FT system to the DIN rail and install it in a suitable environment. (☞ Page 36 Installation Environment and Installation Position of Module, Page 38 Installation)

3. Wiring

Connect the power cables and PROFIBUS cables to the NZ2FT-PBV. (☞ Page 45 Wiring of power cable and I/O cable, Page 42 Wiring products for NZ2FT-PBV)

Connect the I/O cables to the I/O module. (☞ Page 45 Wiring of power cable and I/O cable)

4. DP-Master setting

Set the parameters of the master module and DP-Slaves (NZ2FT-PBV and I/O modules). (☞ Page 238 Parameter Setting)

5. Start operation

Turn on Communication start request signal (Y0).

10.6 Parameter Setting

Set the communication parameters of the master module, NZ2FT-PBV, and I/O module from the software package of the master module.

RJ71PB91V and QJ71PB92V setting

Start PROFIBUS Configuration Tool or GX Configurator-DP and configure the PROFIBUS-DP communication settings and the parameter settings of the NZ2FT-PBV and I/O module. For details, refer to the following.

- When the master module is the RJ71PB91V: DP-Master parameter setting (📖 MELSEC iQ-R PROFIBUS-DP Module User's Manual (Application))
- When the master module is the QJ71PB92V: Master parameter, bus parameter (📖 PROFIBUS-DP Interface Module User's Manual (Details))

Setting item

The following describes the operation where PROFIBUS Configuration Tool is used in the RJ71PB91V.

■Adding the GSD file

Add the GSD file to PROFIBUS Configuration Tool. (☞ Page 226 GSD file)

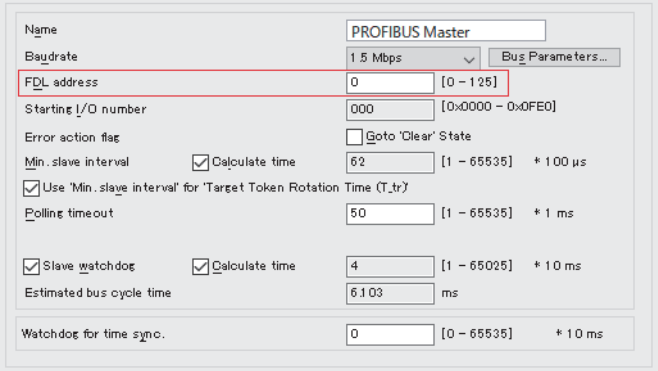
[Import Tasks] ⇨ [Add GSD File]

The NZ2FT-PBV information is added to "Global GSD Database" by adding the GSD file.

■FDL address of the DP-Master

Set the FDL address of the DP-Master on the "Master Settings" window.

[PROFIBUS Network] ⇨ Right-click the master module ⇨ [Master Settings]



Set the FDL address of the DP-Master for "FDL address".

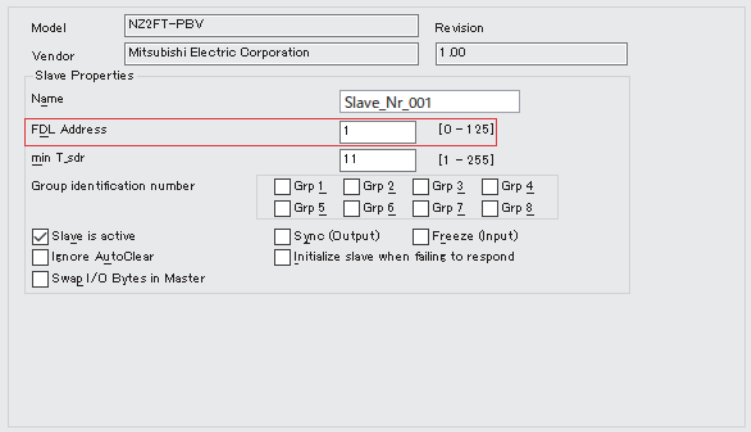
■Parameters of the NZ2FT-PBV and I/O module

Set the parameters of the NZ2FT-PBV and I/O module on the "Slave Settings" window.

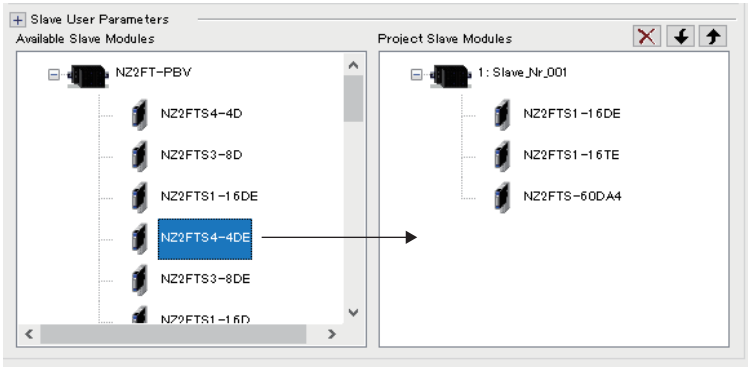
[PROFIBUS Network] ⇨ Right click on NZ2FT-PBV ⇨ [Slave Settings]

1. Set the FDL address of the NZ2FT-PBV.

Enter the FDL address set with the rotary switch of the NZ2FT-PBV for "FDL address" on the "Slave Settings" window.

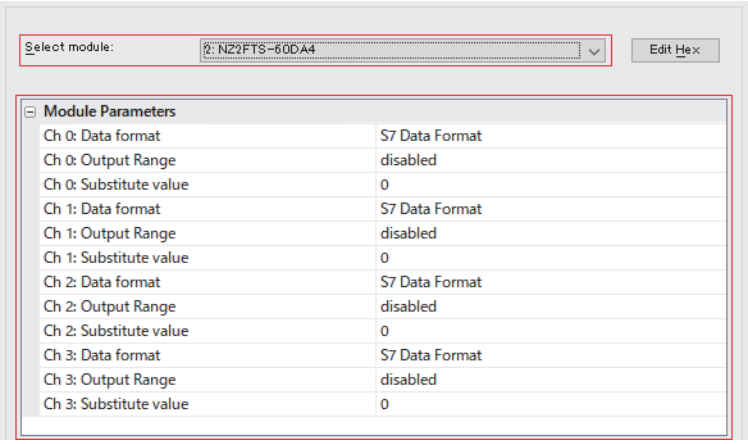


2. Set the structure of the DP-Slave.



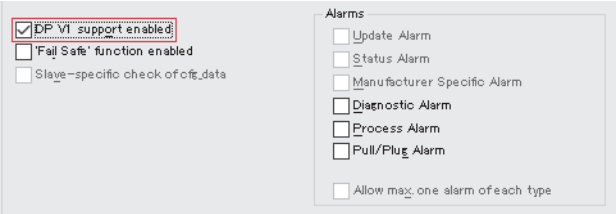
Drag and drop the I/O module to be set from "Available Slave Modules" to "Project Slave Modules".

3. Set the parameters of the NZ2FT-PBV and I/O module.



Select the NZ2FT-PBV or the I/O module of which parameters are set on "Select module". Set the parameters on displayed "Module Parameters".

4. Check "DP V1 support enabled" to use the PROFIBUS-DPV1 function.



Precautions

- If the set I/O module configuration and the DP-Slave configuration are different, an error occurs on the NZ2FT-PBV and the I/O module.
- The PROFIBUS-DPV2 function cannot be used on the NZ2FT-PBV.

Parameter list

Set the parameters from the software package of the master module. (☞ Page 238 Parameter Setting)
The following table lists the parameters that can be set to the NZ2FT-PBV.

Item	Description	Setting range	Default
DP alarm mode	Set the alarm mode. (☞ Page 232 DP alarm mode switching)	• V0 • V1	V1
IP address USB port	Set the IP address of the USB port.	• 192.168.1.202 • 192.168.2.202 • 192.168.3.202 • 192.168.4.202 • 192.168.5.202	192.168.1.202
HTTPS setting	Set this parameter when encrypting the communications with the Web server. (☞ Page 67 HTTPS setting) • HTTP & HTTPS concurrent operation: HTTP and HTTPS communications are possible. • only HTTPS; no HTTP: Only HTTPS communications are possible.	• HTTP & HTTPS concurrent operation • only HTTPS; no HTTP	HTTP & HTTPS concurrent operation
Diagnostic alarm	Set it to "Disabled".	• Disabled • Enabled	Enabled
Process alarm	Set whether to send Process alarm.	• Disabled • Enabled	Enabled
Hot plug alarm	Set it to Disabled.	• Disabled • Enabled	Disabled
ID-related diagnosis	Set whether to include ID in Diagnostic message.	• Disabled • Enabled	Enabled
Channel-related diagnosis	Set whether to include channels in Diagnostic message.	• Disabled • Enabled	Enabled
Module status	Set whether to include Module status in Diagnostic message.	• Disabled • Enabled	Enabled
Data format	Set how to send communication data. • Motorola: Communication data is sent in big-endian format. • Intel: Communication data is sent in little-endian format.	• Motorola • Intel	Motorola
Output behaviour on fieldbus error	Set the output operation when a fieldbus error occurs. • All outputs off: All outputs are turned off. • Enable substitute value: Output is produced according to the substitute value of the output module. • Hold last value: The output status is maintained.	• All outputs off • Enable substitute value • Hold last value	All outputs off
Module behaviour on hot swap	Set the I/O module operation during Hot swap. • Continue data exchange: The operation of the output module is maintained. • Behaviour like on fieldbus error: The output module is operated according to the setting of Output behaviour on fieldbus error.	• Continue data exchange • Behaviour like on fieldbus error	Continue data exchange
Option handling	Setting is not required.		

10.7 Access to Process Data

Process data is I/O data of the I/O module stored in the NZ2FT-PBV during I/O data communication (constant periodic communications) with the master module.

Data configuration

Process data consists of Input data and Output data.

Item	Data size	Description
Input data	Variable length (byte)	The input data of the I/O module mounted on the NZ2FT-PBV is stored. The data size varies depending on the connected I/O modules and the number of them. (☞ Page 242 Data width used by the I/O module)
Output data	Variable length (byte)	The output data of the I/O module mounted on the NZ2FT-PBV is stored. The data size varies depending on the connected I/O modules and the number of them. (☞ Page 242 Data width used by the I/O module)

Point

- Process data can be checked from the Web server. (☞ Page 72 "Process data")
- The communication data format can be changed to little-endian or big-endian by setting the parameter. (☞ Page 241 Parameter list)

Data width used by the I/O module

The following table shows the data width used by each I/O module in the NZ2FT-PBV during I/O data communication (constant periodic communication).

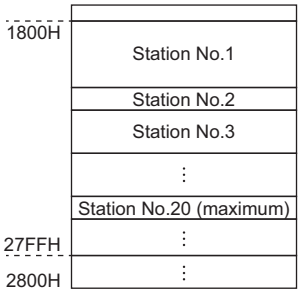
I/O module	Process data	
	Input data	Output data
NZ2FTS4-4DE	8 bits	—
NZ2FTS3-8DE	8 bits	—
NZ2FTS1-16DE	16 bits	—
NZ2FTS4-4D	8 bits	—
NZ2FTS3-8D	8 bits	—
NZ2FTS1-16D	16 bits	—
NZ2FTS2-4A	8 bits	—
NZ2FTS4-4TE	—	8 bits
NZ2FTS2-8TE	—	8 bits
NZ2FTS1-16TE	—	16 bits
NZ2FTS4-4T	—	8 bits
NZ2FTS2-8T	—	8 bits
NZ2FTS1-16T	—	16 bits
NZ2FTS3-4R	—	8 bits
NZ2FTS-60AD4	4 words	—
NZ2FTS-60DA4	—	4 words
NZ2FTS-60RD4	4 words	—
NZ2FTS-60TD4	4 words	—
NZ2FTS-D62P2	6 words	6 words
NZ2FTS-D66D1	3 words	—
NZ2FT-C24	8 words	8 words

Assignment of the master module to the buffer memory

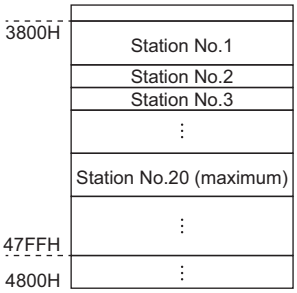
Process data of the NZ2FT-PBV is stored in the following buffer memory addresses of the master module by I/O data communication.

Item	Buffer memory address	Description
Input data area (for mode 3)	Un\6144 to Un\10239	The area that stores Input data received from each DP-Slave
Output data area (for mode 3)	Un\14336 to Un\18431	The area that stores Output data sent to each DP-Slave

Input data area (for mode 3)



Output data area (for mode 3)



Process data of each DP-Slave (FDL address n+1 immediately after FDL address n) is assigned to the buffer memory of the master module in order of FDL address from the top.

The data length of each DP-Slave depends on the system configuration of the station. Therefore, the start address of the second DP-Slave or later is not fixed.

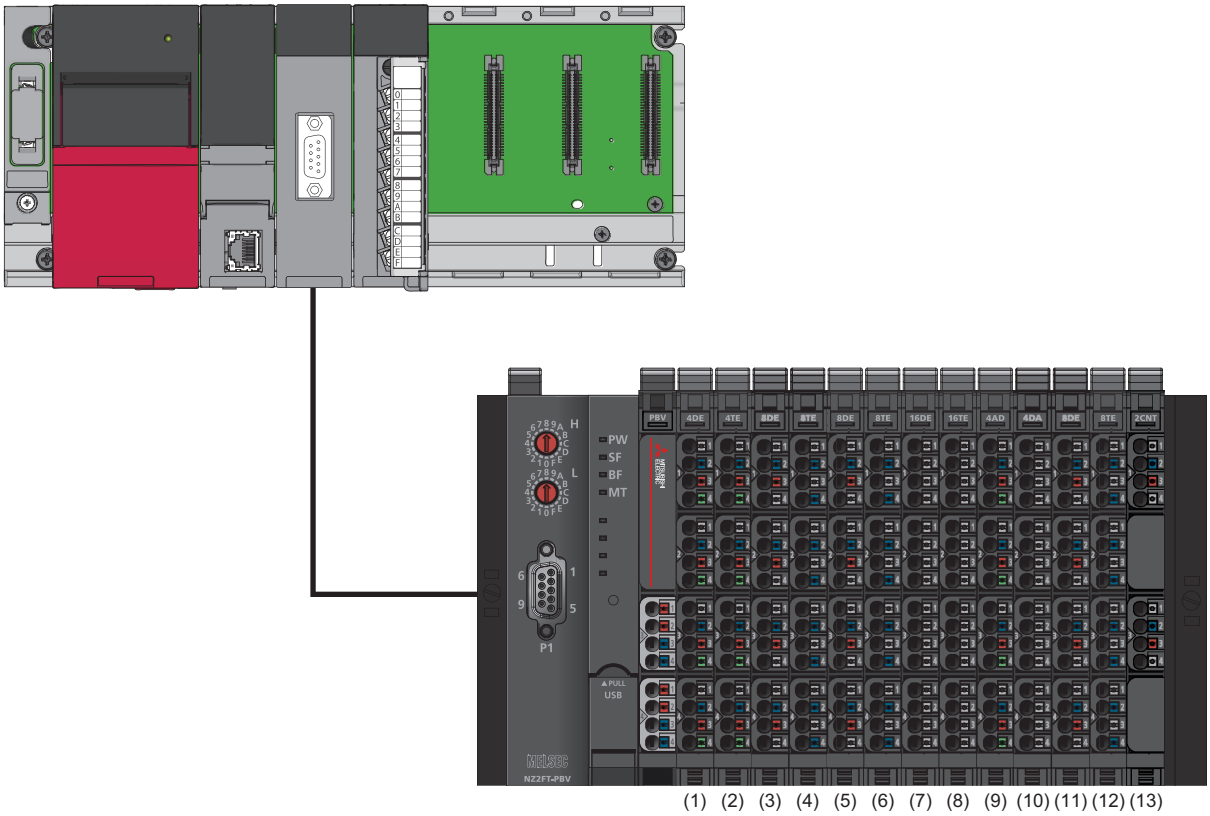
For details on the buffer memory of the master module, refer to the following.

RJ71PB91V: 📖 MELSEC iQ-R PROFIBUS-DP Module User's Manual (Application)

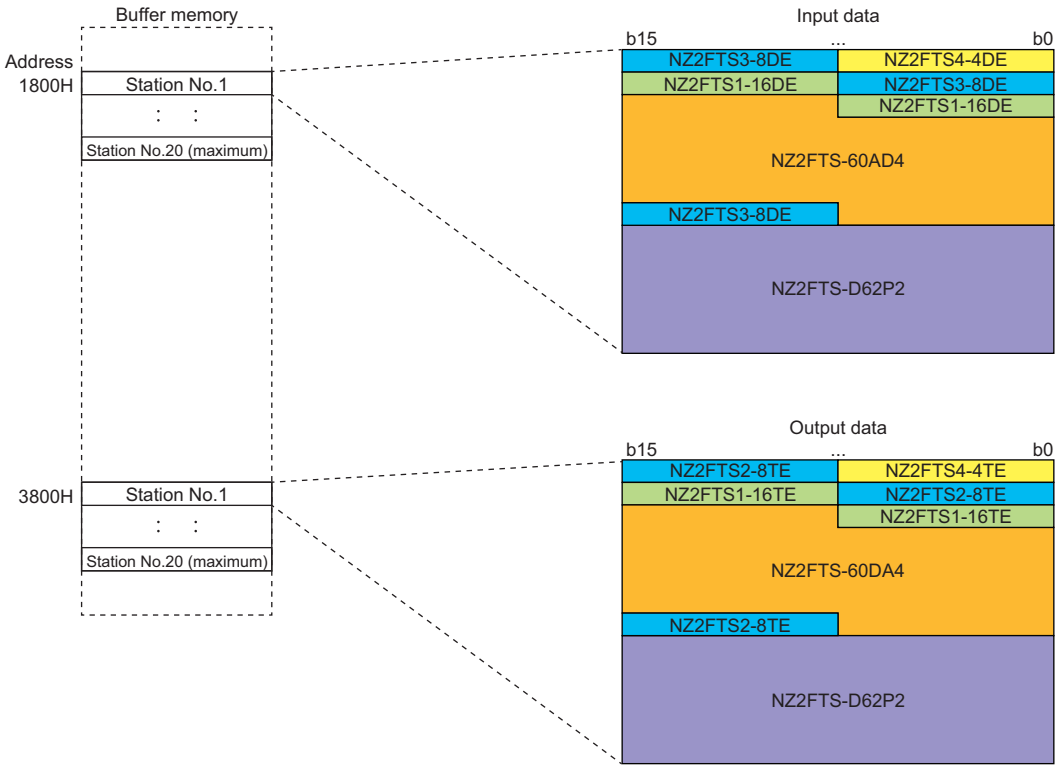
QJ71PB92V: 📖 PROFIBUS-DP Master Module User's Manual (Details)

Ex.

The following system configuration describes the assignment of the RJ71PB91V to the buffer memory and the data structure of Process data of the NZ2FT-PBV.



(1) NZ2FTS4-4DE
(2) NZ2FTS4-4TE
(3) NZ2FTS3-8DE
(4) NZ2FTS2-8TE
(5) NZ2FTS3-8DE
(6) NZ2FTS2-8TE
(7) NZ2FTS1-16DE
(8) NZ2FTS1-16TE
(9) NZ2FTS-60AD4
(10) NZ2FTS-60DA4
(11) NZ2FTS3-8DE
(12) NZ2FTS2-8TE
(13) NZ2FTS-D62P2



■Input data

- Process data of each I/O module is arranged in order of mounting position proximity to the NZ2FT-PBV and with no clearance.
- The size of Process data of each I/O module depends on the I/O module. (☞ Page 242 Data width used by the I/O module)
- Process data of the NZ2FTS4-4DE uses only 4 bits of b0 to b3, and 4 bits of b4 to b7 are allocated for only the area.

■Output data

- Process data of each I/O module is arranged in order of mounting position proximity to the NZ2FT-PBV and with no clearance.
- The size of Process data of each I/O module depends on the I/O module. (☞ Page 242 Data width used by the I/O module)
- Process data of the NZ2FTS4-4TE uses only 4 bits of b0 to b3, and 4 bits of b4 to b7 are allocated for only the area.

10.8 Program Example of NZ2FT-PBV

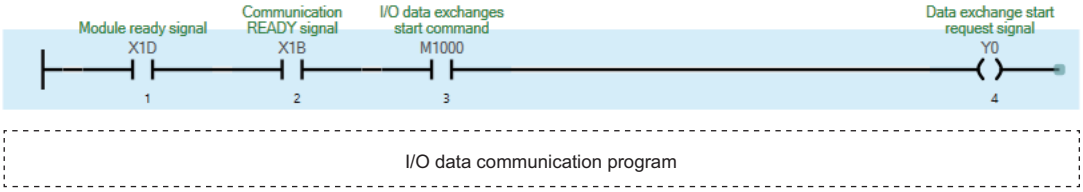
Precautions for programming

In NZ2FT-PBV transmission programs, interlock is provided with the following device.

• I/O data communication start command (M1000)

The following shows an example of interlock being provided in a communication program through the use of I/O data communication start command (M1000).

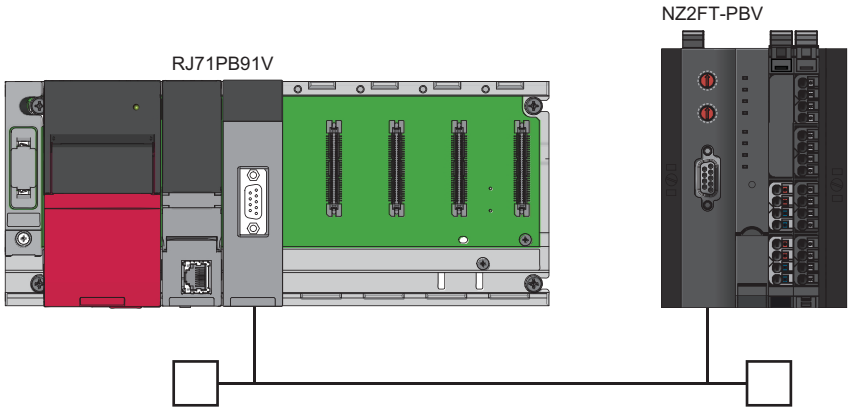
Turning on I/O data communication start command (M1000) executes the I/O data communication program.



Example using the NZ2FTS-60AD4

The following example is for a program to read AI values that are obtained from A/D conversion performed on AI 0 (Channel 0) to AI 3 (Channel 3) of the analog input module.

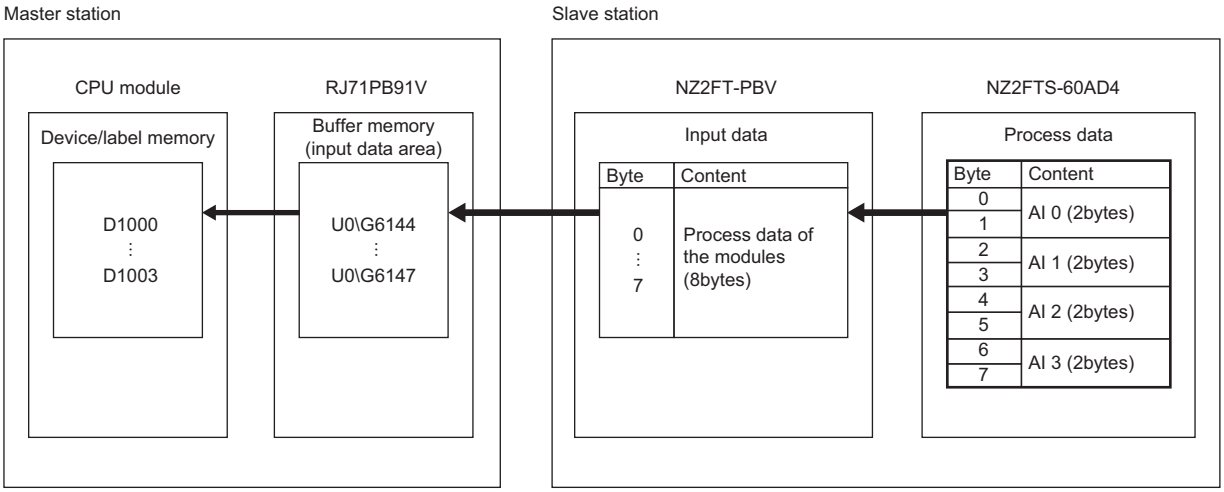
System configuration



Item		Model
DP-Master (FDL address 0)	CPU module	R04CPU
	Power supply module	R61P
	PROFIBUS-DP module	RJ71PB91V
DP-Slave (FDL address 1)	PROFIBUS-DP compatible coupler	NZ2FT-PBV
	4ch analog input module	NZ2FTS-60AD4

Device assignment

The following figure shows the device allocation for I/O data communication. (☞ Page 243 Assignment of the master module to the buffer memory)



Parameter Setting

Use PROFIBUS Configuration Tool to set the communication parameters of the RJ71PB91V and the parameters of the NZ2FT-PBV and NZ2FTS-60AD4. (☞ Page 238 RJ71PB91V and QJ71PB92V setting)

The following table lists the parameter setting values of the NZ2FTS-60AD4. (☞ Page 484 Parameter settings)

Parameter	Setting value			
	AI 0 (Channel 0)	AI 1 (Channel 1)	AI 2 (Channel 2)	AI 3 (Channel 3)
Frequency suppression	Disabled			
Data format	High resolution format			
Measurement range	0...20mA	-10...10V	0...20mA	-10...10V

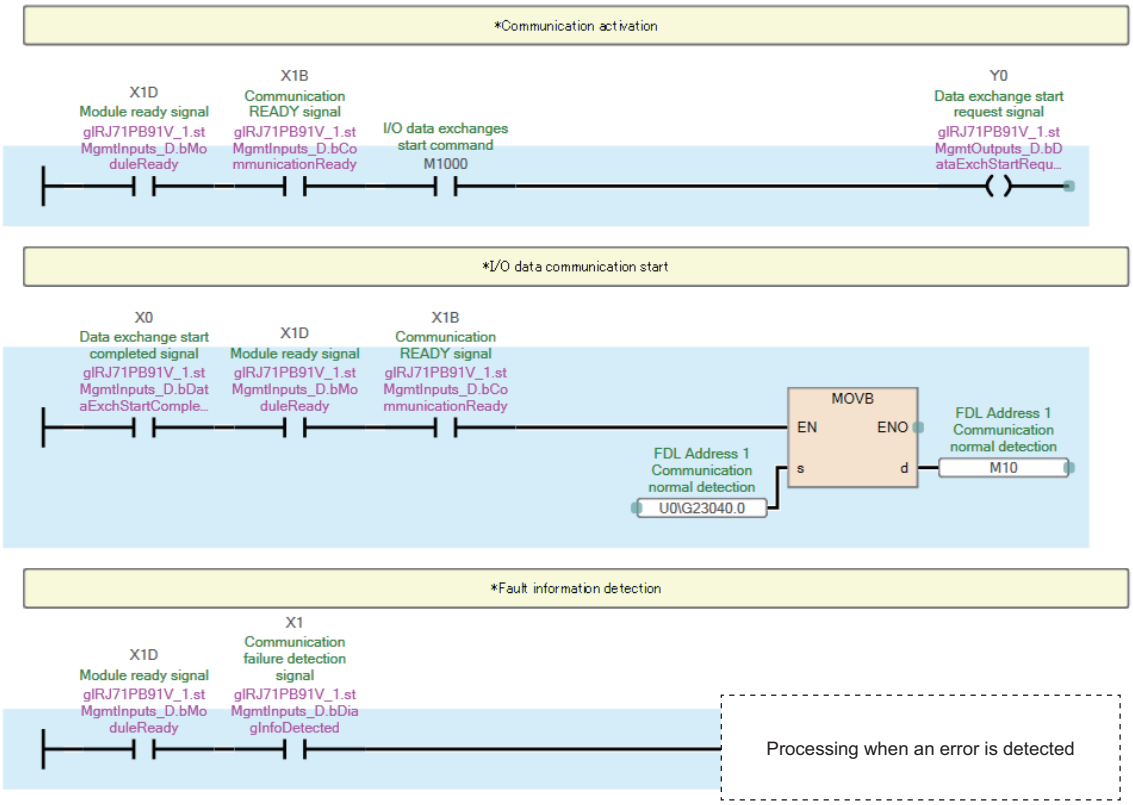
Device used

Device	Description	
X0	Data exchange start completed signal	
X1	Diagnostic information detection signal	
X1B	Communication READY signal	
X1D	Module ready signal	
Y0	Data exchange start request signal	
D1000	I/O data exchange function	AI0
D1001		AI1
D1002		AI2
D1003		AI3
M10		FDL address 1 normal communication detection
M1000		I/O data exchange start command

Program example

When data exchange starts, the reading of AI values starts automatically.

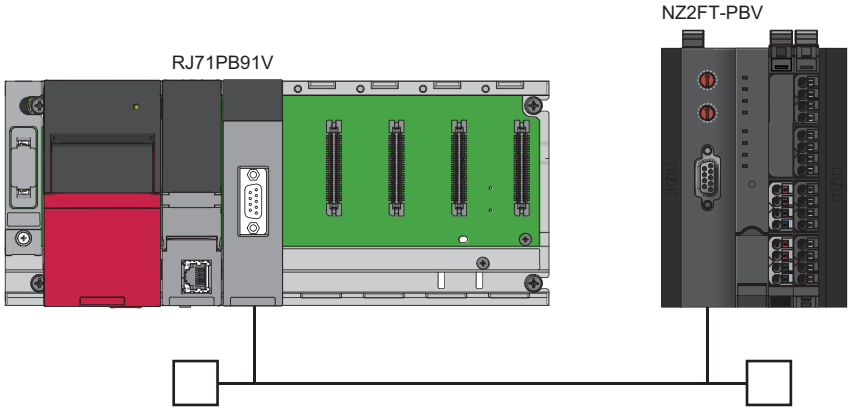
The values of AI 0 to AI 3 are stored in D1000 to D1003.



Example using the NZ2FTS-60RD4

This program reads Process alarm data when Process alarm occurs in RTD 0 (Channel 0) to RTD 3 (Channel 3) of the temperature input module (Resistance Temperature Detector).

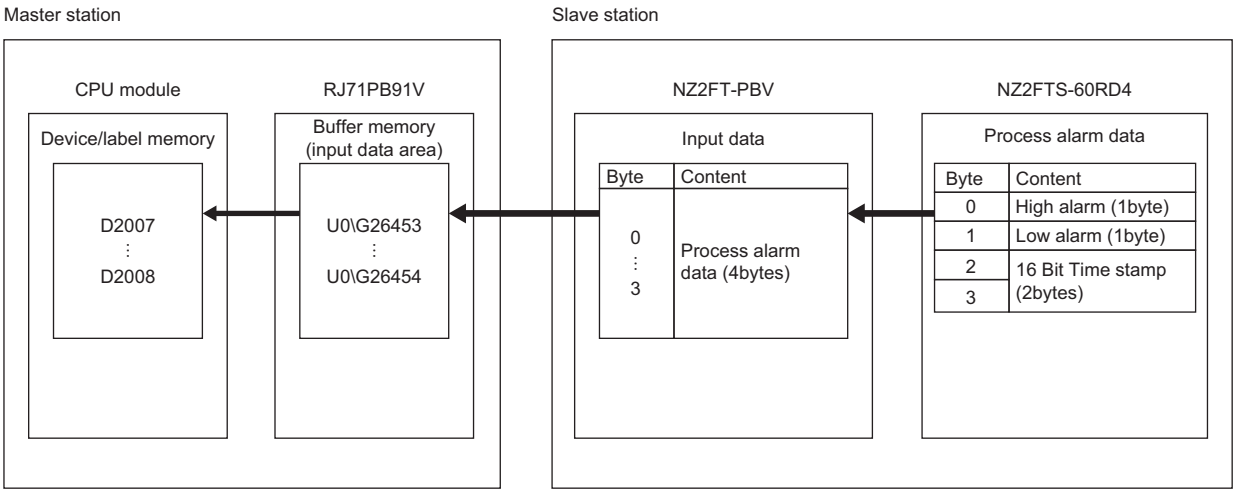
System configuration



Item		Model
DP-Master (FDL address 0)	CPU module	R04CPU
	Power supply module	R61P
	PROFIBUS-DP module	RJ71PB91V
DP-Slave (FDL address 1)	PROFIBUS-DP compatible coupler	NZ2FT-PBV
	4ch analog temperature input module (RTD)	NZ2FTS-60RD4

Device assignment

The following figure shows the device assignment for communications that use the alarm acquisition function. (☞ Page 234 Checking warning output (Process alarm))



Parameter Setting

Use PROFIBUS Configuration Tool to set the communication parameters of the RJ71PB91V and the parameters of the NZ2FT-PBV and NZ2FTS-60AD4. (☞ Page 238 RJ71PB91V and QJ71PB92V setting)

■NZ2FT-PBV

Set the parameters as shown below. (☞ Page 241 Parameter list)

Item	Description
DP alarm mode	V1
Diagnostic alarm	Disabled
Process alarm	Enabled
Hot-plug alarm	Disabled
Identifier-related diagnosis	Enabled
Channel-related diagnosis	Enabled
Module status	Enabled
Data format	Intel
Output behaviour on fieldbus error	All outputs off
Module behaviour on hot swap	Continue data exchange
Option handling	Disabled

■NZ2FTS-60RD4

Set the parameters as shown below. (☞ Page 484 Parameter settings)

Item	Description			
	RTD 0 (Channel 0)	RTD 1 (Channel 1)	RTD 2 (Channel 2)	RTD 3 (Channel 3)
Temperature unit	Degree Celsius			
Measurement range	PT100 -200 ... 850 Degree Celsius	NI100 -60 ... 250 Degree Celsius	Cu10 -100 ... 260 Degree Celsius	Resistance 40 Ohm
Connection type	2-wire	2-wire	2-wire	2-wire
Conversion time	80ms	80ms	80ms	80ms
Channel diagnostics	Disabled	Disabled	Disabled	Disabled
Limit value monitoring	Enabled	Enabled	Enabled	Enabled
High limit value	200.000℃	200.000℃	200.000℃	20.000 Ohm
Low limit value	-200.000℃	-200.000℃	-200.000℃	-20.000 Ohm

Device used

Device	Description		
X0	Data exchange start completed signal		
X1B	Communication READY signal		
X1D	Module ready signal		
Y0	Data exchange start request signal		
D1000	I/O data exchange function	RTD 0	
D1001		RTD 1	
D1002		RTD 2	
D1003		RTD 3	
M10		FDL address 1 normal communication detection	
M1000		I/O data exchange start command	
X18	Alarm acquisition function	Alarm read response signal	
Y18		Alarm read request signal	
U0\G26417.0		Slave status area (Alarm detection) on the first station	
U0\G26432		Alarm read (with ACK) request code	
U0\G26433		FDL address	
U0\G26434		Empty (Fixed to 0H)	
M100		Alarm acquisition request	
D2000		Alarm read (with ACK) abnormal response code	
D2001		FDL address	
D2002		Completed status	
D2003		Alarm No.1	Alarm data length
D2004			Alarm type
D2005			Alarm slot number
D2006			Alarm details
D2007 to D2038			Alarm data
D2039			ACK Normal response code
D2040			ACK Type
D2041			ACK Details
D2042			ACK slot number
D2043 to D2082		Alarm No.2	Same as alarm No.1
⋮		⋮	⋮
D2283 to D2322		Alarm No.8	Same as alarm No.1

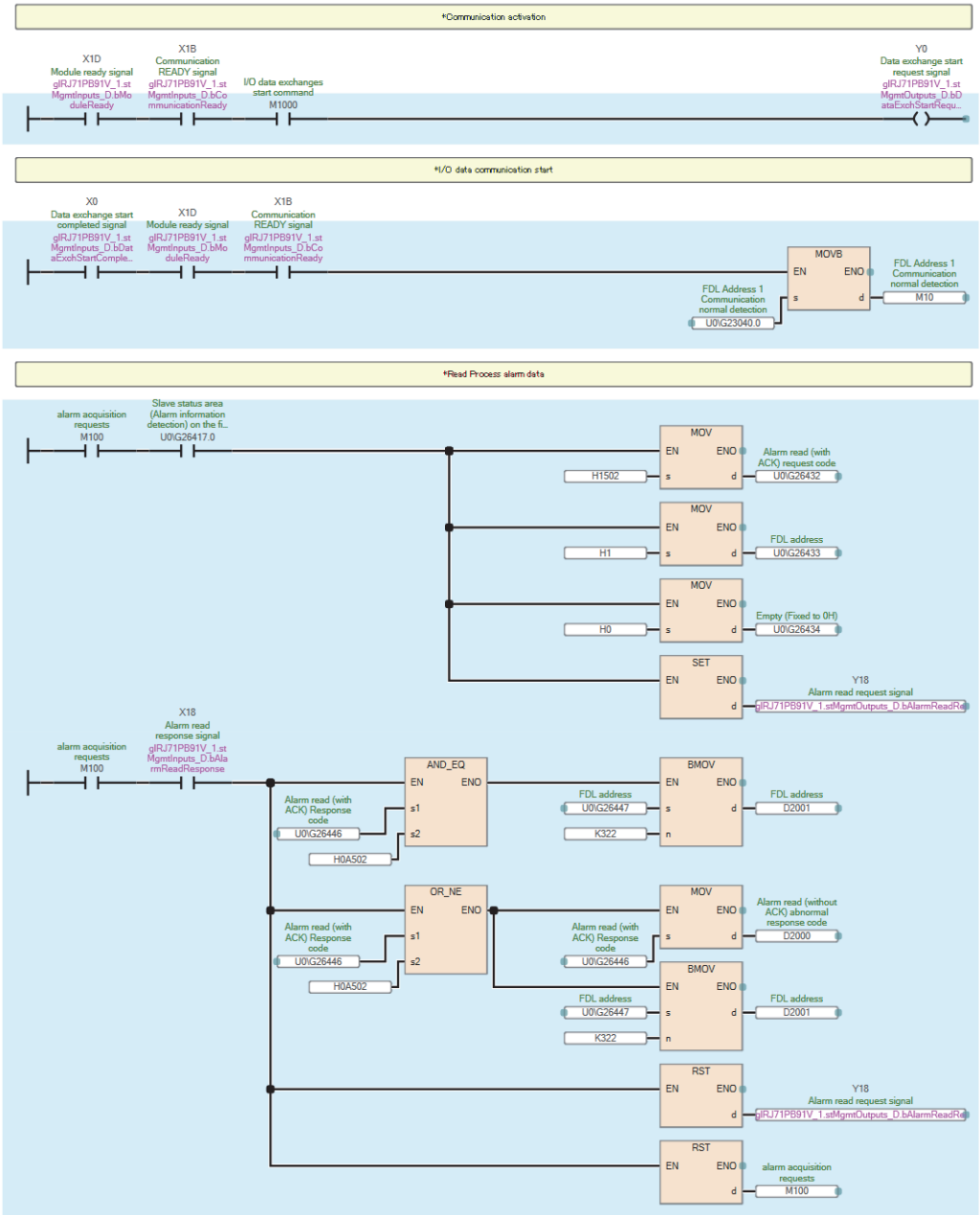
Program example

When data exchange starts, the reading of RTD values starts automatically.

The values of RTD 0 to RTD 3 are stored in D1000 to D1003.

Turning on the alarm acquisition request issues an alarm read (with ACK) request.

High alarm and Low alarm of RTD 0 to RTD 3 are stored in D2007, and 16 Bit Time stamp is stored in D2008.



10.9 Troubleshooting

This section describes troubleshooting of the NZ2FT-PBV.

Point

If troubleshooting does not solve the problem, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Checking with LEDs

When the PW LED turns off

Check the following items in order from the top.

Item	Action
Is the module status LED of the I/O module on in green?	Repair or replace the NZ2FT-PBV. The possible cause is an internal fuse failure.
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 of the external power supply within the range of performance specifications.

When the SF LED turns on in red

Check the following items in order from the top.

Item	Action
Is the latest GSD file in use?	Use the latest GSD file.
Are the station settings matched with the actual settings?	Match the station settings with the actual configuration.
Is the electronic unit part detached?	Insert the electronic unit part.
Are the NZ2FT-PBV and I/O module connected with no clearance between them?	Connect the NZ2FT-PBV and the I/O module with no clearance between them.
Does the DP-Slave setting by the DP-Master software package match the actual network configuration?	Match the station settings with the actual configuration. Check the rotary switch for the FDL address. (☞ Page 228 Rotary switch)
Is the FDL address set outside the effective range (0 or 126 or higher)?	Set the FDL address within the effective range (1 to 125).
Is the set FDL address overlap with that in other stations?	If there are two or more FDL addresses that are the same, make changes so that all the FDL addresses are different from one another.
Has the rotary switch changed during operation?	Restore the rotary switch setting to its original setting.

When the SF LED is flashing in red

Check the following item.

Item	Action
Has the Force mode been selected?	The DP-Slave is in the Force mode. Clear the Force mode.

When the BF LED turns on in red

Check the following items in order from the top.

Item	Action
Is the PROFIBUS cable between the DP-Master and NZ2FT-PBV inserted as far as it will go?	The PROFIBUS cable is not connected. Fix the cable firmly by the screw.
Has the PROFIBUS cable been disconnected?	Replace the PROFIBUS cable.
Is the FDL address set to one that does not match the network configuration setting of the software package?	Set the FDL address to one that matches the network configuration setting.
Is the FDL address set outside the effective range (0 or 126 or higher)?	Set the FDL address within the effective range (1 to 125).
Is the set FDL address overlap with that in other stations?	If there are two or more FDL addresses that are the same, make changes so that all the FDL addresses are different from one another.
Are there any mistakes in the parameter settings of the DP-Master?	Review the FDL address setting of the DP-Master.
Is the firmware version appropriate?	Check the firmware version of the master module and NZ2FT-PBV. Update the firmware if necessary.
Is the communication start request signal of the DP-Master operating?	Check the communication start request signal.
Has an error occurred in the DP-Master?	Follow the manual of the DP-Master and perform troubleshooting.

When the BF LED is flashing in red

Check the following items in order from the top.

Item	Action
Is the latest GSD file in use?	Use the latest GSD file.
Does the DP-Slave setting by the DP-Master software package match the actual network configuration?	Match the station settings with the actual configuration. Or, the FDL address was changed by the rotary switch during the data link, so it does not match the actual network configuration. (☞ Page 228 Rotary switch)
Is the electronic unit part detached?	Insert the electronic unit part.
Are the NZ2FT-PBV and I/O module connected with no clearance between them?	Connect the NZ2FT-PBV and the I/O module with no clearance between them.
Has the rotary switch changed during operation?	Restore the rotary switch setting to its original setting.
Is a firmware update in progress?	Wait for the firmware update to end.

When the MT LED turns on in yellow

Check the following item.

Item	Action
Is the I/O module mounted?	Mount the I/O module again by pressing it to the NZ2FT-PBV until it clicks.

When the following LEDs turn on in red

- Power supply LED
- Input power supply LED 3.2
- Output power supply LED 4.2
- Input power supply internal protection circuit LED 3.4
- Output power supply internal protection circuit LED 4.4

Check the following item.

Item	Action
Is the voltage of the external power supply (24VDC) within the specified range?	The power supply voltage is less than 18VDC. Set the voltage value within the range of performance specifications. If the problem persists, the possible cause is an internal fuse failure. Replace the NZ2FT-PBV.

Confirmation by status information (Standard/Extended Diagnosis)

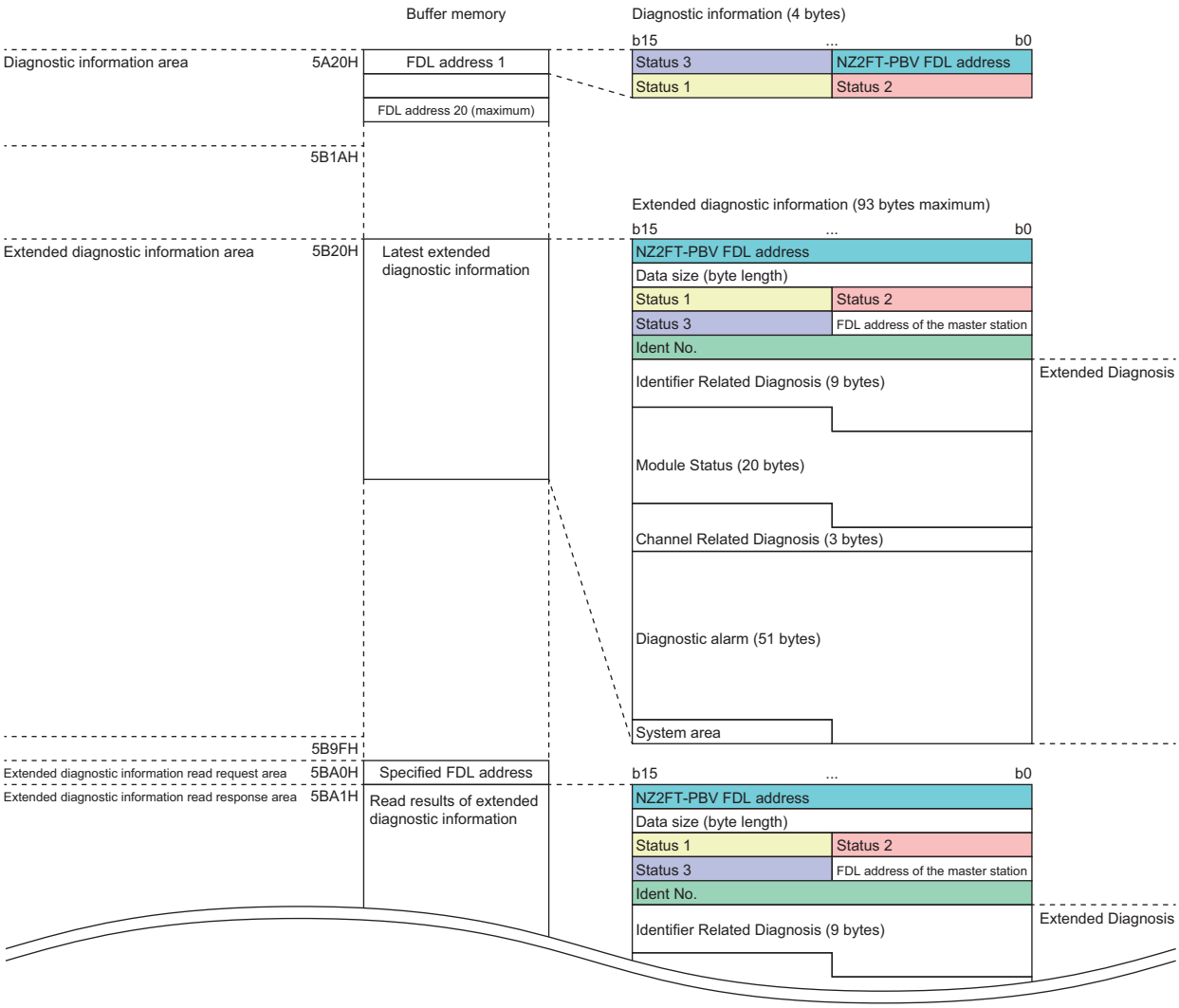
Standard Diagnosis shows the status of the NZ2FT-PBV, and Extended Diagnosis shows the I/O module status and alarm occurrence.

Standard/Extended Diagnosis is automatically stored asynchronously in the buffer memory of the master module.

Assignment of the master module to the buffer memory

The following describes the situation where the master module is the RJ71PB91V.

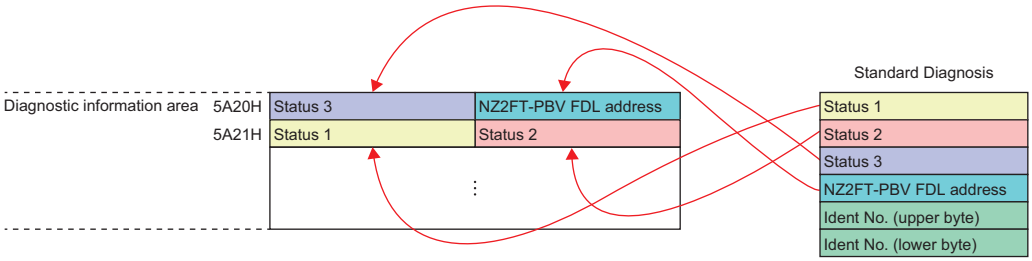
Buffer memory of the master module				NZ2FT-PBV Standard/Extended Diagnosis		
Address (decimal)	**Address (hexadecimal)**	**Name**	**Size**	**Name**		**Reference**
23072 to 23321	5A20H to 5B19H	Diagnostic information area	250 words	Refers to the following data from Standard Diagnosis. • Status 1 • Status 2 • Status 3 • NZ2FT-PBV FDL address		Page 258 Standard Diagnosis
23328 to 23454	5B20H to 5B9EH	Extended diagnostic information area	127 words	Standard Diagnosis		Page 258 Standard Diagnosis
				Extended Diagnosis	Identifier Related Diagnosis	Page 259 Identifier Related Diagnosis
					Module Status	Page 260 Module Status
					Channel Related Diagnosis	Page 261 Channel Related Diagnosis
					Diagnostic alarm	Page 261 Diagnostic alarm
23456	5BA0H	Extended diagnostic information read request area	1 word	Set the FDL address of the NZ2FT-PBV for the destination where the extended diagnostic information is read.		—
23457 to 23583	5BA1H to 5C1FH	Extended diagnostic information read response area	127 words	The same data structure as the extended diagnostic information area		—


Buffer memory
Diagnostic information (4 bytes)
b15 ... b0
Diagnostic information area
5A20H
FDL address 1
Status 3
NZ2FT-PBV FDL address
Status 1
Status 2
FDL address 20 (maximum)
5B1AH
Extended diagnostic information (93 bytes maximum)
b15 ... b0
Extended diagnostic information area
5B20H
Latest extended diagnostic information
NZ2FT-PBV FDL address
Data size (byte length)
Status 1
Status 2
Status 3
FDL address of the master station
Ident No.
Identifier Related Diagnosis (9 bytes)
Extended Diagnosis
Module Status (20 bytes)
Channel Related Diagnosis (3 bytes)
Diagnostic alarm (51 bytes)
System area
5B9FH
Extended diagnostic information read request area
5BA0H
Specified FDL address
b15 ... b0
Extended diagnostic information read response area
5BA1H
Read results of extended diagnostic information
NZ2FT-PBV FDL address
Data size (byte length)
Status 1
Status 2
Status 3
FDL address of the master station
Ident No.
Identifier Related Diagnosis (9 bytes)
Extended Diagnosis

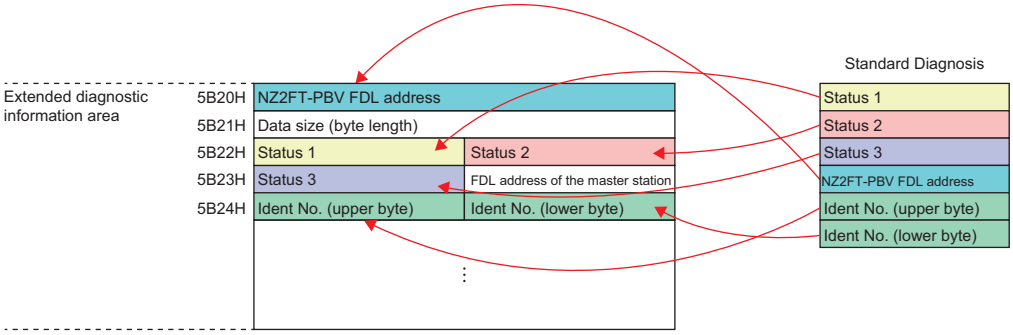
For details on the buffer memory of the master module, refer to the following.
RJ71PB91V: 📖 MELSEC iQ-R PROFIBUS-DP Module User's Manual (Application)
QJ71PB92V: 📖 PROFIBUS-DP Master Module User's Manual (Details)

■Allocation of Standard Diagnosis

Standard Diagnosis of the NZ2FT-PBV is assigned to the diagnostic information area of the buffer memory of the RJ71PB91V as shown below.



Standard Diagnosis is also assigned to the extended diagnostic information area as shown below.



How to check Standard/Extended Diagnosis

■GX Works3

- In "Device/Buffer Memory Batch Monitor", check Standard/Extended Diagnosis stored in the diagnostic information area and the extended diagnostic information area. (☞ Page 255 Assignment of the master module to the buffer memory)
- When the extended diagnostic information read command (Y6) is turned on, the latest extended diagnosis information received by the DP-Slave which is specified in the extended diagnostic information read request area is stored in the extended diagnostic information read response area. After reading, extended diagnostic information read response (X6) turns on.

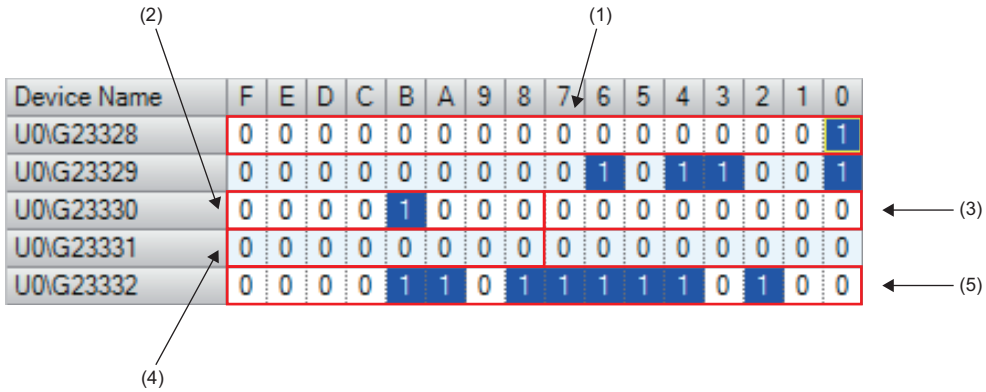
Data configuration

■Standard Diagnosis

Address (byte)	Item	Description		Detected in
1	Status 1	b0	I/O data communication with the NZ2FT-PBV is disabled.	DP-Master
		b1	The NZ2FT-PBV is not ready for I/O data communication.	DP-Slave
		b2	The I/O bytes parameter received from the DP-Master does not match that of the NZ2FT-PBV.	DP-Slave
		b3	Extended diagnostic information exists.	DP-Master
		b4	The function requested by the DP-Master is not supported.	DP-Slave
		b5	The response from the NZ2FT-PBV is invalid.	DP-Master
		b6	The parameter from the DP-Master is invalid.	DP-Slave
		b7	The station is controlled by another DP-Master.	DP-Master
2	Status 2	b0	A parameter send request from the DP-Slave	DP-Slave
		b1	A malfunction occurred in the slave.	DP-Slave
		b2	Fixed to 0	—
		b3	The NZ2FT-PBV is monitoring the watchdog timer.	DP-Slave
		b4	Fixed to 0	DP-Slave
		b5	Fixed to 0	DP-Slave
		b6	System area	—
		b7	A parameter setting excluded the station from I/O data exchanges.	DP-Master
3	Status 3	b0 to b6	System area	—
		b7	0 (fixed)	DP-Slave
4	FDL address	b0 to b7	FDL address of the NZ2FT-PBV (displayed in hexadecimal) If the NZ2FT-PBV has not started I/O data communication, FFH is stored.	DP-Slave
5	Upper byte of Ident No.	b0 to b7	Ident No. is the number assigned by PNO to identify unique device types. The value is acquired from Ident_Number entry in the GSD file.	DP-Slave
6	Lower byte of Ident No.	b0 to b7		DP-Slave

Ex.

Confirmation in the extended diagnostic information area of the buffer memory of the RJ71PB91V (☞ Page 257 How to check Standard/Extended Diagnosis)



(1) NZ2FT-PBV FDL address
(2) Status 1
(3) Status 2
(4) Status 3
(5) Ident No.

■Identifier Related Diagnosis

Address (byte)	Description	
1	b0 to b5	Size of Identifier Related Diagnosis (byte length)
	b6 to b7	1: Identifier Related Diagnosis
2	b0 to b7	The presence or absence of Diagnosis Data is notified from I/O modules at the mounting position 1 to 8.
3	b0 to b7	The presence or absence of Diagnosis Data is notified from I/O modules at the mounting position 9 to 16.
4	b0 to b7	The presence or absence of Diagnosis Data is notified from I/O modules at the mounting position 17 to 24.
5	b0 to b7	The presence or absence of Diagnosis Data is notified from I/O modules at the mounting position 25 to 32.
6	b0 to b7	The presence or absence of Diagnosis Data is notified from I/O modules at the mounting position 33 to 40.
7	b0 to b7	The presence or absence of Diagnosis Data is notified from I/O modules at the mounting position 41 to 48.
8	b0 to b7	The presence or absence of Diagnosis Data is notified from I/O modules at the mounting position 49 to 56.
9	b0 to b7	The presence or absence of Diagnosis Data is notified from I/O modules at the mounting position 57 to 64.

Ex.

Confirmation in the extended diagnostic information area of the buffer memory of the RJ71PB91V

Device Name	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	
U0\G23333	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	1	← (1)
U0\G23334	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	← (2)
U0\G23335	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
U0\G23336	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
U0\G23337	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	

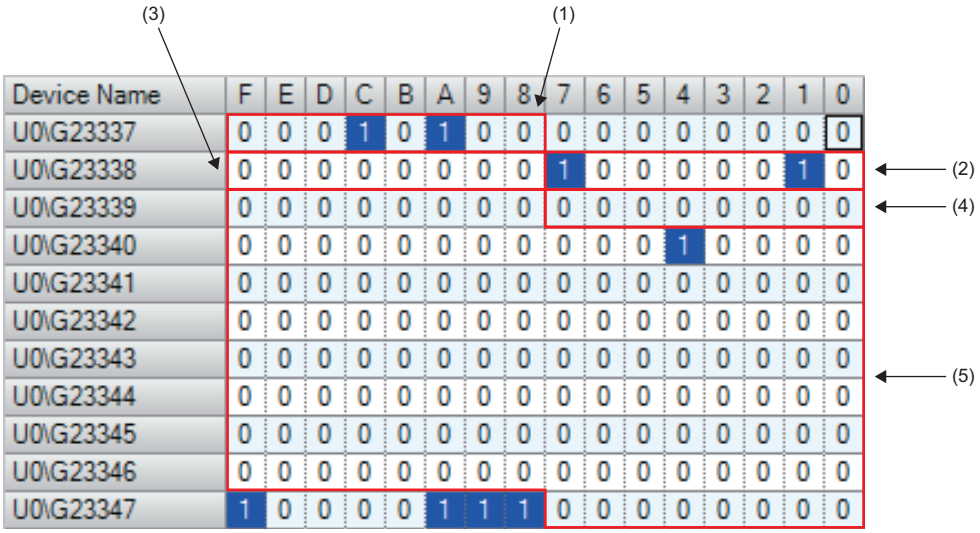
(1) Size of Identifier Related Diagnosis + Identifier Related Diagnosis
(2) Presence or absence of Diagnosis Data of the I/O module

■Module Status

Address (byte)	Description	
1	b0 to b5	Size of Module Status (byte length)
	b6 to b7	0: Device Related Diagnosis
2	b0 to b6	2: Module Status
	b7	1: Status
3	b0 to b7	0: Data type Unsigned8
4	b0 to b1	0: no further differentiation Extended
	b2 to b7	System area
5	b0 to b1	The status of the I/O module at the mounting position 1 is notified. 0: Normal I/O module status, valid data 1: Normal I/O module status, invalid data due to error (such as disconnection) 2: Incorrect I/O module used, invalid data 3: No module is mounted, invalid data
	b2 to b3	The status of the I/O module at the mounting position 2 is notified.
	b4 to b5	The status of the I/O module at the mounting position 3 is notified.
	b6 to b7	The status of the I/O module at the mounting position 4 is notified.
6	b0 to b7	The status of the I/O module at the mounting position 5 to 8 is notified.
7	b0 to b7	The status of the I/O module at the mounting position 9 to 12 is notified.
8	b0 to b7	The status of the I/O module at the mounting position 13 to 16 is notified.
9	b0 to b7	The status of the I/O module at the mounting position 17 to 20 is notified.
10	b0 to b7	The status of the I/O module at the mounting position 21 to 24 is notified.
11	b0 to b7	The status of the I/O module at the mounting position 25 to 28 is notified.
12	b0 to b7	The status of the I/O module at the mounting position 29 to 32 is notified.
13	b0 to b7	The status of the I/O module at the mounting position 33 to 36 is notified.
14	b0 to b7	The status of the I/O module at the mounting position 37 to 40 is notified.
15	b0 to b7	The status of the I/O module at the mounting position 41 to 44 is notified.
16	b0 to b7	The status of the I/O module at the mounting position 45 to 48 is notified.
17	b0 to b7	The status of the I/O module at the mounting position 49 to 52 is notified.
18	b0 to b7	The status of the I/O module at the mounting position 53 to 56 is notified.
19	b0 to b7	The status of the I/O module at the mounting position 57 to 60 is notified.
20	b0 to b7	The status of the I/O module at the mounting position 61 to 64 is notified.

Ex.

Confirmation in the extended diagnostic information area of the buffer memory of the RJ71PB91V



Device Name	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
U0\G23337	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
U0\G23338	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
U0\G23339	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U0\G23340	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
U0\G23341	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U0\G23342	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U0\G23343	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U0\G23344	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U0\G23345	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U0\G23346	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U0\G23347	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0

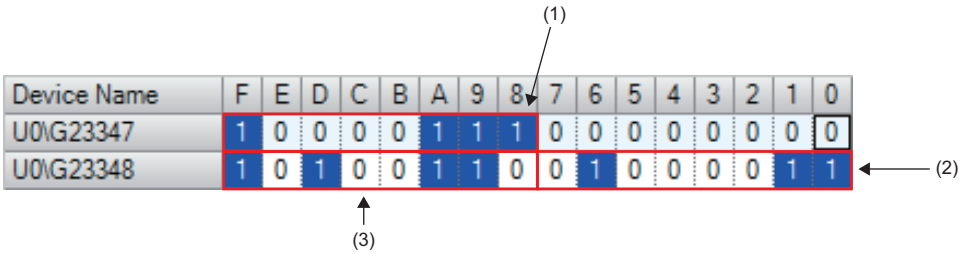
(1) Size of Device Related Diagnosis + Module Status
(2) Status + Module Status
(3) Data type Unsigned8
(4) no further differentiation Extended
(5) I/O module status

■Channel Related Diagnosis

Address (byte)	Description	
1	b0 to b5	Mounting position of the I/O module
	b6 to b7	2: Channel Related Diagnosis
2	b0 to b5	Channel number
	b6 to b7	I/O selection 0: Reserved 1: Input 2: Output 3: I/O
3	b0 to b4	Error type 0: Reserved 1: Short circuit 2: Low voltage 3: High voltage 4: Overload 5: Overheat 6: Disconnection 7: Upper limit exceeded 8: Lower limit underrun 9: Error 10 to 15: Reserved 16 to 31: Manufacturer specific (defined by the GSD file)
	b5 to b7	Channel type 0: Unspecified 1: Bit 2: 2 bits 3: 4 bits 4: Octet 5: Word 6: 2 words 7: Reserved

Ex.

Confirmation in the extended diagnostic information area of the buffer memory of the RJ71PB91V



(1) Channel Related Diagnosis + I/O module mounting position
(2) I/O selection + Channel number
(3) Channel type + Error type

■Diagnostic alarm

Address (byte)	Description	
1	b0 to b5	Size of Diagnostic alarm (byte length)
	b6 to b7	0: Device Related Diagnosis
2	b0 to b7	System area
3	b0 to b7	Mounting position of the I/O module
4	b0 to b1	Alarm specifier 0: No change in the I/O module status 1: Error occurred, Normal I/O module status 2: Error recovered, Normal I/O module status 3: An error recovered, I/O module still abnormal
	b2	0: ACK return not required 1: ACK return required
	b3 to b7	Sequence program No.
5 to 51	—	System area

Troubleshooting by symptom

Cannot communicate with the DP-Master

Check the following items.

Item	Action
Is the BF LED on the NZ2FT-PBV off?	If it is not turned off, perform troubleshooting. Also, check other LEDs. (☞ Page 254 When the BF LED turns on in red, Page 254 When the BF LED is flashing in red)
Is the voltage of the power supply (24VDC) of the NZ2FT-PBV within the specified range?	Set the voltage value within the range of performance specifications.
Is the wiring between the DP-Master and NZ2FT-PBV appropriate?	Review the wiring between the DP-Master and NZ2FT-PBV. (☞ Page 46 Wiring of network cable)
Are the parameters correct?	Check the parameters. (☞ Page 238 Parameter Setting)

If communication is not established with the DP-Master even after checking all of the above and checking with the LEDs of the I/O module and Web server, there is a risk of hardware failure in the NZ2FT-PBV.
Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

11 NZ2FT-MT

This chapter describes the details of the MODBUS/TCP coupler.

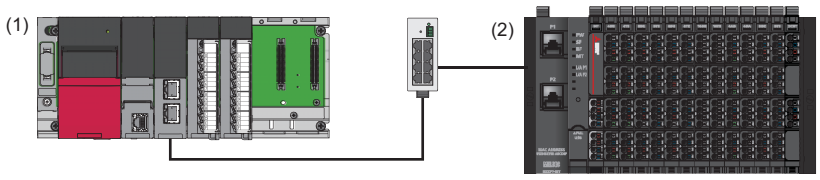
11.1 MODBUS/TCP Configuration

MODBUS/TCP is communication that uses the MODBUS protocol via an Ethernet cable, and is consisted of MODBUS/TCP master devices and MODBUS/TCP slave devices.
The NZ2FT system that uses the NZ2FT-MT supports MODBUS/TCP master devices that use the RJ71EN71 or QJ71MT91, and operates as MODBUS/TCP slave devices.

When the MODBUS/TCP master device is the RJ71EN71 (MELSEC iQ-R series)

Communication is performed using the following methods. (MODBUS/TCP master function MELSEC iQ-R Ethernet User's Manual (Application))

- Automatic communication by simple CPU communication function (constant periodic communication)
- Communication using the predefined protocol at any time (ECPRTCL instruction)

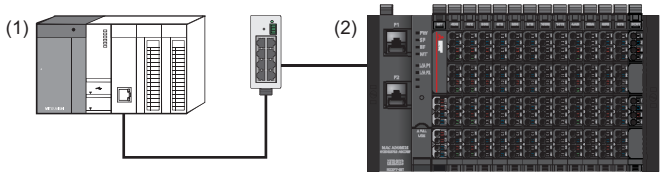


(1) MODBUS/TCP master device using the RJ71EN71
(2) MODBUS/TCP slave device using the NZ2FT-MT

When the MODBUS/TCP master device is the QJ71MT91 (MELSEC-Q series)

Communication is performed using the following methods. (Master function MODBUS/TCP Interface Module User's Manual (Details))

- Automatic communication by setting automatic communication parameters (constant periodic communication)
- Communication at any time (MBRW or MBREQ instruction)



(1) MODBUS/TCP master device using the QJ71MT91
(2) MODBUS/TCP slave device using the NZ2FT-MT

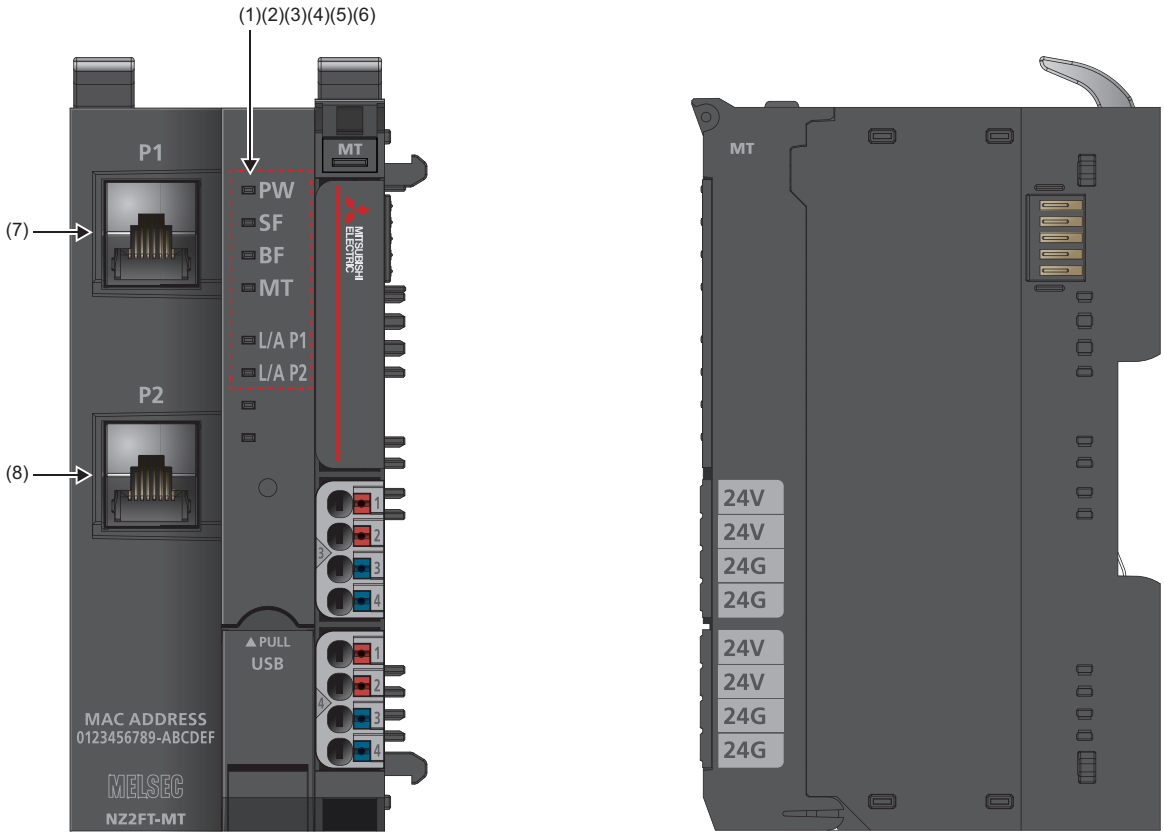
Corresponding master module and software package

The master module corresponding to the NZ2FT-MT and the software package corresponding to each master module are shown.
For how to check the version, refer to the manual for each master module and software package.

Master module			Software package	
Name	Model	Version	Product name	Version
Ethernet module	RJ71EN71	Firmware version "42" or later	GX Works3	1.045X or later
MODBUS/TCP interface module	QJ71MT91	The serial number (first five digits) of 17062 or later	GX Works2	1.568S or later

11.2 Part Names

This section describes the LEDs of the NZ2FT-MT. (☞ Page 94 Coupler Common Part Names)



No.	Name	Description
(1)	PW LED	Indicates the status of the module power supply. On in green: Power-on Off: Power-off
(2)	SF LED	Indicates the module status. On in red: Error (☞ Page 357 When the SF LED turns on in red) Flashing in red: Force mode Off: No error
(3)	BF LED	Indicates a communication error. On in red: Fieldbus error (☞ Page 358 When the BF LED turns on in red) Flashing in red: Error (☞ Page 358 When the BF LED is flashing in red) Off: No error
(4)	MT LED	Shows the status of the NZ2FT-MT and modules. On in yellow: Error (☞ Page 358 When the MT LED turns on in yellow) Off: No error
(5)	L/A P1 LED	On: Connection is established between P1 of the NZ2FT-MT and other field devices. Flashing: Data is being exchanged at P1 of the NZ2FT-MT. Off: Connection is not established between P1 of the NZ2FT-MT and other field devices. (☞ Page 359 When the L/A P1 LED and L/A P2 LED turn off) When it is on/flashing in green, the data communication speed is 100Mbps, and when it is on/flashing in yellow, the data communication speed is 10Mbps.
(6)	L/A P2 LED	Same as L/A P1 LED
(7)	P1 (Ethernet port)	Connect an Ethernet cable. (☞ Page 41 Wiring products for coupler that use the Ethernet cable)
(8)	P2 (Ethernet port)	

11.3 Performance Specifications

This section describes the performance specifications of the NZ2FT-MT. (☞ Page 30 General Specifications).

Item		Specifications
Connection		2×RJ45
Network		MODBUS/TCP
Number of connectable stations per master station		20 stations maximum
Open multi-client connection		64 maximum
Process data		1K bytes maximum
Parameter data		1K bytes maximum
Number of connectable I/O modules (excluding extension power supply modules)		64 modules maximum
Setting interface		Micro USB 2.0
Communication speed	Fieldbus	10Mbps 100Mbps
Transfer rate	System bus	48Mbps maximum
External power supply voltage	Input power supply	24VDC +20%/-15%
	Output power supply	24VDC +20%/-15%
Power supply rated current	Input power supply	10A
	Output power supply	10A
Module current consumption		105mA
Power cable connection method		Spring clamp terminal block
Applicable wire size		Solid wire, stranded wire 0.14 to 1.5mm² (26 to 16 AWG)
Weight		240g

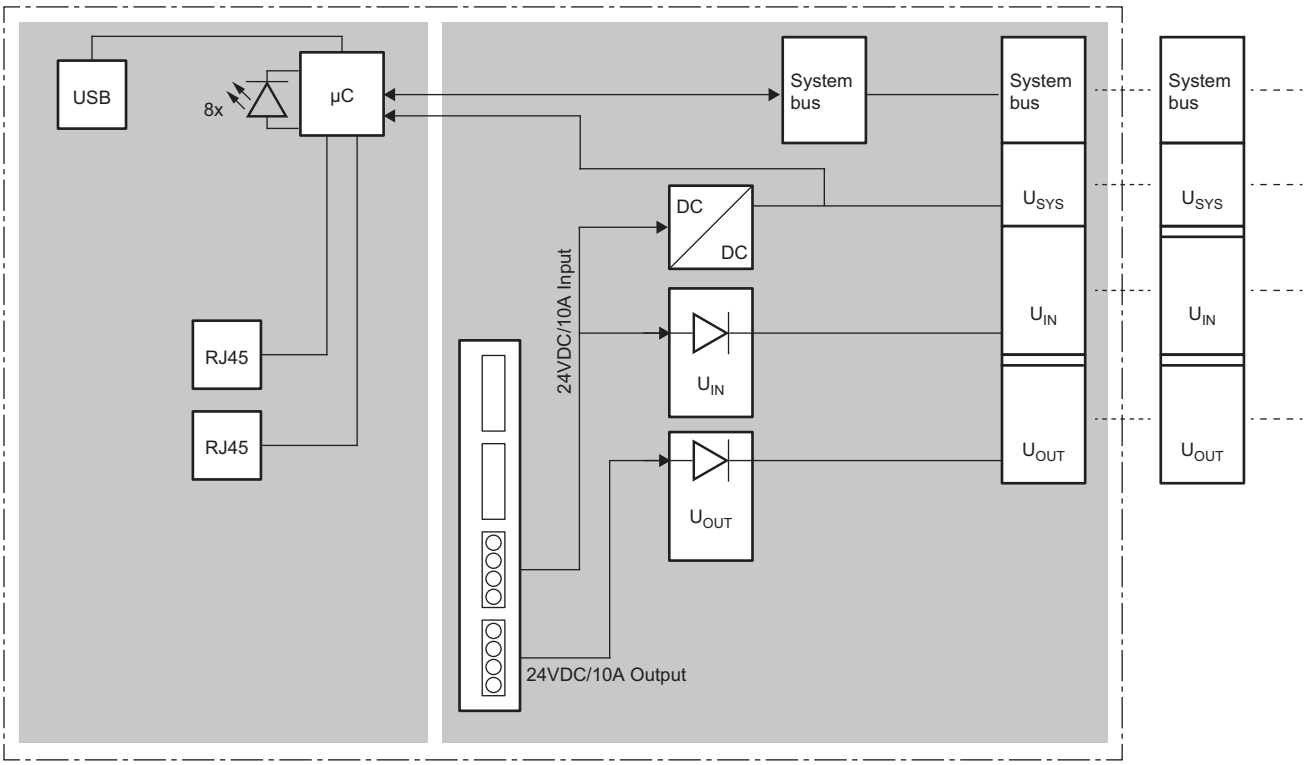
Precautions

The NZ2FT-MT supports only the following master modules.

☞ Page 263 Corresponding master module and software package

Block diagram

The following figure shows the internal block diagram of the NZ2FT-MT.



11.4 Functions

This section describes the functions of the NZ2FT-MT.

Function list

Item	Description	Reference
Fieldbus communication	Communicates with the master station using the MODBUS/TCP protocol. When the master station is the RJ71EN71, perform the following. • Automatic communication by simple CPU communication function (constant periodic communication) • Communication using the predefined protocol at any time (ECPRTCL instruction) When the master station is the QJ71MT91, perform the following. • Automatic communication by setting automatic communication parameters (constant periodic communication) • Communication at any time (MBRW or MBREQ instruction)	• Page 263 When the MODBUS/TCP master device is the RJ71EN71 (MELSEC iQ-R series) • Page 263 When the MODBUS/TCP master device is the QJ71MT91 (MELSEC-Q series)
Parameter setting (slave parameter)	Use the engineering tool of the RJ71EN71 or QJ71MT91 to set the slave parameters for the NZ2FT-MT.	• Page 299 Settings on the master station (RJ71EN71) • Page 302 Settings on the master station (QJ71MT91)
Data format switching	Sets the data format received/sent from/to the master station to big-endian or little-endian.	Page 304 Parameter list
Save module parameters on coupler function	Records the I/O module parameters in the non-volatile memory of the NZ2FT-MT. It is compatible with the NZ2FT-MT with firmware version 2.6.0 or earlier.	Page 75 Module parameter function
Module parameter function	Records the I/O module parameters in the non-volatile memory of the NZ2FT-MT. It is compatible with the NZ2FT-MT with firmware version 2.7.0 or later.	Page 75 Module parameter function
Additional TCP port	Assigns one more TCP port number in addition to number 502 to connect to 2 master stations.	Page 268 Additional TCP port function
Status Modbus watchdog function	Monitors the watchdog between master stations in the specified time.	Page 268 Status Modbus watchdog function
Modbus automatic communication timeout monitoring	Monitors the Process data exchange (automatic communication) with the master station of MODBUS.	Page 269 Modbus automatic communication timeout monitoring
Writing access in multi-client operation	Sets the master station for which the parameter write is enabled.	Page 269 Writing access in multi-client operation
Check reference list before data exchange	Sets whether to start communications with the master station by verifying the module configuration information (reference list) of the master and slave stations.	Page 270 Check reference list before data exchange
Modbus Dual LAN	Enables communications with two different networks.	Page 291 Modbus Dual LAN Mode
Output value setting for fieldbus error	Set the output value of the I/O module for each case, such as when the CPU module status of the master station changes or a fieldbus error occurs.	Page 292 Output value setting for fieldbus error
I/O value setting for Hot swap	Set the I/O value of the I/O module of when replacing the I/O module while the power is on.	Page 79 I/O value setting for Hot swap
Checking warning output (Process alarm)	Check whether Process alarm has occurred from the I/O module corresponding to the warning output, and read Process alarm data of the content.	Page 294 Checking warning output (Process alarm)

Web server functions

Item	Description	Reference
Web server connection	Access the Web server via the USB port or the Ethernet port.	Page 60 Connection with a Personal Computer
Webserver via Ethernet	Set whether to enable or disable the access to the Web server via the Ethernet port.	Page 304 Parameter list
IP address specification method setting	Set the specification method of the IP address.	Page 304 Parameter list
DHCP server response timeout time setting	Sets the timeout time when an IP address is acquired from the DHCP server.	Page 304 Parameter list
Login/Logout	Authenticate/clear access to the Web server. The functions will be limited if not logged in.	Page 64 Login/Logout
HTTPS setting	Encrypts the communications with the Web server.	Page 67 HTTPS setting
Help display	Displays Help of the Web server.	Page 69 Window Layout
Changing the language	Changes the display language of the Web server.	Page 73 Changing the language
Parameter setting	On the Web server, set the parameters of the NZ2FT-MT and I/O module.	Page 304 Parameter list
Force mode	Inputs/outputs an arbitrary value forcibly from the Web server without being affected by the input from an external device or by the operation result (cyclic data) of the program.	Page 76 Force mode
Lock force mode	Enables or disables to change mode to the Force mode.	Page 304 Parameter list
Tag name function	Set an arbitrary character string as the channel name of the I/O module.	Page 83 Tag name function
I&M data function	Records I&M data (Identification & Maintenance) such as the installation location of the system and the installation date.	Page 85 I&M data function
Reset	Restarts the NZ2FT-MT from the Web server.	Page 85 Resetting the coupler
Saving/loading parameter files	Saves or loads the parameter file of the NZ2FT-MT and I/O module.	Page 80 Saving/loading parameter files
Initialization	Restores the NZ2FT-MT to the factory default settings from the Web server.	Page 86 Initialization of the coupler
Firmware update	Updates the firmware of the NZ2FT-MT and I/O module.	Page 87 Firmware update

Troubleshooting

Item	Description	Reference
LED indication	The status of the NZ2FT-MT is displayed in LED.	• Page 264 Part Names • Page 357 Checking with LEDs
Status management	Check Coupler status indicating the status of the NZ2FT-MT with the NZ2FT-MT or Web server.	Page 360 Confirmation by status information (Coupler status)
Acquisition of the service file	If troubleshooting does not solve the problem, analyze the failure by acquiring the service file.	Page 88 Acquisition of the service file

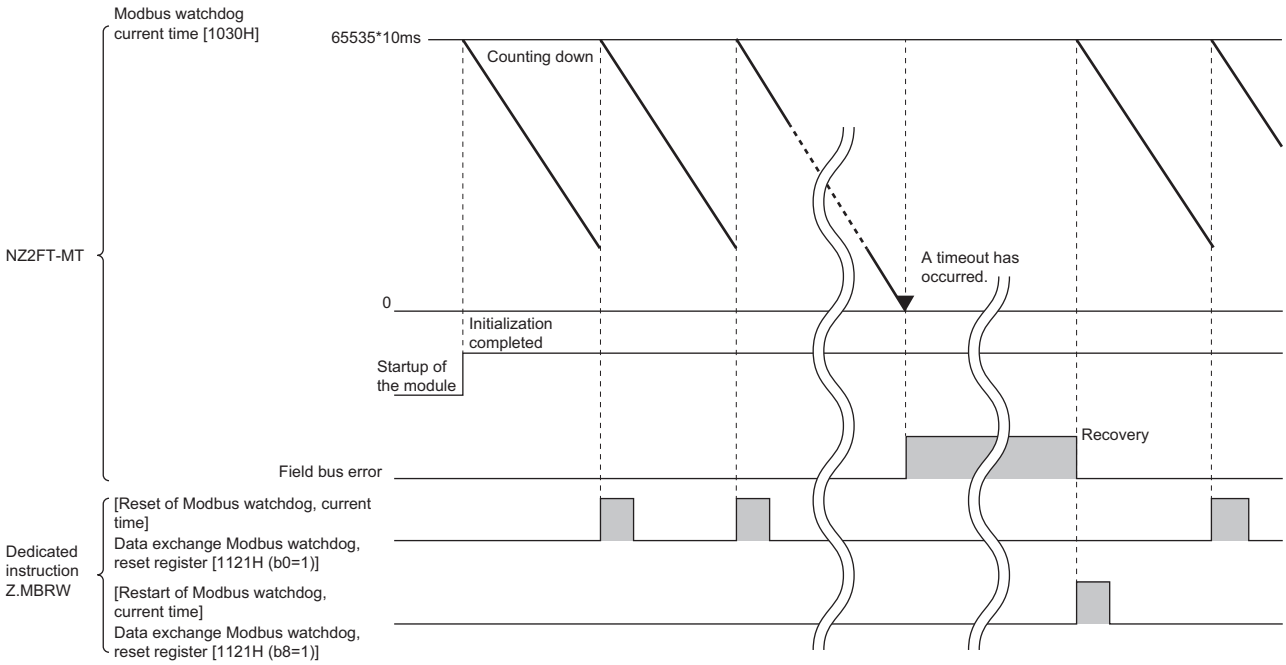
Additional TCP port function

The TCP port number of MODBUS/TCP for the slave station is 502 by default. Setting a port number for the parameter "Additional TCP port" allows opening of another TCP port which can be used to connect only one more master station.
Additional port numbers are set with the parameter "Additional TCP port". (☞ Page 304 Parameter list)
The setting range is 0 to 65535 (except for 80, 161, and 443). When 0 is set, no port number is added.

Status Modbus watchdog function

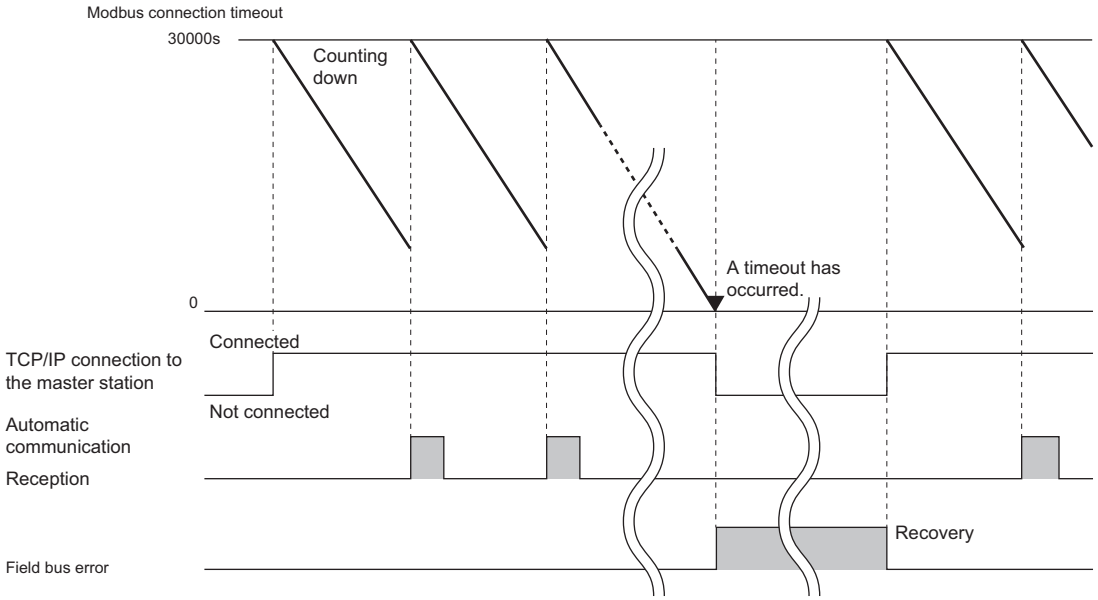
This function monitors the Watchdog reset from the master station.
Monitoring starts when the NZ2FT-MT is started (initialization is completed), and a fieldbus error occurs when the Watchdog timeout occurs. If it is a fieldbus error caused by a Watchdog timeout, communication with the master station is possible and a response is sent when requested by the master station. The output control depends on the setting of the parameter "Output behaviour on fieldbus error". (☞ Page 292 Output value setting for fieldbus error).

Item	Register address	Size	Description	
Modbus watchdog, current time	1030H	Word	Remaining time of Status Modbus watchdog • When Data exchange Modbus watchdog reset register (1121H, b0 = 1) is reset, the value set in the parameter "Status Modbus watchdog" is set again. • When the value is counted down to 0, a fieldbus error occurs.	
Data exchange Modbus watchdog, reset register	1121H	Word	b0	Reset of the Watchdog monitoring timer • Set (reset) b0 to 1 periodically to prevent the Watchdog timeout. • After setting b0 to 1, b0 need not be set to 0.
			b8	Restart of Status Modbus watchdog • After the Watchdog has timed out, set b8 to 1 to restart the Watchdog monitoring. • After setting b8 to 1, b8 need not be set to 0.



Modbus automatic communication timeout monitoring

This function monitors the automatic communication of Process data with the master station.
When the TCP/IP connection is disconnected due to a timeout, a fieldbus error occurs.
The monitoring time is set with the parameter "Modbus connection timeout". (☞ Page 304 Parameter list)



For the operation of the master station when the TCP/IP connection is disconnected during automatic communication, refer to the following.

- When the master station is the RJ71EN71: Communication timeout time, number of communication retries, abnormal monitoring time (📖 MELSEC iQ-R Ethernet User's Manual (Application))
- When the master station is the QJ71MT91: Operating status of the automatic communication function (📖 MODBUS/TCP Interface Module User's Manual (Details))

Writing access in multi-client operation

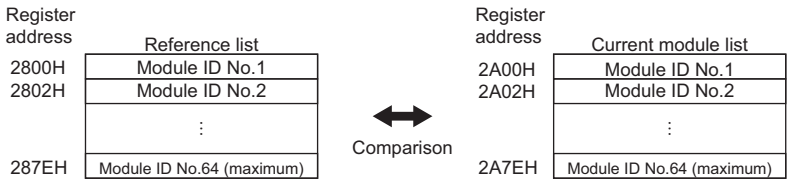
This function sets from which connection would writing be enabled when the parameter "Additional TCP port" is set and up to two master stations are connected. (The connection is a combination of IP address and port number. Even if the IP address is the same, if the port number is different, the connection will be different.)
The TCP port number 502 is not related.
The write enabled setting is set with the parameter "Writing access in multi-client operation". (☞ Page 304 Parameter list)

Check reference list before data exchange

To detect a configuration error, the coupler verifies the I/O module configuration information (Reference list) defined in the master station with the I/O module configuration information (Current module list) held by the coupler. The coupler verifies Module ID for each I/O module.

When Reference list defined in the master station and Current module list created in the coupler match, data output from the master station to the coupler starts. (Data input from the coupler to the master station starts when the communication is returned.)

Reference list and Current module list consist of Module IDs of I/O modules, in order they were mounted to the coupler. (☞ Page 591 Module ID list)



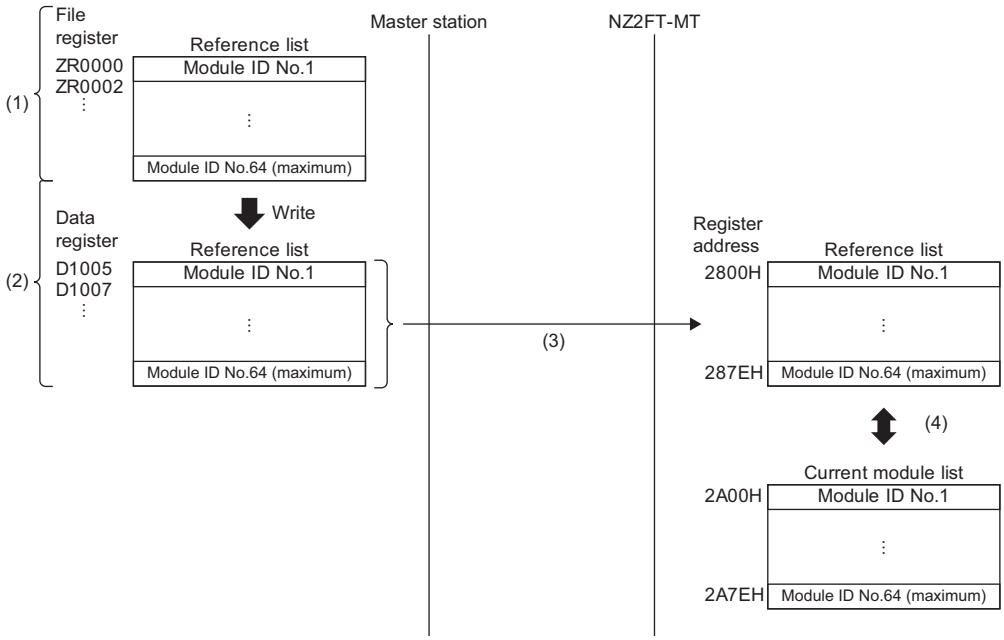
- When the parameter "Check reference list before data exchange" is set to "Enabled", Reference list (2800H) and Current module list (2A00H) are verified. (☞ Page 304 Parameter list)
- The coupler verifies Reference list against Current module list immediately after startup. Immediately after startup, the Module ID data in Reference list disappears (all become 0), so Reference list needs to be written from the master station.
- If the verification results do not match, the output data operates according to the setting of the parameter "Output behaviour on fieldbus error". (☞ Page 304 Parameter list)

For the RJ71EN71

The following describes how to verify Reference list against Current module list.

Ex.

Operation until verification



(1) Enter Module ID of the I/O module in the file register (ZR).
(2) In the program, write Module ID of the file register (ZR) to the data register (D).
(3) Write Module ID of the data register (D) to the NZ2FT-MT using the dedicated instruction GP.ECPRTCL.
(4) Verify Reference list against Current module list. (The contents of Current module list are automatically created when the NZ2FT-MT is started.)

■Verification procedure

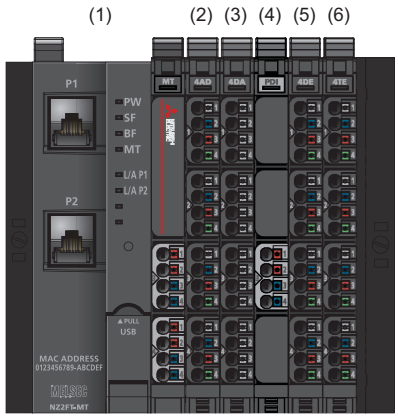
The following describes how to verify Reference list.

1. Create protocol configuration data. (☞ Page 272 Creating protocol setting data)
2. Create a connection number. (☞ Page 277 Creating a connection number)
3. Create Reference list. (☞ Page 278 Creating Reference list)
4. Write Reference list to the NZ2FT-MT. (☞ Page 279 Writing Reference list)

Point

When verifying Reference list from the second time onward, it is not necessary to create the protocol setting data and connection number.

Each procedure is explained using the following system configuration as an example.



No.	Model	Module ID*1
(1)	NZ2FT-MT	—
(2)	NZ2FTS-60AD4	15C40401H
(3)	NZ2FTS-60DA4	25E00506H
(4)	NZ2FTPDI	— (Extension power supply modules are not included in Reference list.)
(5)	NZ2FTS4-4DE	1F840009H
(6)	NZ2FTS4-4TE	2FA00101H

*1 Indicates Module ID when the data format is in Motorola format. For details on changing the data format, refer to the following.
☞ Page 304 Parameter list

■Creating protocol setting data

The following describes how to create protocol setting data.

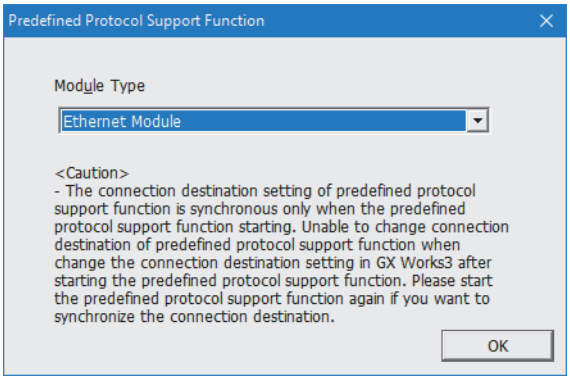
For details on the predefined protocol support function and protocol setting data, refer to the following.

MELSEC iQ-R Ethernet User's Manual (Application)

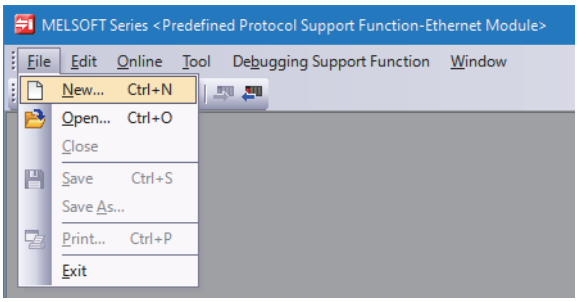
1. Start the predefined protocol support function of the engineering tool.

[Tool] ⇨ [Predefined Protocol Support Function]

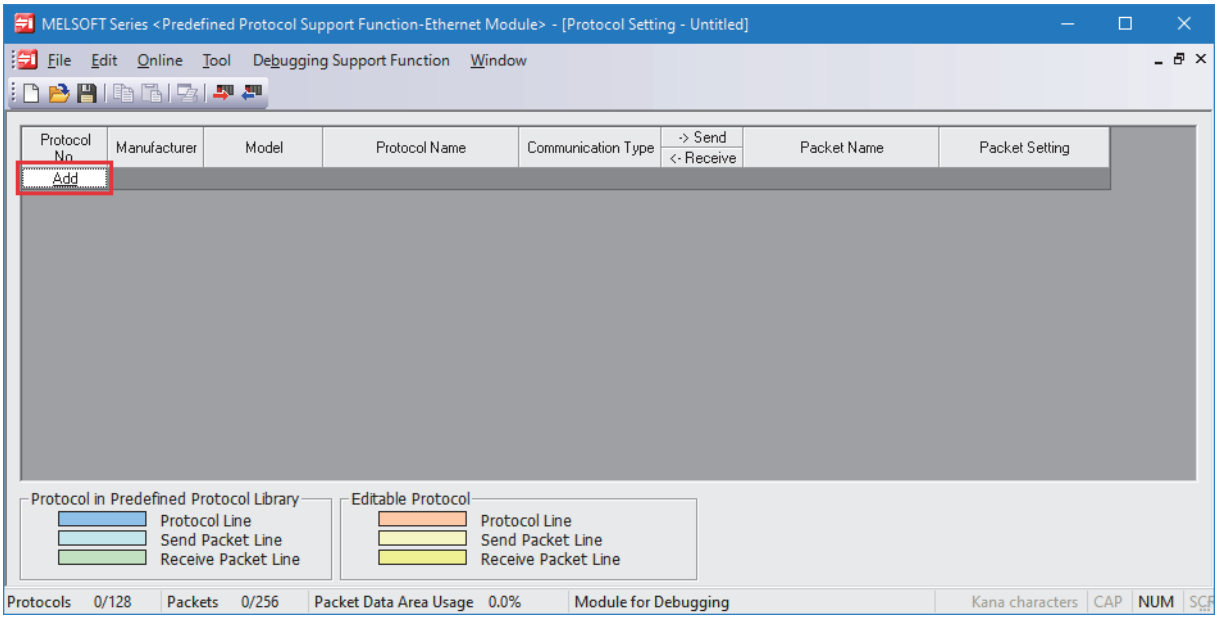
2. Select "Ethernet Module" for "Module Type" and click the [OK] button.



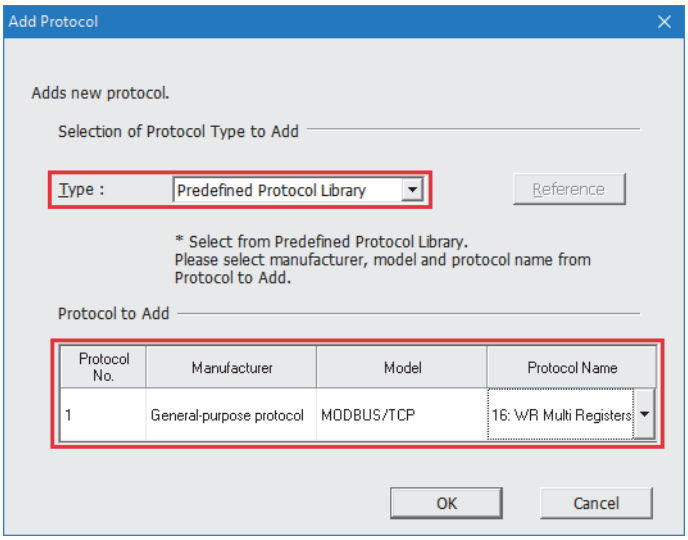
3. On the "Predefined Protocol Support Function" window, select [File] and [New].



4. Select "Add" in the "Protocol No." column.



5. Set the following on the "Add Protocol" window and click the [OK] button.

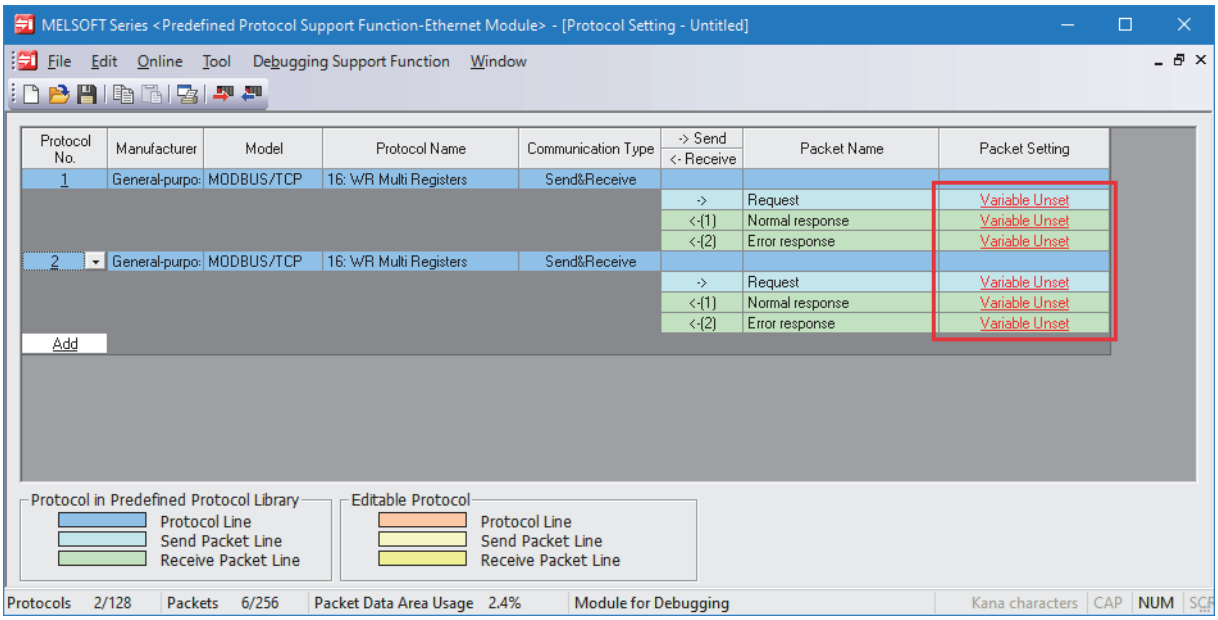


Item	Setting details
Type	Predefined protocol library
Protocol number	1 (Specify a unique number for each protocol setting data.)
Manufacturer	General purpose protocol
Model	MODBUS/TCP
Protocol name	16: WR Multi Registers

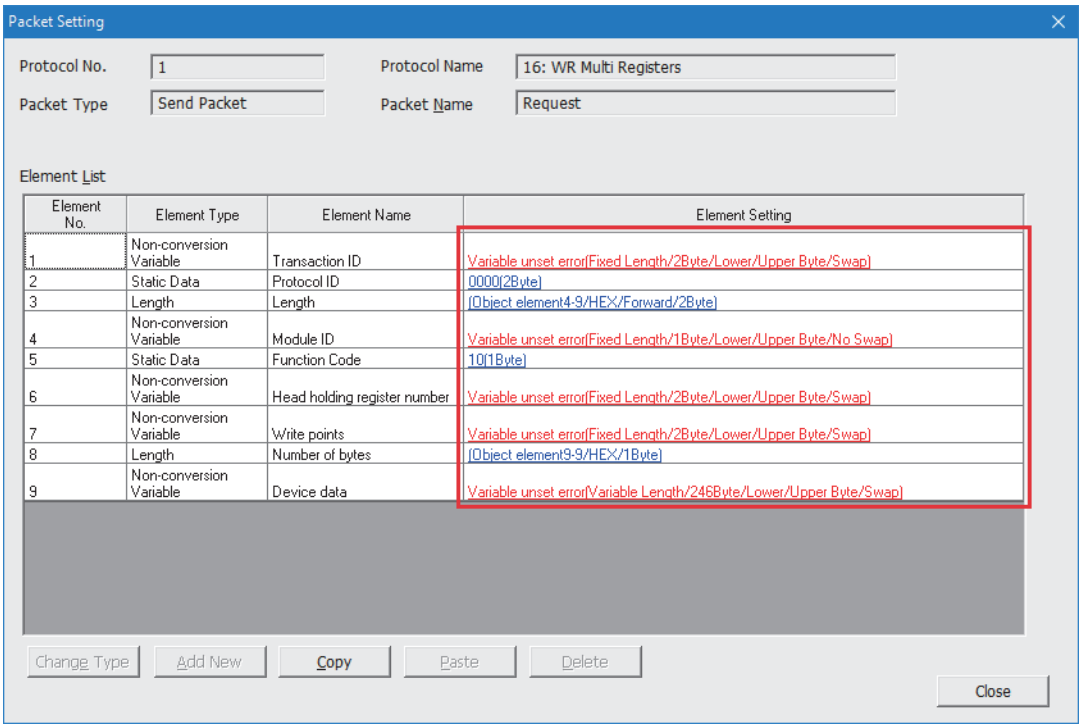
Repeat procedures 4 and 5 to also add the following settings. (Since Reference list for 64 modules cannot be sent to the NZ2FT-MT at once, two protocol setting data are created.)

Item	Description
Type	Predefined protocol library
Protocol number	2 (Specify a unique number for each protocol setting data.)
Manufacturer	General purpose protocol
Model	MODBUS/TCP
Protocol name	16: WR Multi Registers

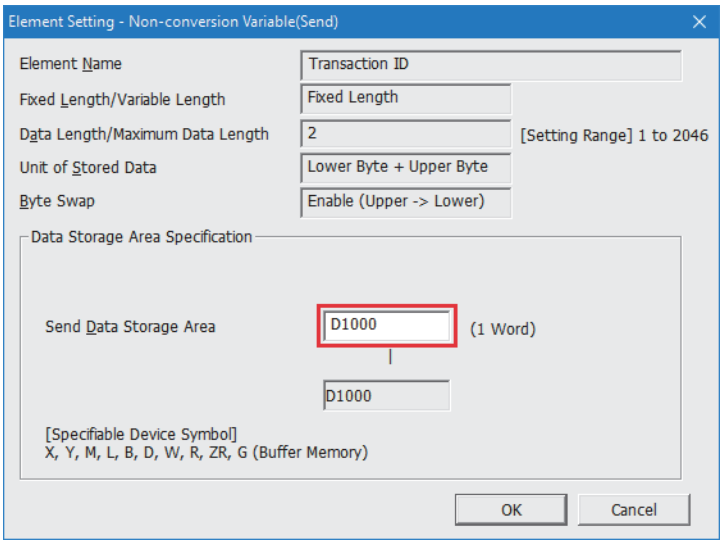
6. For the added protocol setting data "Request", "Normal response", and "Error response", click "Variable Unset" in the "Packet Setting" column. The following procedure is described using "Request" with protocol number 1 as an example.



7. On the "Packet Setting" window, click "Variable unset error" in "Element Setting".



8. Set the device to "Data Storage Area Specification".



The following is a device that can be used in Check reference list before data exchange (for R04CPU by default). Set it so that it does not overlap with other data storage areas.

Device	Range of use
D	D0 to D18307 (123 words are allocated for Request.)

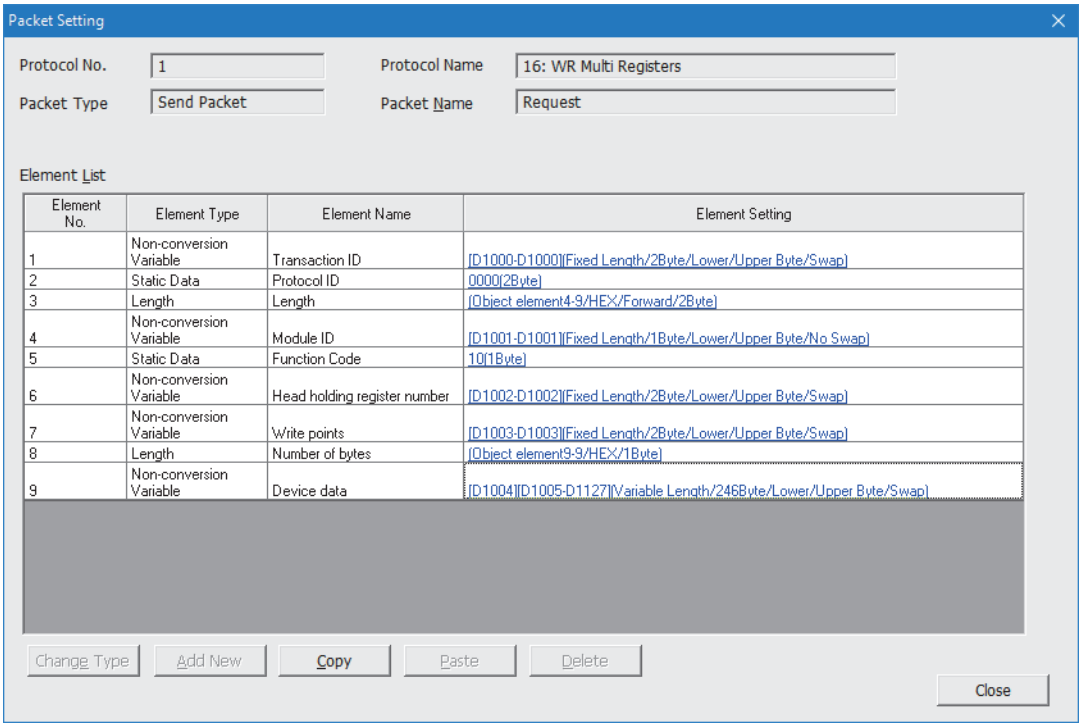
After setting the device, click the [OK] button.

9. Repeat procedures 7 and 8 to set the following.

Protocol number	Packet name	Element name	Data storage area specification
1	Request	Transaction ID	D1000
		Module ID	D1001
		Head holding register number	D1002
		Write points	D1003
		Device data	D1004
	Normal response	Transaction ID	D2000
		Module ID	D2001
		Head holding register number	D2002
		Write points	D2003
	Error response	Transaction ID	D3000
		Module ID	D3001
		Exception Code	D3002
2	Request	Transaction ID	D1150
		Module ID	D1151
		Head holding register number	D1152
		Write points	D1153
		Device data	D1154
	Normal response	Transaction ID	D2050
		Module ID	D2051
		Head holding register number	D2052
		Write points	D2053
	Error response	Transaction ID	D3050
		Module ID	D3051
		Exception Code	D3052

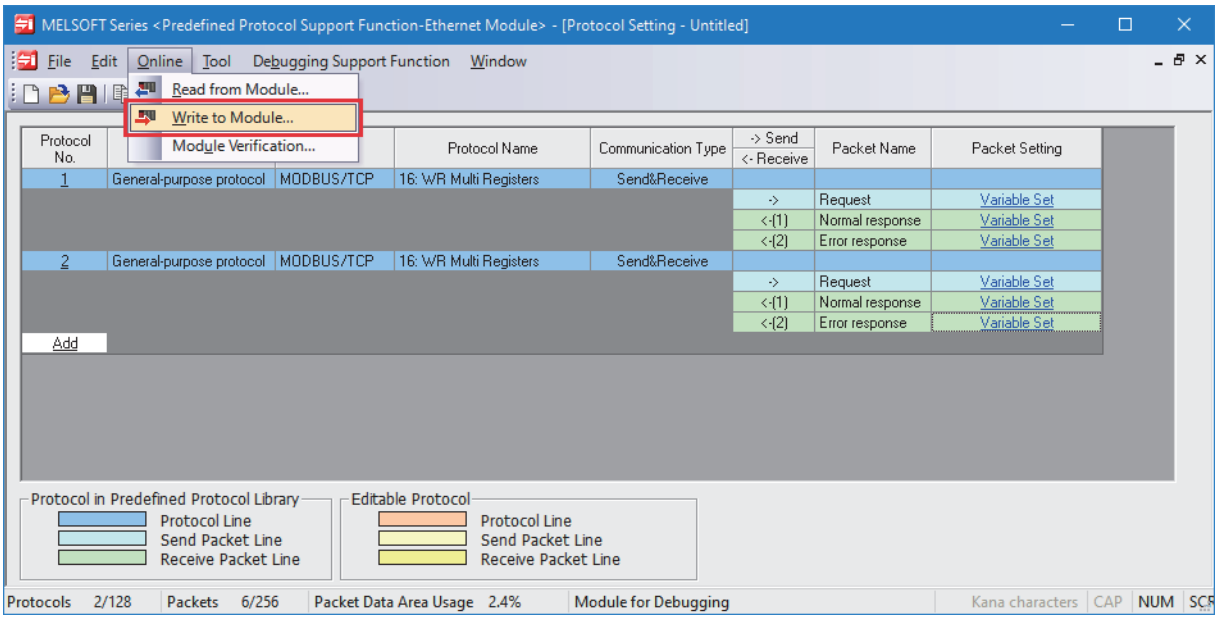
Ex.

For "Request" with protocol number 1

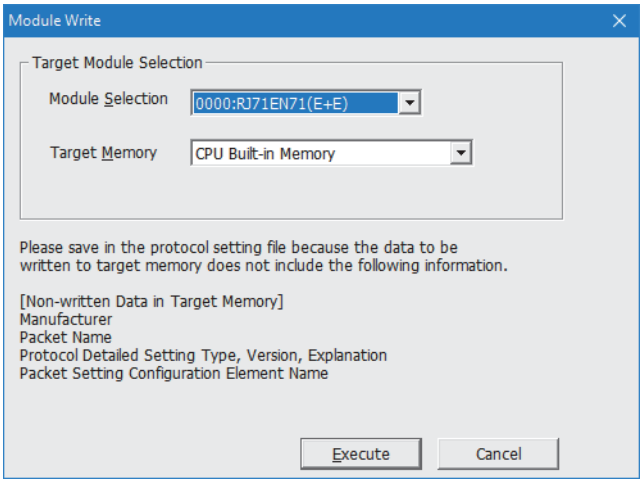


After completing the settings, click the [Close] button.

10. Select [Online] ⇨ and [Write to Module].



11. Set the following on the "Module Write" window.



- Set "Module Selection" to "0000:RJ71EN71(E+E)".
- Set "Target Memory" to "CPU Built-in Memory".

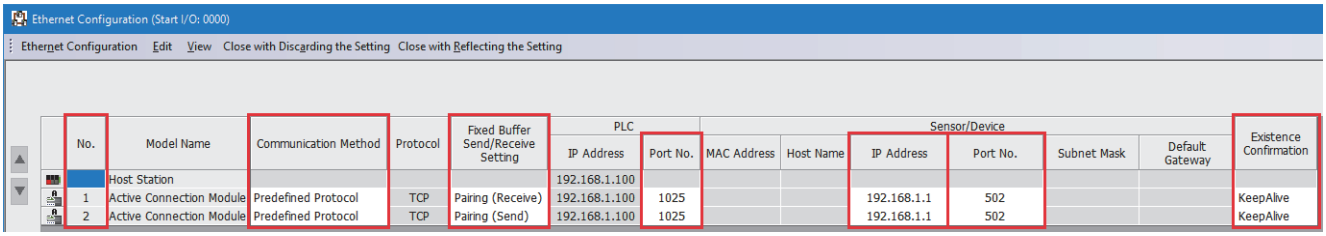
After setting, click the [Execute] button to write the protocol setting data. When writing, put the CPU module in the STOP state.

■Creating a connection number

The connection number is created in the connection configuration setting of the external device in the engineering tool. (📖 MELSEC iQ-R Ethernet User's Manual (Application))

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71EN71] ⇨ [Port 1 Module Parameter (Ethernet)] ⇨ [Basic Settings] ⇨ [External Device Configuration]

1. Select "Active Connection Module" from "Module List" and drag and drop it twice on the device list or device map.
2. Set the following items.

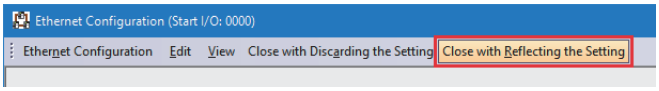


Item		Description	
No.		1	2
Communication Method		Predefined Protocol	Predefined Protocol
Fixed Buffer Send/Receive Setting		Pairing (Receive)	Pairing (Send)
PLC	Port No.	1025	1025
Sensor/Device	IP Address	192.168.1.1	192.168.1.1
	Port No.	502	502
Existence Confirmation		KeepAlive	KeepAlive

For the setting range of each item, refer to the following.

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

3. Select [Close with Reflection the Setting] to close the window.



4. Perform [Online] and [Write to PLC] and write the set contents to the CPU module and RJ71EN71.
5. Turn off and on or reset the CPU module.

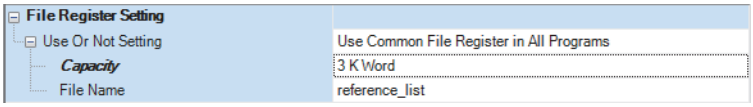
■Creating Reference list

Create Reference list in the latched area.

The following describes how to create Reference list using an example of creating a file register (ZR) of the CPU module.

1. In GX Works3, set the file register as follows.

[Parameter] ⇨ [CPU Parameter] ⇨ [File Setting] ⇨ [File Register Setting]



Item	Description
Use Or Not Setting	Use common file registers for all programs
Capacity	3 (Module ID (2 words) × Maximum number of connectable I/O modules (64) × Maximum number of connectable stations (20) = 2560 words → 3K word)
File Name	reference_list

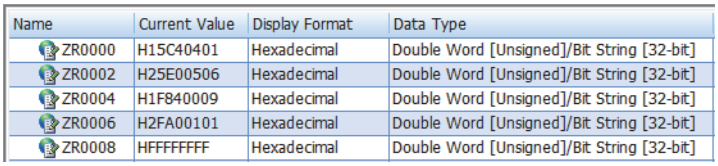
For details on setting the file register, refer to the following.

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

2. The watch window is displayed.

[View] ⇨ [Docking Window] ⇨ [Watch 1] to [Watch 4]

3. Set "Display Format" to "Hexadecimal" and "Data Type" to "Double Word [Unsigned]/Bit String [32-bit]", and set Module ID according to the system configuration.



Name	Current Value	Display Format	Data Type
ZR0000	H15C40401	Hexadecimal	Double Word [Unsigned]/Bit String [32-bit]
ZR0002	H25E00506	Hexadecimal	Double Word [Unsigned]/Bit String [32-bit]
ZR0004	H1F840009	Hexadecimal	Double Word [Unsigned]/Bit String [32-bit]
ZR0006	H2FA00101	Hexadecimal	Double Word [Unsigned]/Bit String [32-bit]
ZR0008	HFFFFFFFF	Hexadecimal	Double Word [Unsigned]/Bit String [32-bit]

Name	Current value*1	Description
ZR0000	H15C40401	Module ID of the NZ2FTS-60AD4
ZR0002	H25E00506	Module ID of the NZ2FTS-60DA4
ZR0004	H1F840009	Module ID of the NZ2FTS4-4DE
ZR0006	H2FA00101	Module ID of the NZ2FTS4-4TE
ZR0008	HFFFFFFFF	The program for writing Reference list includes processing to reduce the number of loops in the program when the number of I/O modules is less than 64. Therefore, set FFFFFFFFH as the end code next to the I/O module mounted last.

*1 Indicates Module ID when the data format is in Motorola format. For details on changing the data format, refer to the following.
☞ Page 304 Parameter list

For Module ID of each I/O module, refer to the following.

☞ Page 591 Module ID list

■Writing Reference list

The following describes a program for writing Reference list to the coupler using the dedicated instruction GP.ECPRTCL.

For details on the dedicated instruction GP.ECPRTCL, refer to the following.

📖 MELSEC iQ-R Programming Manual (Module Dedicated Instruction)

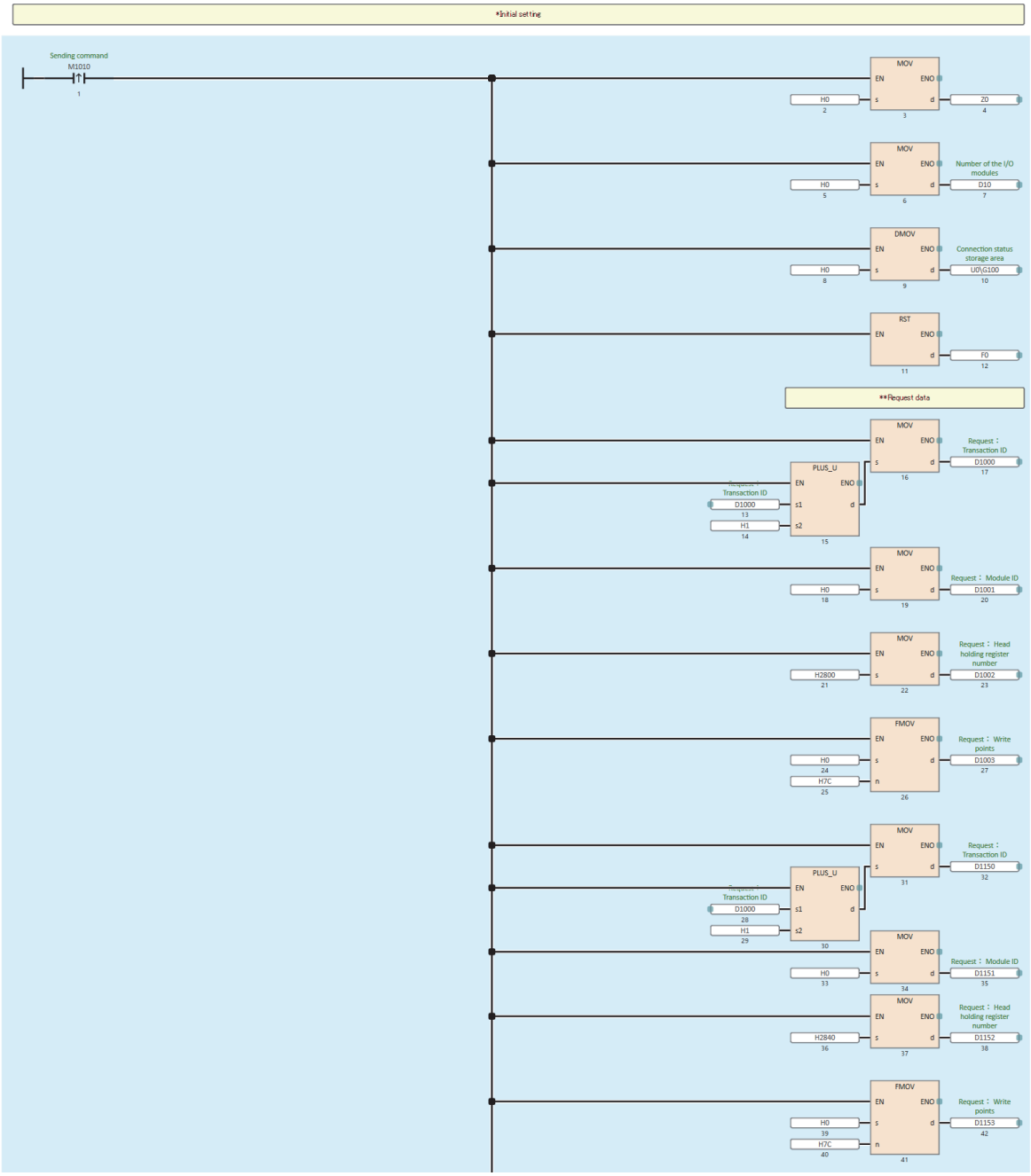
• Device to be used

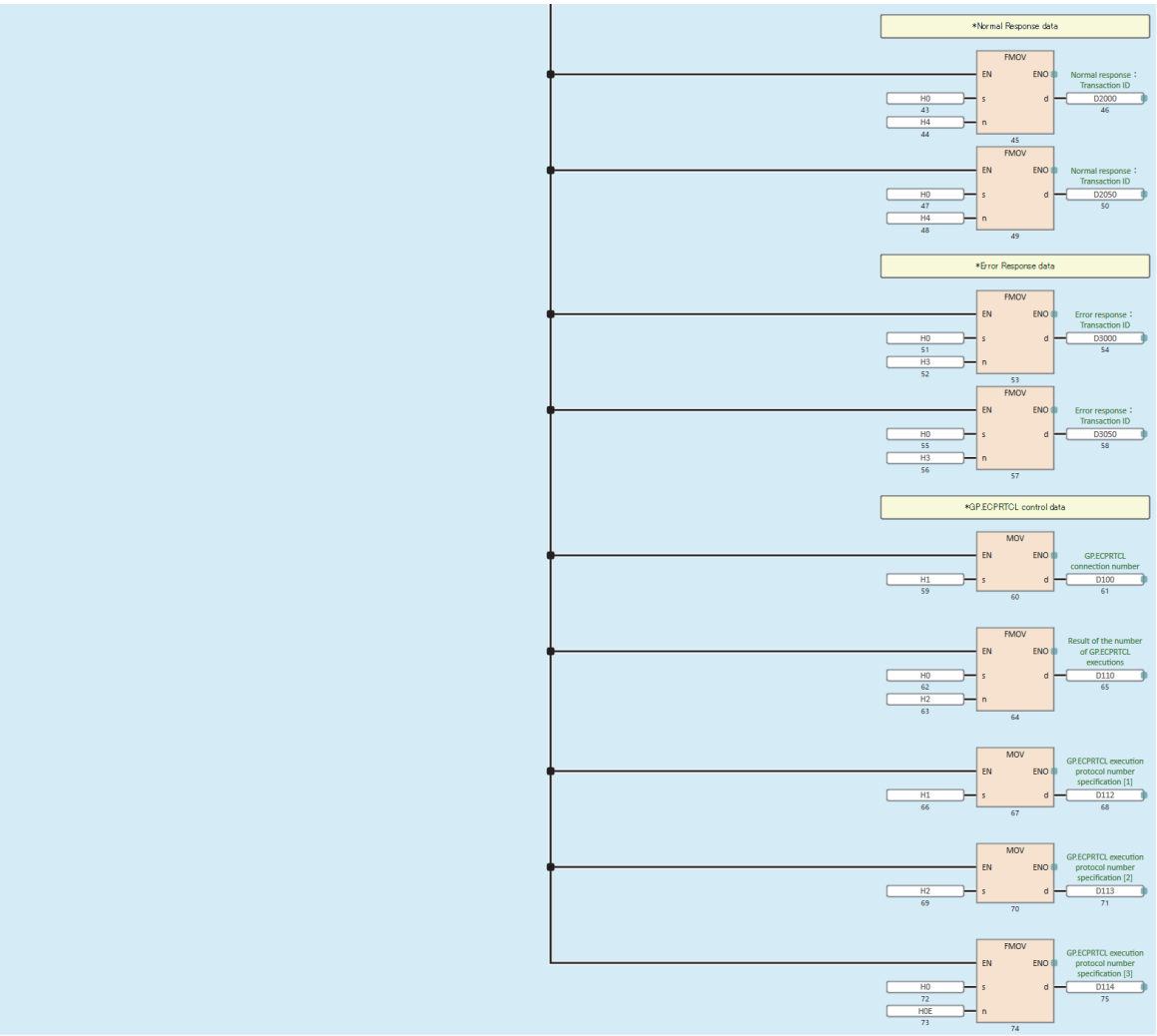
Device	Description	
M1010	Reference list send request flag	
Z0	For address specification	
D10	I/O module count	
F0	Error occurrence flag • 0: No error • 1: Error	
M1	Dedicated instruction GP.ECPRTCL	Operand (d+0): Dedicated instruction completion signal
M2		Operand (d+1): Dedicated instruction error signal
D100		Operand (s1): Connection No.1 (0001H) (📖 MELSEC iQ-R Ethernet User's Manual (Application))
D101		Operand (s2): Number of protocol setting data created
D110		Operand (s3+0): Number of protocols executed by the GP.ECPRTCL instruction
D111		Operand (s3+1): State at instruction completion If the GP.ECPRTCL instruction is executed multiple times, the last execution result is stored. • 0: Completed successfully • Other than 0: Completed with an error (error code)
D112		Operand (s3+2): The protocol number created in the protocol setting data to be executed first
D113		Operand (s3+3): The protocol number created in the protocol setting data to be executed secondly
D114 to D119		Operand (s3+4 to +9): 0000H
D120		Operand (s3+10): Result of the protocol number executed first • 0: Not executed • 1: The result is stored in Normal response. • 2: The result is stored in Error response.
D121		Operand (s3+11): Result of protocol number executed secondly • 0: Not executed • 1: The result is stored in Normal response. • 2: The result is stored in Error response.
D122 to D127		Operand (s3+12 to +17): 0000H
D1000	Request (protocol number 1)	Transaction ID: 0 to 65535 (Set consecutive numbers. When it reaches 65536, return it to 0.)
D1001		Module ID: 0000H (fixed)
D1002		Head holding register number: Reference list register address 2800H
D1003		Write points: Number of registers to be written (number of I/O modules × 2 registers)
D1004		Device data: Number of bytes to be written (number of registers to be written × 2 bytes)
D1005 to D1127		Device data: Reference list transferred to the data register (D)
D2000	Normal response (protocol number 1)	Transaction ID: Transaction ID specified in Request
D2001		Module ID: 0000H
D2002		Head holding register number: Head holding register number (2800H) specified in Request
D2003		Write points: Write points specified in Request
D3000	Error response (protocol number 1)	Transaction ID: Transaction ID specified in Request
D3001		Module ID: 0000H
D3002		Exception Code: MODBUS abnormal response code (☞ Page 321 MODBUS abnormal response code)
D1150	Request (protocol number 2)	Transaction ID: 0 to 65535 (Set consecutive numbers. When it reaches 65536, return it to 0.)
D1151		Module ID: 0000H (fixed)
D1152		Head holding register number: Reference list register address 2840H
D1153		Write points: Number of registers to be written (number of I/O modules × 2 registers)
D1154		Device data: Number of bytes to be written (number of registers to be written × 2 bytes)
D1155 to D1277		Device data: Reference list transferred to the data register (D)

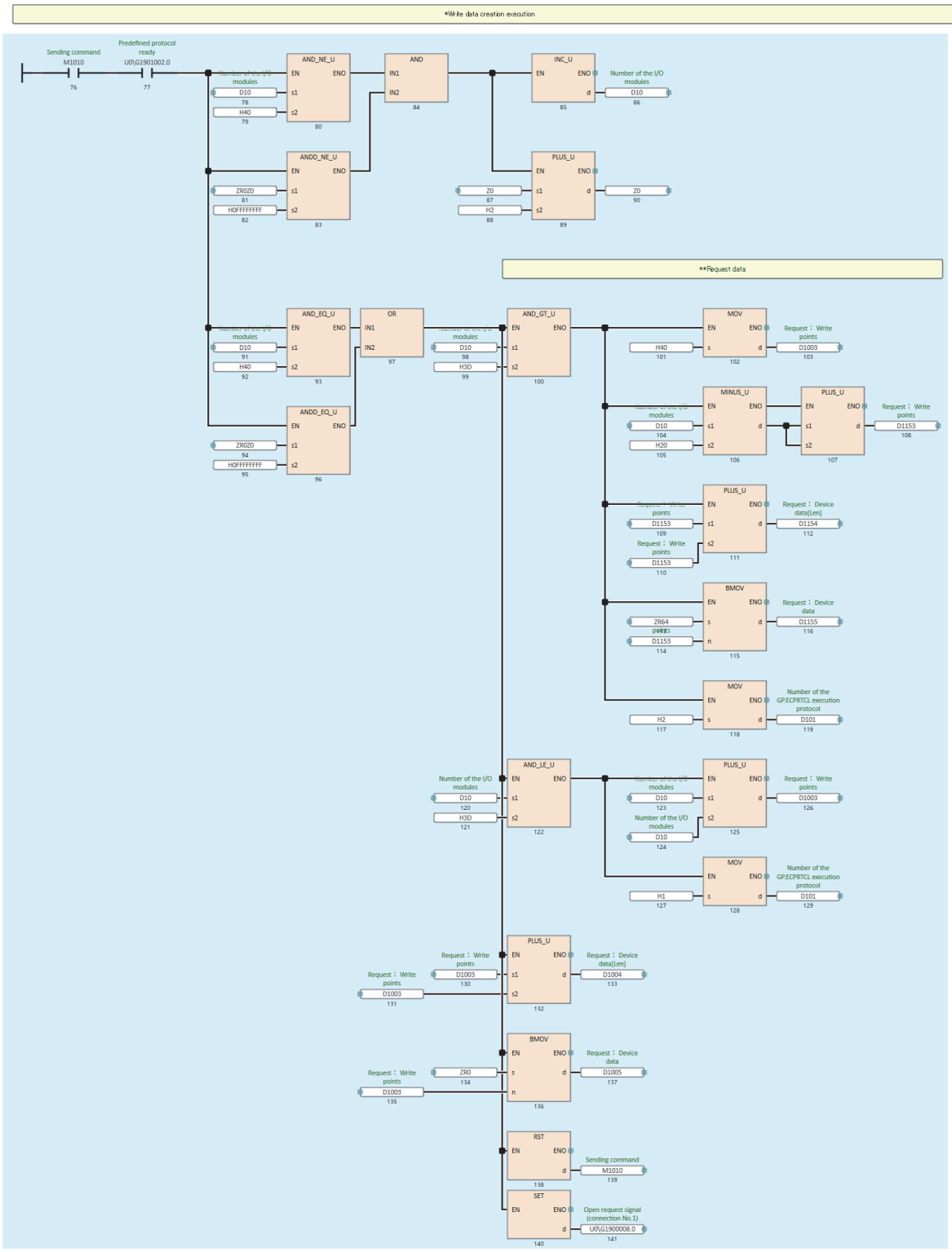
Device	Description	
D2050	Normal response (protocol number 2)	Transaction ID: Transaction ID specified in Request
D2051		Module ID: 0000H
D2052		Head holding register number: Head holding register number (2840H) specified in Request
D2053		Write points: Write points specified in Request
D3050	Error response (protocol number 2)	Transaction ID: Transaction ID specified in Request
D3051		Module ID: 0000H
D3052		Exception Code: MODBUS abnormal response code (☞ Page 321 MODBUS abnormal response code)
ZR0 to ZR127	Reference list created in the file register	
U0\G100	Error code It is stored when the opening is not completed.	
U0\G1900000.0	Open completion signal (connection No.1) The open state is stored. • 0: Closed or unopened • 1: Open completed	
U0\G1900008.0	Open request signal (connection No.1) The open processing status is stored. • 0: No open request • 1: Open request in progress	
U0\G1901002.0	Predefined protocol ready The preparation status of the protocol setting data is stored. • 0: Not ready • 1: Ready	

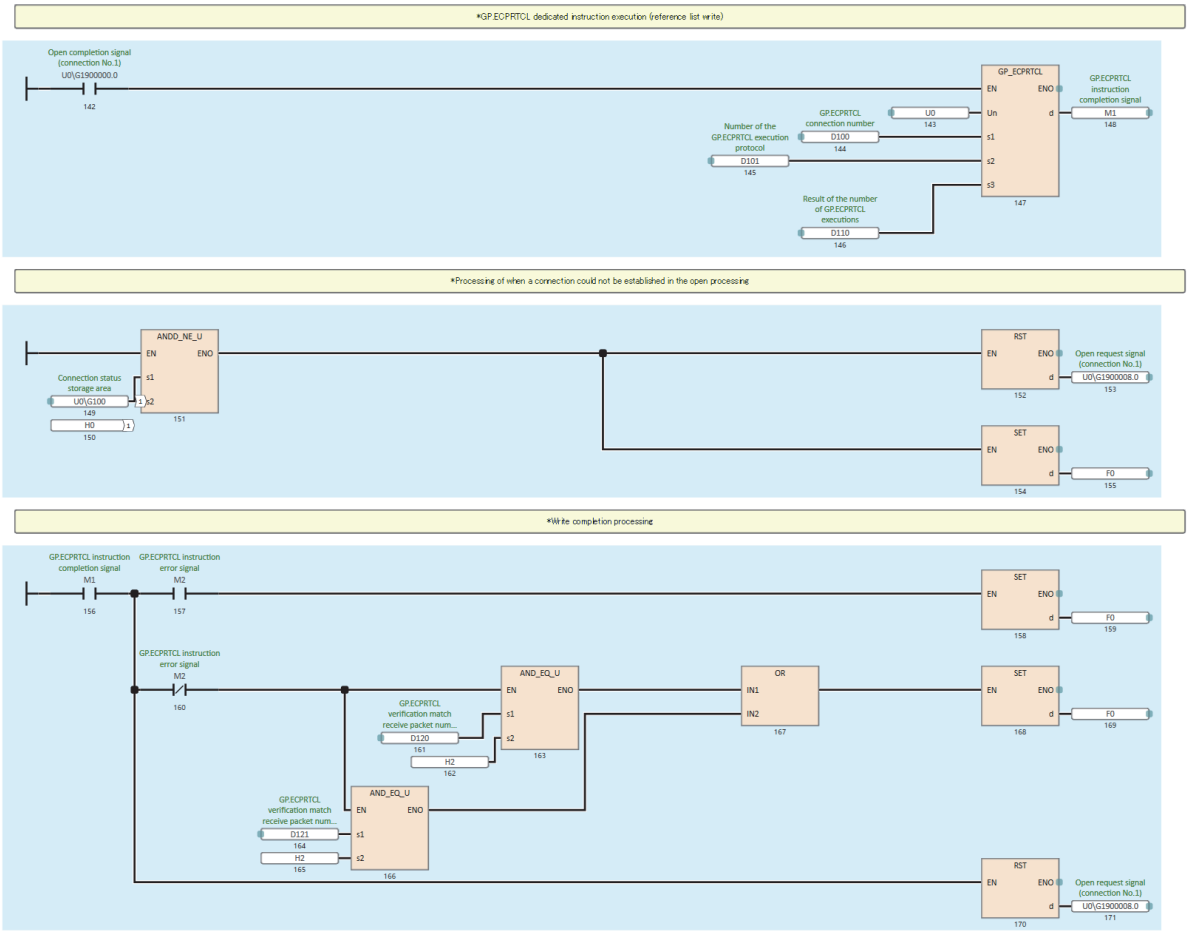
• Reference list write program example

When Module ID is set in Reference list and M1010 (Reference list send request flag) is turned on according to the I/O module configuration of the slave station, the program is executed and Reference list is written to the coupler.




*Normal Response data
FMOV
EN
ENO
s
d
n
H0
43
H4
44
45
Normal response : Transaction ID
D2000
46
FMOV
EN
ENO
s
d
n
H0
47
H4
48
49
Normal response : Transaction ID
D2050
50
*Error Response data
FMOV
EN
ENO
s
d
n
H0
51
H3
52
53
Error response : Transaction ID
D3000
54
FMOV
EN
ENO
s
d
n
H0
55
H3
56
57
Error response : Transaction ID
D3050
58
*GP.ECPRTCL control data
MOV
EN
ENO
s
d
H1
59
60
GP.ECPRTCL connection number
D100
61
FMOV
EN
ENO
s
d
n
H0
62
H2
63
64
Result of the number of GP.ECPRTCL executions
D110
65
MOV
EN
ENO
s
d
H1
66
67
GP.ECPRTCL execution protocol number specification [1]
D112
68
MOV
EN
ENO
s
d
H2
69
70
GP.ECPRTCL execution protocol number specification [2]
D113
71
FMOV
EN
ENO
s
d
n
H0
72
H0E
73
74
GP.ECPRTCL execution protocol number specification [3]
D114
75


*Write data creation execution
Sending command
M1010
76
Predefined protocol ready
U0\G1901002.0
77
AND_NE_U
EN
ENO
Number of the I/O modules
D10
78
s1
H40
79
s2
80
AND
IN1
IN2
84
INC_U
EN
ENO
d
85
Number of the I/O modules
D10
86
ANDD_NE_U
EN
ENO
ZR0Z0
81
s1
H0FFFFFFFF
82
s2
83
PLUS_U
EN
ENO
Z0
87
s1
H2
88
s2
89
Z0
90
**Request data
AND_EQ_U
EN
ENO
Number of the I/O modules
D10
91
s1
H40
92
s2
93
OR
IN1
IN2
97
ANDD_EQ_U
EN
ENO
ZR0Z0
94
s1
H0FFFFFFFF
95
s2
96
AND_GT_U
EN
ENO
Number of the I/O modules
D10
98
s1
H3D
99
s2
100
MOV
EN
ENO
H40
101
s
d
102
Request : Write points
D1003
103
MINUS_U
EN
ENO
Number of the I/O modules
D10
104
s1
H20
105
s2
106
PLUS_U
EN
ENO
s1
d
s2
107
Request : Write points
D1153
108
PLUS_U
EN
ENO
Request : Write points
D1153
109
s1
d
s2
Request : Write points
D1153
110
111
Request : Device data[Len]
D1154
112
BMOV
EN
ENO
ZR64
113
s
d
Request : Device data
D1155
116
D1153
114
n
115
MOV
EN
ENO
H2
117
s
d
118
Number of the GP.ECPRTCL execution protocol
D101
119
AND_LE_U
EN
ENO
Number of the I/O modules
D10
120
s1
H3D
121
s2
122
PLUS_U
EN
ENO
Number of the I/O modules
D10
123
s1
d
Number of the I/O modules
D10
124
s2
125
Request : Write points
D1003
126
MOV
EN
ENO
H1
127
s
d
128
Number of the GP.ECPRTCL execution protocol
D101
129
PLUS_U
EN
ENO
Request : Write points
D1003
130
s1
d
Request : Write points
D1003
131
s2
132
Request : Device data[Len]
D1004
133
BMOV
EN
ENO
Request : Write points
ZR0
134
s
d
Request : Device data
D1005
137
D1003
135
n
136
RST
EN
ENO
d
138
Sending command
M1010
139
SET
EN
ENO
d
140
Open request signal (connection No.1)
U0\G1900008.0
141



If F0 (error occurrence flag) is turned on, check the following.

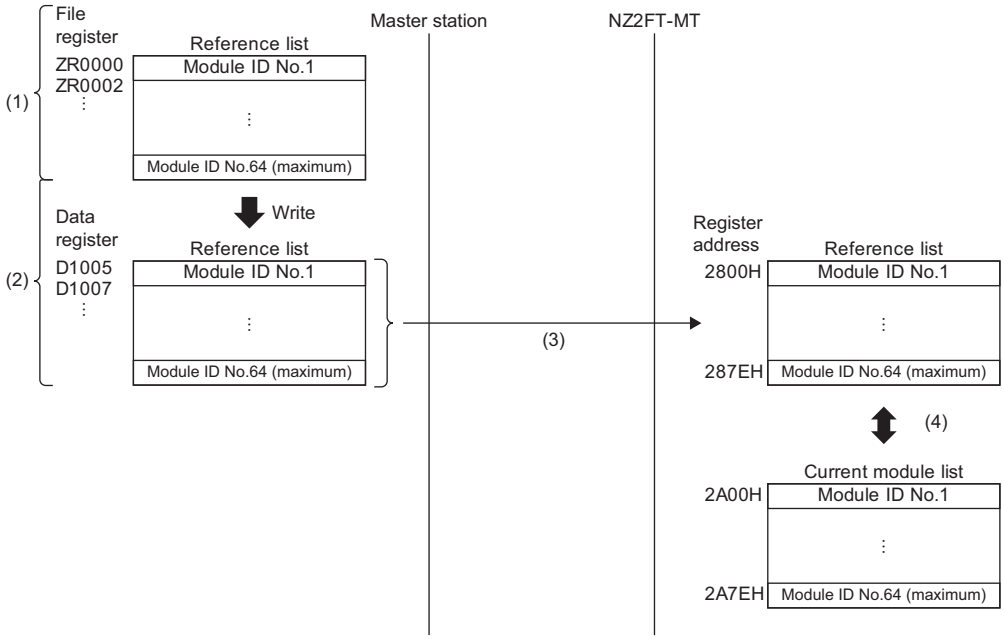
Item	Action
A value other than the normal value (0000H) is stored in U0\G100 (error code).	Refer to the following and take action. 📖 MELSEC iQ-R Ethernet User's Manual (Application)
A value other than the normal value (0000H) is stored in D111 (state at the time of instruction completion).	■When C000H to CFBFH is stored Refer to the following and take action. 📖 MELSEC iQ-R Ethernet User's Manual (Application) ■When CFC0H to CFFFH is stored Refer to the following and take action. 📖 MELSEC iQ-R CPU Module User's Manual (Application)
A value other than the normal value (0000H) is stored in D3002 or D3052.	Refer to the following and take action. ☞ Page 321 MODBUS abnormal response code

For the QJ71MT91

The following describes how to verify Reference list against Current module list.

Ex.

Operation until verification



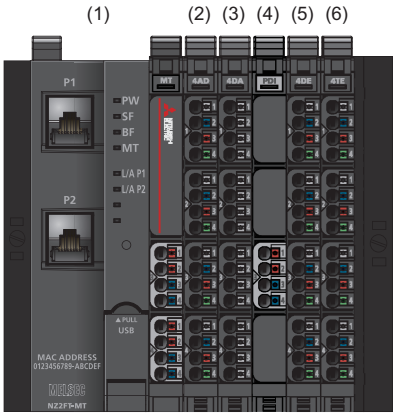
(1) Enter Module ID of the I/O module in the file register (ZR).
(2) In the program, write Module ID of the file register (ZR) to the data register (D).
(3) Write Module ID of the data register (D) to the NZ2FT-MT using the dedicated instruction Z(P).MBRW.
(4) Verify Reference list against Current module list. (The contents of Current module list are automatically created when the NZ2FT-MT is started.)

■Verification procedure

The following describes how to verify Reference list.

1. Create Reference list. (☞ Page 287 Creating Reference list)
2. Write Reference list to the NZ2FT-MT. (☞ Page 288 Writing Reference list)

Each procedure is explained using the following system configuration as an example.



No.	Model	Module ID*1
(1)	NZ2FT-MT	—
(2)	NZ2FTS-60AD4	15C40401H
(3)	NZ2FTS-60DA4	25E00506H
(4)	NZ2FTPDI	— (Extension power supply modules are not included in Reference list.)
(5)	NZ2FTS4-4DE	1F840009H
(6)	NZ2FTS4-4TE	2FA00101H

*1 Indicates Module ID when the data format is in Motorola format. For details on changing the data format, refer to the following.
☞ Page 304 Parameter list

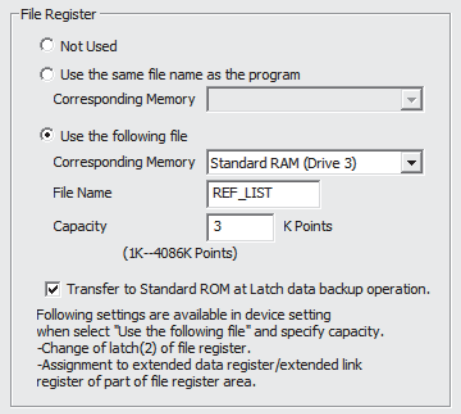
■Creating Reference list

Create Reference list in the latched area.

The following describes how to create Reference list using an example of creating a file register (ZR) of the CPU module.

1. In GX Works2, set the file register as follows.

[Parameter] ⇨ [PLC Parameter] ⇨ [PLC File]



Item	Setting details
Use the following file	Check this item.
Corresponding Memory	Standard RAM (Drive 3)
File Name	REF_LIST
Capacity	3 (Module ID (2 words) × Maximum number of connectable I/O modules (64) × Maximum number of connectable stations (20) = 2560 words → 3K)

For details on setting the file register, refer to the following.

QnUCPU User's Manual (Functional Explanation/Program Basics)

2. The watch window is displayed.

[View] ⇨ [Docking Window] ⇨ [Watch 1] to [Watch 4]

3. Set the "Data Type" to "Double Word[Unsigned]/Bit String[32-bit]" and set Module ID according to the system configuration. (Set Module ID in hexadecimal.)

Device/Label	Current Value	Data Type
ZR0000	H15C40401	Double Word[Unsigned]/Bit String[32-bit]
ZR0002	H25E00506	Double Word[Unsigned]/Bit String[32-bit]
ZR0004	H1F840009	Double Word[Unsigned]/Bit String[32-bit]
ZR0006	H2FA00101	Double Word[Unsigned]/Bit String[32-bit]
ZR0008	HFFFFFFFF	Double Word[Unsigned]/Bit String[32-bit]

Device/label	Current value*1	Description
ZR0000	H15C40401	Module ID of the NZ2FTS-60AD4
ZR0002	H25E00506	Module ID of the NZ2FTS-60DA4
ZR0004	H1F840009	Module ID of the NZ2FTS4-4DE
ZR0006	H2FA00101	Module ID of the NZ2FTS4-4TE
ZR0008	HFFFFFFFF	The program for writing Reference list includes processing to reduce the number of loops in the program when the number of I/O modules is less than 64. Therefore, set FFFFFFFFH as the end code next to the I/O module mounted last.

*1 Indicates Module ID when the data format is in Motorola format. For details on changing the data format, refer to the following.
☞ Page 304 Parameter list

For Module ID of each I/O module, refer to the following.

☞ Page 591 Module ID list

■Writing Reference list

The following describes a program for writing Reference list to the coupler using the dedicated instruction Z(P).MBRW.

For details on the dedicated instruction Z(P).MBRW, refer to the following.

MODBUS/TCP Interface Module User's Manual (Details)

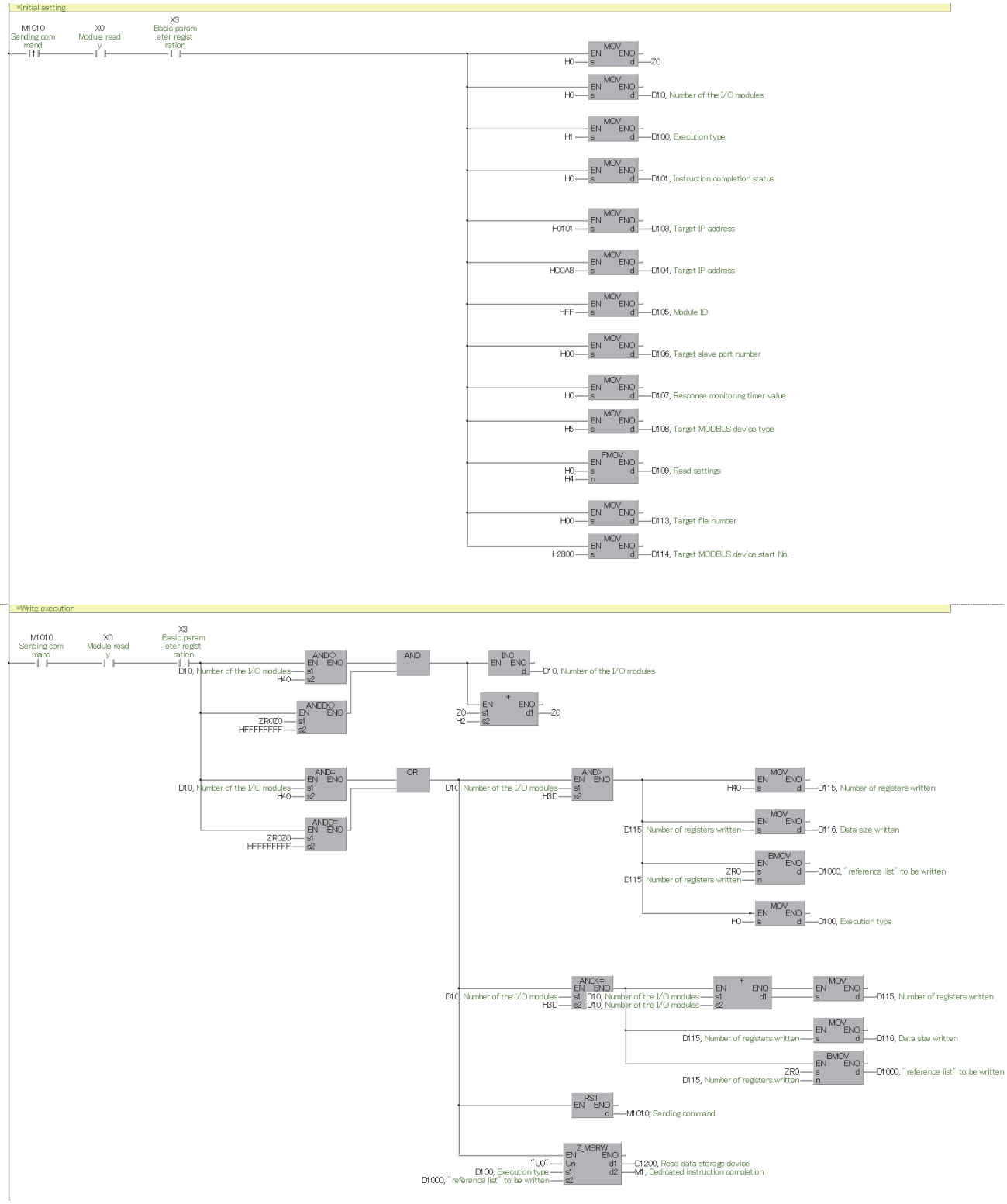
• Device to be used

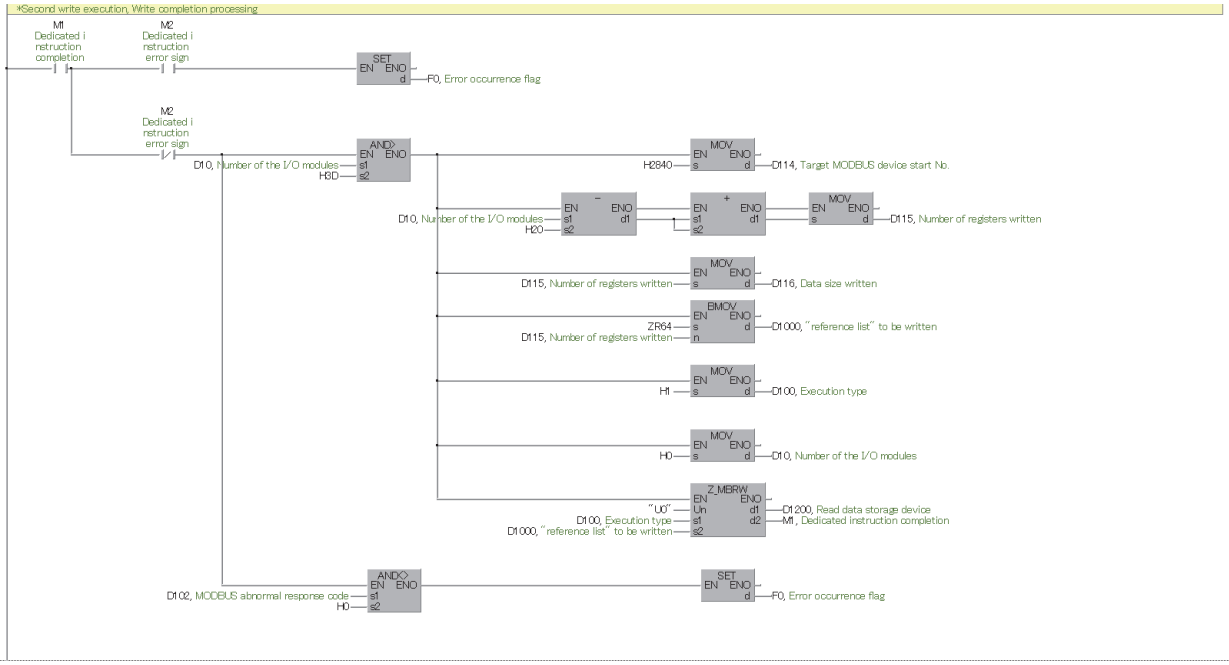
Device	Description	
M1010	Reference list send request flag	
Z0	For address specification	
D10	I/O module count	
F0	Error occurrence flag • 0: No error • 1: Error	
M1	Dedicated instruction Z.MBRW	Operand (d2+0): Dedicated instruction completion signal
M2		Operand (d2+1): Dedicated instruction error signal
D100		Operand (s1+0): Execution type (0001H)
D101		Operand (s1+1): State at instruction completion • 0: Completed successfully • Other than 0: Completed with an error (error code)
D102		Operand (s1+2): MODBUS error response code
D103 to D104		Operand (s1+3 to +4): Target IP address • IP address 3rd octet, 4th octet in s1+3 • IP address 1st octet, 2nd octet in s1+4 Example: For IP address 192.168.1.1 s1+3: 0102H s1+4: C0A8H
D105		Operand (s1+5): Module ID (00FFH)
D106		Operand (s1+6): Target slave port number (0000H)
D107		Operand (s1+7): Response monitoring timer value (0000H)
D108		Operand (s1+8): Write multiple registers from the target MODBUS device type specification (0005H).
D109 to D112		Operand (s1+9 to +12): 0000H
D113		Operand (s1+13): Target file number (0000H)
D114		Operand (s1+14): Reference list register address (2800H)
D115		Operand (s1+15): Number of registers to be written (Number of I/O modules × 2 registers)
D116		Operand (s1+16): Data size to be written (number of I/O modules × 2 words)
D1000	Reference list transferred to the data register (D)	
D1200	Read data storage device (unused)	
ZR0 to ZR127	Reference list created in the file register	

• Reference list write program example

When Module ID is set in Reference list and M1010 (Reference list send request flag) is turned on according to the I/O module configuration of the slave station, the program is executed and Reference list is written to the coupler.

In the program below, if the number of I/O modules set in Reference list is 61 or more, Reference list is written in two steps. (Because the number of registers that can be written at one time with the dedicated instruction used for writing is 123 registers, and Reference list (128 registers) for 64 I/O modules cannot be written at one time)



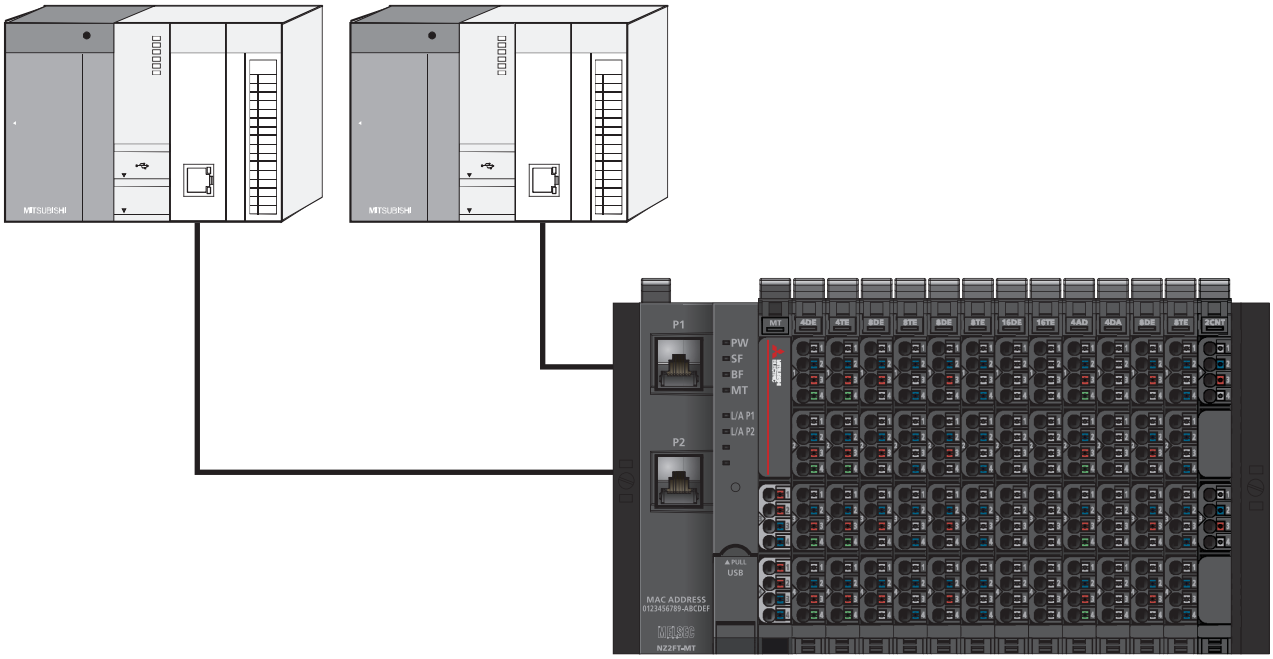


If F0 (error occurrence flag) is turned on, check the following.

Item	Action
A value other than the normal value (0000H) is stored in D101.	Refer to the following and take action. 📖 MODBUS/TCP Interface Module User's Manual (Details)
A value other than the normal value (0000H) is stored in D102.	Refer to the following and take action. ☞ Page 321 MODBUS abnormal response code

Modbus Dual LAN Mode

This mode allows communication to be performed with two different networks. MAC addresses are assigned to each port automatically.



Operating procedure

1. Disconnect the Ethernet cable of the NZ2FT-MT.
2. Set the parameter "Modbus Dual LAN Mode" to "Enabled" and reset the NZ2FT-MT.
3. Set the parameters for each Ethernet port from the Web server. (☞ Page 304 Parameter list)

Port name	Parameter	Description
P1	IP address 1	Set the IP address of the P1.
	Subnet mask 1	Set the subnet mask of the P1.
	Gateway 1	Set the gateway of the P1.
	IP configuration 1	Set the specification method of the IP address of the P1.
P2	IP address 2	Set the IP address of the P2.
	Subnet mask 2	Set the subnet mask of the P2.
	Gateway 2	Set the gateway of the P2.
	IP configuration 2	Set the specification method of the IP address of the P2.

4. Connect the Ethernet cable to the NZ2FT-MT and connect the network.

Precautions

When using Modbus Dual LAN Mode, set the parameters before connecting the NZ2FT-MT to the network. A loop may occur in the network, resulting in a network error.

Output value setting for fieldbus error

Set the output value of the I/O module for each case, such as when the CPU module status of the master station changes or a fieldbus error occurs.

The output value changes depending on the following three settings.

- The master station CPU module device specified as the transfer destination of the bit address of the NZ2FT-MT register in the simple CPU communication setting (when the master module is the RJ71EN71)
- NZ2FT-MT parameter "Output behaviour on fieldbus error"
- Parameter "Substitute value" for each I/O module

However, the data sent from the NZ2FT-C24 to the external device is not affected by the setting of the NZ2FT-MT parameter "Output behaviour on fieldbus error".

Ex.

For the digital output module (master module: RJ71EN71)

Master station status NZ2FT-MT bit address transfer destination: CPU module device Y		**NZ2FT-MT parameter "Output behaviour on fieldbus error" setting**							
		0: All outputs off (All outputs are turned off.)		**1: Enable substitute value (A substitute value is output.)**				**2: Hold last value (The last output value is held.)**	
				The I/O module parameter "Substitute value" set to 1		**The I/O module parameter "Substitute value" set to 0**			
		Last output value is off	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset*1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	When in CPU module stop error	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Master station status NZ2FT-MT bit address transfer destination: other than CPU module device Y		**NZ2FT-MT parameter "Output behaviour on fieldbus error" setting**							
		0: All outputs off (All outputs are turned off.)		**1: Enable substitute value (A substitute value is output.)**				**2: Hold last value (The last output value is held.)**	
				The I/O module parameter "Substitute value" set to 1		**The I/O module parameter "Substitute value" set to 0**			
		Last output value is off	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**	**Last output value is off**	**Last output value is on**
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset*1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When in CPU module stop error	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

*1 Maintains the connection for the time set in the NZ2FT-MT parameter "Modbus connection timeout". It is disconnected when the set time has elapsed.

Ex.

For the NZ2FTS-60DA4 (master module: RJ71EN71)

Master station status		NZ2FT-MT parameter "Output behaviour on fieldbus error" setting		
		0: All outputs off (All outputs are turned off.)	1: Enable substitute value (A substitute value is output.)	2: Hold last value (The last output value is held.)
Data link in operation	CPU module RUN state	D/A conversion value		
	CPU module: RUN → STOP			
	CPU module PAUSE state			
	When the CPU module is reset*1			
	When in CPU module stop error			
Disconnected (fieldbus error occurred)		0	A substitute value is output.	The last output value is held.

*1 Maintains the connection for the time set in the NZ2FT-MT parameter "Modbus connection timeout". It is disconnected when the set time has elapsed.

Ex.

For the digital output module (master module: QJ71MT91)

Master station status		NZ2FT-MT parameter "Output behaviour on fieldbus error" setting							
		0: All outputs off (All outputs are turned off.)		1: Enable substitute value (A substitute value is output.)				2: Hold last value (The last output value is held.)	
				The I/O module parameter "Substitute value" set to 1		The I/O module parameter "Substitute value" set to 0			
		Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset*1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When in CPU module stop error	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

*1 Maintains the connection for the time set in the NZ2FT-MT parameter "Modbus connection timeout". It is disconnected when the set time has elapsed.

Ex.

For the NZ2FTS-60DA4 (master module: QJ71MT91)

Master station status		NZ2FT-MT parameter "Output behaviour on fieldbus error" setting		
		0: All outputs off (All outputs are turned off.)	1: Enable substitute value (A substitute value is output.)	2: Hold last value (The last output value is held.)
Data link in operation	CPU module RUN state	D/A conversion value		
	CPU module: RUN → STOP			
	CPU module PAUSE state			
	When the CPU module is reset*1			
	When in CPU module stop error			
Disconnected (fieldbus error occurred)		0	A substitute value is output.	The last output value is held.

*1 Maintains the connection for the time set in the NZ2FT-MT parameter "Modbus connection timeout". It is disconnected when the set time has elapsed.

Checking warning output (Process alarm)

Check whether Process alarm has occurred from the I/O module corresponding to the warning output, and read Process alarm data of the content.

The I/O modules that support the warning output and their details are as follows.

- NZ2FTS-60RD4: ☞ Page 506 Warning data (Process alarm data)
- NZ2FTS-60TD4: ☞ Page 518 Warning data (Process alarm data)
- NZ2FTS-D62P2: ☞ Page 547 Warning data (Process alarm data)

Process alarm cannot be checked from the Web server.

When the NZ2FT-MT parameter "Process alarm" is set to "Enabled" in advance, Process alarm will be detected.

Data configuration

■Collective process alarm message for I/O modules

Collective process alarm message for I/O modules indicates the mounting position of the I/O module in which Process alarm has occurred. (☞ Page 310 Register address list)

When Process alarm occurs in an I/O module, the corresponding bit of Collective process alarm message for I/O modules is set to 1.

Register address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
101CH	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
101DH	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
101EH	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
101FH	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49

Ex.

When Process alarm has occurred in the 13th I/O module

Register address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
101CH	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
101DH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101EH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101FH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

■Process alarm data

For the data structure of Process alarm data of each I/O module, refer to the following.

- NZ2FTS-60RD4: ☞ Page 506 Warning data (Process alarm data)
- NZ2FTS-60TD4: ☞ Page 518 Warning data (Process alarm data)
- NZ2FTS-D62P2: ☞ Page 547 Warning data (Process alarm data)

Point

If the second Process alarm is detected on the same channel of the same I/O module before reading Process alarm data, the second Process alarm data will not be stored correctly.

If Process alarm is detected, read Process alarm data.

Checking method

The following describes how to check whether Process alarm has occurred and how to read Process alarm data.

1. Use the following dedicated instruction at the master station to read Collective process alarm message for I/O modules (4 words from the register address 101CH) from the NZ2FT-MT register. 1 indicates that there is an unacknowledged Process alarm.

- When the master module is the RJ71EN71: GP.ECPRTCL (MELSEC iQ-R Ethernet User's Manual (Application))
- When the master module is the QJ71MT91: Z.MBRW (MODBUS/TCP Interface Module User's Manual (Details))

2. From the read Collective process alarm message for I/O modules value, identify the mounting position of the I/O module that is detecting Process alarm. (☞ Page 294 Collective process alarm message for I/O modules)

3. Use a dedicated instruction to read Process alarm data of the I/O module that is detecting Process alarm. The register address of Process alarm data to be read is the following.

Register address B000H + 32 words × 32 words from (mounting position -1)

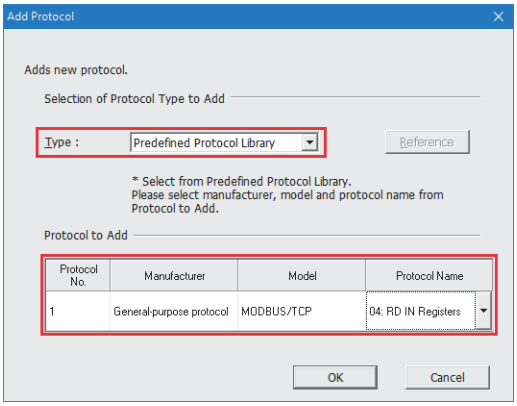
■GP.ECPRTCL settings

When using the dedicated instruction GP.ECPRTCL, create a protocol for the predefined protocol support function in advance.

For the procedure for creating protocol setting data, refer to the following.

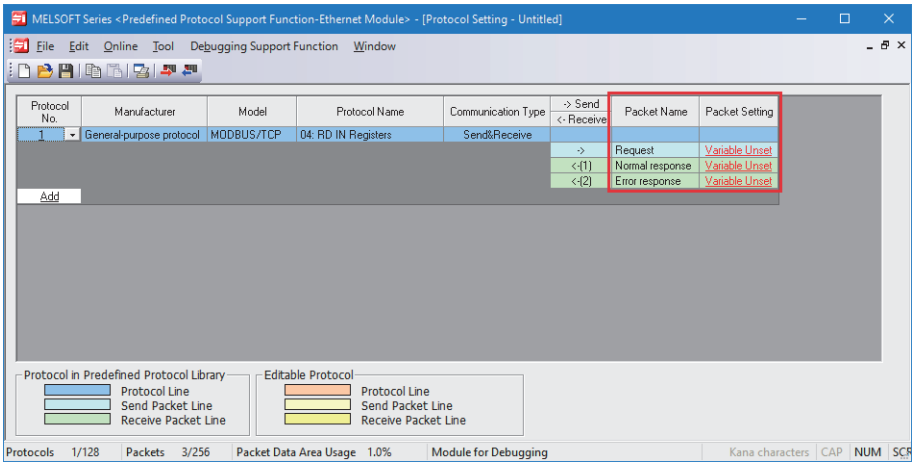
☞ Page 272 Creating protocol setting data

Set the following on the "Add Protocol" window.



Item	Setting details
Type	Predefined Protocol Library
Protocol No.	1
Manufacturer	General-purpose protocol
Model	MODBUS/TCP
Protocol Name	04: RD IN Registers

When protocol number 1 is added, click "Variable Unset" in "Packet Setting" and set the packet setting data to be sent and received.



The following describes the packet settings for Request.

Element number	Element type	Element name	Element setting
1	Variable without conversion	Transaction ID	0000H
2	Fixed data	Protocol ID	-
3	Length	Length	-
4	Variable without conversion	Module ID	0000H
5	Fixed data	Function Code	-
6	Variable without conversion	Head input register number	B000H + 32 words × (I/O module mounting position where Process alarm is detected -1)
7	Variable without conversion	Read points*1	0020H

*1 The maximum size that can be read by a dedicated instruction is 125 words. If the size is exceeded and the data is read, the correct data cannot be acquired. Set the element settings so that it is 007DH or less.

The following describes the packet settings for Normal response.

Element number	Element type	Element name	Element setting
1	Variable without conversion	Transaction ID	0000H
2	Fixed data	Protocol ID	-
3	Length	Length	-
4	Variable without conversion	Module ID	0000H
5	Fixed data	Function Code	-
6	Length	Number of read bytes	-
7	Variable without conversion	Device data	The data length of Process alarm data and Process alarm data are stored.

The following describes the packet settings for Error response.

Element number	Element type	Element name	Element setting
1	Variable without conversion	Transaction ID	0000H
2	Fixed data	Protocol ID	-
3	Length	Length	-
4	Variable without conversion	Module ID	0000H
5	Fixed data	Function Code	-
6	Variable without conversion	Exception Code	0000H

After creating the protocol setting data for the predefined protocol support function, set the dedicated instruction GP.ECPRTCL as follows.

Operand	+0	+1	+2	+3 to +9	+10	+11 to +17
(U)	Start I/O number of the module: 0000H	-	-	-	-	-
(s1)	Connection number*1	-	-	-	-	-
(s2)	Number of protocols to be executed consecutively: 0001H	-	-	-	-	-
(s3)	Result of the number of executions: 0000H	Completion status: 0000H	Execution protocol number specification 1: 0001H*2	Execution protocol number specification 2 to 8*3	Verification match receive packet number 1: 0000H	Verification match receive packet number 2 to 8*3
(d)*4	Instruction completion: 0	Completed with an error: 0	-	-	-	-
EN	Execution flag: 1	-	-	-	-	-
ENO*4	Execution result: 0	-	-	-	-	-

*1 Set the connection number to be used. For details on the connection number, refer to the following.
MELSEC iQ-R Ethernet User's Manual (Application)

*2 Set the protocol number set on the "Add Protocol" window.

*3 Set 0000H for the execution protocol number 2 to 8 and the receive packet number successful in collation match 2 to 8.

*4 Set 0 when executing the dedicated instruction.

When the dedicated instruction GP.ECPRTCL is executed, the data length of Process alarm data and Process alarm data are stored in the Device data section of Normal response.

For details on the dedicated instruction GP.ECPRTCL, refer to the following.

MELSEC iQ-R Programming Manual (Module Dedicated Instruction)

■Z.MBRW settings

When using the dedicated instruction Z.MBRW, set as follows.

Operand	+0	+1	+2 to +16
(Un)	Start I/O number of the module: U0	-	
(s1) Control data	Setting data: 34 bytes		
(d1)*1	Process Alarm: 4 bytes (☞ Warning data (Process alarm data) of each I/O module)		
(s2)*1	-		
(d2)*1	Instruction completion: 0	Completed with an error: 0	-
EN	Execution flag: 1	-	
ENO*1	Execution result: 0	-	

*1 Set 0 when executing the dedicated instruction.

Set the control data as follows.

Operand (S1)	Item		Setting value
+0	Execution type		0001H
+1	Completion status		0000H
+2	MODBUS abnormal response code		0000H
+3	Target IP address For example, if the IP address is 192.168.1.2, set the following. • S1+3: 0102H • S1+4: C0A8H		IP address 3rd octet, 4th octet
+4			IP address 1st octet, 2nd octet
+5	Module ID		00FFH
+6	Target slave port number		0000H
+7	Response monitoring timer value		0000H
+8	Target MODBUS device type specification		0400H
+9	Read settings	Target file number	0000H
+10		Target MODBUS device start number	B000H + 32 words × (I/O module mounting position where Process alarm is detected -1)
+11		Number of access points The maximum size that can be read by a dedicated instruction is 125 words. If the size is exceeded and the data is read, the correct data cannot be acquired. Set the setting value so that it is 007DH or less.	0020H
+12		Read data storage size	0000H
+13	Write settings	Target file number	0000H
+14		Target MODBUS device start number	0000H
+15		Number of access points	0000H
+16		Write data storage size	0001H

For details on the dedicated instruction Z.MBRW, refer to the following.

MODBUS/TCP Interface Module User's Manual (Details)

11.5 Procedures Before Operation

1. Installation

Attach the NZ2FT system to the DIN rail and install it in a suitable environment. (☞ Page 36 Installation Environment and Installation Position of Module, Page 38 Installation)

2. Wiring

Connect the power cable and Ethernet cable to the NZ2FT-MT. (☞ Page 45 Wiring of power cable and I/O cable, ☞ Page 41 Wiring products for coupler that use the Ethernet cable)

Connect the I/O cables to the I/O module. (☞ Page 45 Wiring of power cable and I/O cable)

3. DHCP/BootP server setting

To use DHCP or BootP, set the DHCP server or BootP server in advance.

Use the static IP address. For the server setting, refer to the manual of the server used.

4. Master device settings

Check the firmware and software package version of the corresponding master module. (☞ Page 263 Corresponding master module and software package)

Set the parameters with the software package according to the master module to be used.

- ☞ Page 299 Settings on the master station (RJ71EN71)
- ☞ Page 302 Settings on the master station (QJ71MT91)

5. Connection between the Web server and personal computer

Access the NZ2FT-MT Web server via the USB port or the Ethernet port. (☞ Page 60 Connection with a Personal Computer)

6. Slave device settings

Set the parameters of the NZ2FT-MT and I/O module on the Web server. (☞ Page 304 Parameter list)

11.6 Parameter Settings

This section describes the parameters to be set for the master station (RJ71EN71 or QJ71MT91) and slave station (NZ2FT-MT and I/O module).

Settings on the master station (RJ71EN71)

Use GX Works3 to set automatic communication (constant periodic communication) using the simple CPU communication function among the MODBUS/TCP master functions.

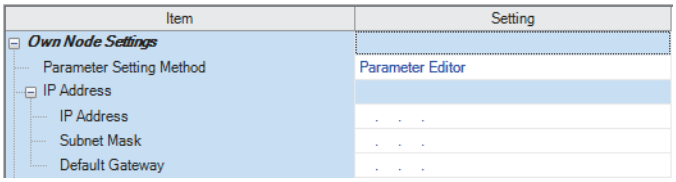
MELSEC iQ-R Ethernet User's Manual (Application)

This section describes the case where the RJ71EN71 is the master station and the NZ2FT-MT and I/O module are the slave stations.

Basic settings

Set the communication parameters of the RJ71EN71 in "Basic Settings" of GX Works3.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71EN71(E+E)] ⇨ [Module Parameter (Ethernet)]

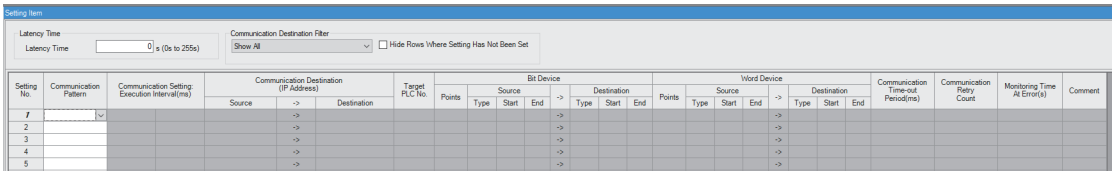


Item		Description
IP address setting	IP address	Set the IP address of the RJ71EN71.
	Subnet mask	Set the subnet mask of the RJ71EN71.
	Default gateway	Set the default gateway of the RJ71EN71.

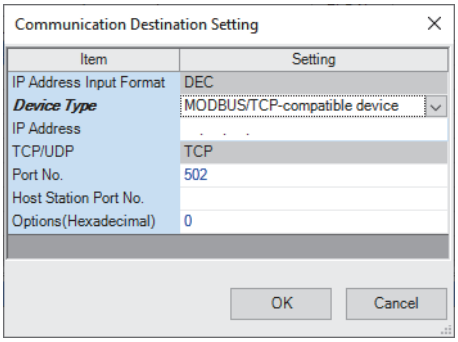
Simple CPU communication settings

Set the communication settings with NZ2FT-MT in "Simple PLC Communication Setting" in "Application Settings".

Set "To Use or Not to Use Simple PLC Communication" to "Use" and click the [Detailed Setting] tab of "Simple PLC Communication Setting" to display the following window.



Item	Description
Communication Pattern	Set whether to read or write the NZ2FT-MT data.
Communication Setting: Execution Interval (ms)	Set the data communication method. • Fixed Interval: Data is sent and received at the specified execution interval (ms). • On Request: Data is sent and received only once on request. (Operation when communication setting is requested MELSEC iQ-R Ethernet User's Manual (Application))

Item	Description
Communication Destination (IP Address)	Set the IP address (NZ2FT-MT) and port number (NZ2FT-MT, RJ71EN71).  • For "Device Type", select "MODBUS/TCP compatible device". • For "IP Address", set the IP address of the NZ2FT-MT. • "Port No." is the port number set in the parameter "Additional TCP port" of 502 or the NZ2FT-MT. (☞ Page 304 Parameter list) • It is recommended to specify 1024 to 4999 and 5010 to 61439 for "Host Station Port No.". This is because 1 to 1023 are generally reserved port numbers (WELLKNOWN PORT NUMBERS), and 61440 to 65534 are used for other communication functions. Also, do not specify 5000 to 5009 because they are used by the system. • If the same port number is specified for "Host Station Port No.", set 64, and if a different port number is specified for "Host Station Port No.", set up to 8. If the number of different own station port number settings is greater than 8, a communication error (CFB4H) may occur before the start of simple CPU communication for each setting. For settings where a communication error has occurred, the communication is restarted every time after the elapse of "Monitoring Time At Error(s)" × 2 seconds, and simple CPU communication is started in sequence.
Bit Device	Set the "Source" bit device type, start number, and end number, and the "Destination" bit device type and start number. (☞ Page 300 Bit Device) When these items are entered, "Points" will be displayed automatically.
Word Device	Set the type, start number, and end number of the "Source" word device, and the type and starting number of the "Destination" word device. (☞ Page 301 Word device) When these items are entered, "Points" will be displayed automatically.
Communication Time-out Period(ms)*1	Set the time to wait for a response from the NZ2FT-MT. If there is no error response or response, retry is performed after the time set in "Communication Time-out Period(ms)" has elapsed.
Communication Retry Count*1	Set the number of retries to be performed when there is no error response or response from the NZ2FT-MT. If there is no error response or response even after executing the set number of communication retries, a communication error occurs.
Monitoring Time At Error(s)*1	Set the cycle for monitoring (constant periodic communication) for the NZ2FT-MT after a communication error occurs. If there is a normal response from the NZ2FT-MT within the set error monitoring time, the communication returns to the communication set in "Communication Setting: Execution Interval(ms)". If there is no error response or response, standby is performed for the duration of time set for the error monitoring time.

*1 For the relationship between the communication timeout time, the number of communication retries, and the monitoring time when an error occurs, see the following.
MELSEC iQ-R Ethernet User's Manual (Application)

■Bit Device

Depending on what was selected in "Communication Pattern", the contents to be set for "Source" and "Target" differ.

For the device and address value of the RJ71EN71 or CPU module, see Simple CPU communication function. (MELSEC iQ-R Ethernet User's Manual (Application))

Communication Pattern	Transfer source			Transfer destination		
	Type	Start	End	Type	Start	End
Read	NZ2FT-MT register type	NZ2FT-MT register bit address		RJ71EN71 or CPU module device	RJ71EN71 or CPU module device address	
Write	RJ71EN71 or CPU module device	RJ71EN71 or CPU module device address		NZ2FT-MT register type	NZ2FT-MT register bit address	

The following table lists the combinations of the register type and the MODBUS standard function supported by the NZ2FT-MT. (☞ Page 309 Bit address, Page 307 MODBUS standard function)

Simple CPU communication		MODBUS standard function	
Communication pattern	Register type	Function code	Function name
Read	Coil	01	Read coils
	Input	02	Read inputs
Write	Coil	15	Write multiple coils

For the number of points that can be read/written, refer to the details of the MODBUS standard function below.

MELSEC iQ-R MODBUS/TCP Reference Manual

■Word device

Depending on what was selected in "Communication Pattern", the contents to be set for "Source" and "Target" differ.
For the device and address value of the RJ71EN71 or CPU module, see Simple CPU communication function. (📖 MELSEC iQ-R Ethernet User's Manual (Application))

Communication Pattern	Transfer source			Transfer destination		
	Type	Start	End	Type	Start	End
Read	NZ2FT-MT register type	Register address of the NZ2FT-MT register		RJ71EN71 or CPU module device	RJ71EN71 or CPU module device address	
Write	RJ71EN71 or CPU module device	RJ71EN71 or CPU module device address		NZ2FT-MT register type	Register address of the NZ2FT-MT register	

The following table lists the combinations of the register type and the MODBUS standard function supported by the NZ2FT-MT. (☞ Page 309 Bit address, Page 307 MODBUS standard function)

Simple CPU communication		MODBUS standard function	
Communication pattern	Register type	Function code	Function name
Read	Input Register	04	Read input register areas
	Holding Register	03	Read holding register areas
Write	Holding Register	16	Write multiple register areas

For the number of points that can be read/written, refer to the details of the MODBUS standard function below.
📖 MELSEC iQ-R MODBUS/TCP Reference Manual

Precautions

Do not set the same address for "Bit Device" and "Word Device". When the same address is set, the operation cannot be guaranteed. Also, the bit device 0000 and the register address 0000.0 refer to the same bit. Therefore, if 0000 to 001F is set for the bit device and 0000 to 0001 is set for the register device, the same address is set.

Settings on the master station (QJ71MT91)

Use GX Works2 to set up MODBUS/TCP communication.

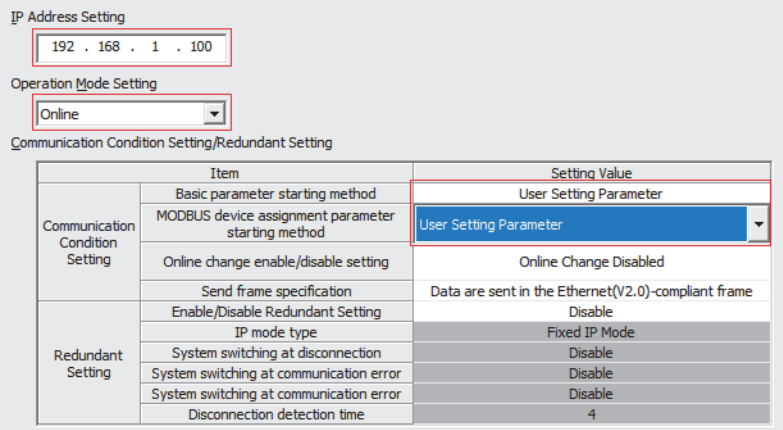
📖 MODBUS/TCP Interface Module User's Manual (Details)

This section describes the case where the QJ71MT91 is the master station and the NZ2FT-MT and I/O module are the slave stations.

Switch settings

On the "Switch Setting" window of GX Works2, set the IP address and operation mode parameters of the QJ71MT91.

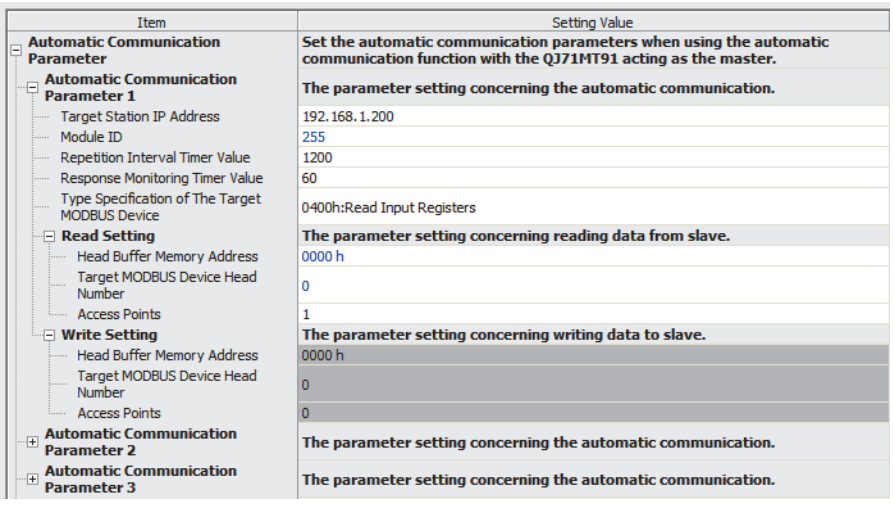
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [QJ71MT91]



- Set the IP address of the QJ71MT91 in "IP Address Setting".
- Set "Online" for "Operation Mode Setting".
- Set "User Setting Parameter" for "Basic parameter starting method" and "MODBUS device assignment parameter starting method" of "Communication Condition Setting/Redundant Setting".

Automatic communication parameter

On the "Automatic Communication Parameter" window, set the communication with the NZ2FT-MT.



Item	Description
Target Station IP Address	Set the IP address of the NZ2FT-MT.
Module ID	MODBUS/TCP is fixed at 255.
Repetition Interval Timer Value	The time from when the QJ71MT91 receives the response message from the NZ2FT-MT until the QJ71MT91 sends the next request message to the NZ2FT-MT Setting time = Repeat interval timer value × 10ms The timing to start the repetition interval timer is as follows. • When the response message of the NZ2FT-MT is received • When the response monitoring timer is complete

Item		Description	
Response Monitoring Timer Value		The time from when the QJ71MT91 sends a request message to the NZ2FT-MT until the QJ71MT91 receives a response message from the NZ2FT-MT Setting time = Response monitoring timer value × 500ms The response monitoring timer starts when the QJ71MT91 sends a request message to the NZ2FT-MT. When the response monitoring timer is completed, the QJ71MT91 determines that an error has occurred in the NZ2FT-MT and disconnects the connection. Even after an error occurs, the QJ71MT91 establishes a connection and sends a request message to the NZ2FT-MT when the repetition interval timer is completed.	
Type Specification of The Target MODBUS Device		Set the type of MODBUS device to be read/written. The following lists the combinations of the values specified for the target MODBUS device type that can be set and the MODBUS standard functions supported by the NZ2FT-MT. (☞ Page 307 MODBUS standard function)	
		Type Specification of The Target MODBUS Device	MODBUS standard function
		0000h: No Specification	—
		0100h: Read Coils	01: Read coils
		0200h: Read Discrete Inputs	02: Read discrete inputs
		0400h: Read Input Registers	04: Read input registers
		0500h: Read Holding Registers	03: Read holding registers
		0001h: Write Coils	15: Write multiple coils
		0005h: Write Holding Registers	16: Write multiple registers
		0505h: Read/Write Holding Registers	23: Read/write multiple registers
Read Setting/Write Setting	Head Buffer Memory Address	Set the start buffer memory address that stores the data read/written from/to the NZ2FT-MT. The setting range of read data and write data is different as shown below. • Read data: Start buffer memory address setting range 1000H to 1FFFH • Write data: Start buffer memory address setting range 3000H to 3FFFH	
	Target MODBUS Device Head Number	From the setting details of the target MODBUS device type specification, specify the target bit address or register address of the NZ2FT-MT. (☞ Page 309 Bit address, Page 309 Register address)	
		Type Specification of The Target MODBUS Device	NZ2FT-MT target address
		0000h: No Specification	—
		0100h: Read Coils	Bit address
		0200h: Read Discrete Inputs	Bit address
		0400h: Read Input Registers	Register address
		0500h: Read Holding Registers	Register address
		0001h: Write Coils	Bit address
		0005h: Write Holding Registers	Register address
		0505h: Read/Write Holding Registers	Register address
	Access Points	Set the number of points to be read from the NZ2FT-MT or the number of points to be written to the NZ2FT-MT. The range of points that can be set differs depending on the target MODBUS device type specification.	
		Target MODBUS device type specification	Setting range of access points
		0000h: No Specification	—
		0100h: Read Coils	Number of read points: 1 to 2000 points
		0200h: Read Discrete Inputs	Number of read points: 1 to 2000 points
		0400h: Read Input Registers	Number of read points: 1 to 125 points
		0500h: Read Holding Registers	Number of read points: 1 to 125 points
		0001h: Write Coils	Number of write points: 1 to 1968 points
		0005h: Write Holding Registers	Number of write points: 1 to 123 points
		0505h: Read/Write Holding Registers	Number of read points: 1 to 125 points, number of write points: 1 to 121 points

For the setting range of the number of access points, refer to the content of the automatic communication parameters below.
📖 MODBUS/TCP Interface Module User's Manual (Details)

Slave station setting

Set the parameters of the NZ2FT-MT and each I/O module on the Web server. (☞ Page 304 Parameter list)

Parameter list

These parameters can be set in the NZ2FT-MT from the Web server. (☞ Page 74 Parameter setting)
Configure the settings while communications are not being performed with the master station. Use any of the following methods to stop communications.

- Power off the master station. (Communication does not stop by changing RUN to STOP in the CPU module.)
- When the master station is the RJ71EN71: Turn on the periodic communication stop request (bits of all setting numbers).
- When the master station is the QJ71MT91: Turn on the MODBUS/TCP automatic communication function stop request [Y6].

Set the master station parameters by referring to the following.

- When the master station is the RJ71EN71: ☞ Page 299 Settings on the master station (RJ71EN71)
- When the master station is the QJ71MT91: ☞ Page 302 Settings on the master station (QJ71MT91)

Item	Description	Setting range	Default
IP address (IP address 1, IP address 2)*1	Set the IP address of the NZ2FT-MT.	0.0.0.1 to 223.255.255.254*2	192.168.0.222*3
Subnet mask (Subnet mask 1, Subnet mask 2)*1	Set the subnet mask of the NZ2FT-MT.	128.0.0.0 to 255.255.255.248*2	255.255.255.0
Gateway (Gateway 1, Gateway 2)*1	Set the gateway of the NZ2FT-MT.	0.0.0.1 to 223.255.255.254*2	192.168.0.1*3
IP configuration (IP configuration 1, IP configuration 2)*1	Set the specification method of the IP address. • Static: The value set for the IP address of the NZ2FT-MT is used. • DHCP: The IP address is acquired from the DHCP server. (Communication is not possible if there is no DHCP server on the network.) • BootP: The IP address is acquired from the BootP server. (Communication is not possible if there is no BootP server on the network.) • DHCP and Static: The IP address is acquired from the DHCP server. If there is no DHCP server on the network, the value set for the IP address of the NZ2FT-MT is used after the time set with Modbus DHCP timeout elapses. (If there is no DHCP server on the network, it will take some time to start communication.) If there is no DHCP server or BootP server on the network, set "Static". When using the DHCP or BootP server, add the static IP address.	• Static • DHCP • BootP • DHCP and Static	DHCP and Static
Modbus DHCP timeout	Set the DHCP timeout time (in second). This parameter is effective only when "IP configuration" is "DHCP and Static".	1 to 1000	30
Additional TCP port	Assign another TCP port in addition to number 502. However, specifying 80 (http), 161 (SNMP), or 443 (HTTPS) returns the settings to their previous values. Specifying 0 closes the previously assigned ports. Port number 502 can be used as a TCP port even while this setting is used.	1 to 65535 Excluding 80, 161, and 443.	0
Modbus Dual LAN Mode	Configure the setting to communicate with two different networks. ☞ Page 291 For the QJ71MT91	• Disabled • Enabled	Disabled
IP address USB port	Set the IP address of the USB port. The NZ2FT-MT must be reset after the setting.	• 192.168.1.202 • 192.168.2.202 • 192.168.3.202 • 192.168.4.202 • 192.168.5.202	192.168.1.202
Webserver via Ethernet	Set whether to enable or disable the access to the Web server via the Ethernet port. The NZ2FT-MT must be reset after the setting.	• Disabled • Enabled	Enabled

Item	Description	Setting range	Default
Save module parameters on coupler	Records the I/O module parameter settings in the non-volatile memory of the NZ2FT-MT. When reset, the recorded parameter settings are loaded into the I/O module before operation. • No: The parameter settings of the I/O module are not recorded. • Yes: The parameter settings of the I/O module are recorded. • Default: The I/O module parameters are returned to their default values. The displays of "Yes" and "Default" return to "No" when the Web server window is switched.	• No • Yes • Default	No
Status Modbus watchdog	Set the time to monitor the Watchdog reset from the master station (setting value × 10ms). (☞ Page 268 Status Modbus watchdog function) When 0 is set, Watchdog timeout monitoring is not performed.	0 to 65535	0
Modbus connection timeout	Monitors the non-communication status of automatic communication with the master station, and sets the time (seconds) until disconnection due to a timeout. (☞ Page 269 Modbus automatic communication timeout monitoring) When 0 is set, the automatic communication is not monitored.	0 to 30000	1
Writing access in multi-client operation	This function sets from which connection would writing be enabled when "Additional TCP port" is set and two master stations are connected. • For all connections: Writing is permitted from all connections. • For client with first write access: Writing only from the connection that wrote data first is permitted in the automatic communication function or simple CPU communication function. • For client with first connection: Writing only from the connection that was established first is permitted in the automatic communication function or simple CPU communication function. The connection is a combination of IP address and port number. Even if the IP address is the same, if the port number is different, the connection will be different.	• For all connections • For client with first write access • For client with first connection	For all connections
Check reference list before data exchange	Set whether to verify Reference list (2800H) and Current module list (2A00H) at the start of communications. When the setting is Enabled, communications start only when Reference list (2800H) and Current module list (2A00H) match.	• Disabled • Enabled	Disabled
HTTPS setting	Set this parameter when encrypting the communications with the Web server. (☞ Page 67 HTTPS setting) • HTTP & HTTPS concurrent operation: HTTP and HTTPS communications are possible. • only HTTPS; no HTTP: Only HTTPS communications are possible.	• HTTP & HTTPS concurrent operation • only HTTPS; no HTTP	HTTP & HTTPS concurrent operation
Process alarm	Set whether to detect Process alarm in the I/O module.	• Disabled (0)*4 • Enabled (1)*4	Disabled
Diagnostic alarm	Set it to "Disabled".	• Disabled (0)*4 • Enabled (1)*4	Disabled
Output behaviour on fieldbus error	Set the output operation when a fieldbus error or an error of Reference list occurs. • All outputs off: All outputs are turned off. • Enable substitute value: Output is produced according to the substitute value of the output module. • Hold last value: The output status is maintained.	• All outputs off (0)*4 • Enable substitute values (1)*4 • Hold last value (2)*4	All outputs off
Module behaviour on hot swap	Set the I/O module operation during Hot swap. • Continue data exchange: The operation of the output module is maintained. • Behaviour like on fieldbus error: The output module is operated according to the setting of Output behaviour on fieldbus error.	• Continue data exchange (0)*4 • Behaviour like on fieldbus error (1)*4	Continue data exchange
Data format	Switch the data format of communication data. • Motorola: Communication data is sent in big-endian format. • Intel: Communication data is sent in little-endian format.	• Motorola (0)*4 • Intel (1)*4	Motorola
Lock force mode	Set whether to enable or disable to switch to the Force mode in the Web server. • Force mode unlocked: Switch to the Force mode is enabled. • Force mode locked: Switch to the Force mode is disabled.	• Force mode unlocked • Force mode locked	Force mode unlocked

*1 When Modbus Dual LAN Mode is set to "Enabled", the parameters of the P1 and P2 are displayed.
*2 Do not set the values out of the setting range.
*3 When the NZ2FT-MT is initialized, it will be 0.0.0.0.
*4 (0) (1) (2) are the values set in the register when the digital I/O module is attached to the NZ2FT-MT.

Point

When there is no DHCP server on the network and the coupler parameter "IP configuration" is set to "DHCP and Static", communication will start after the following time.

- When the master station is the RJ71EN71: Time of the master module parameter "Monitoring Time At Error(s) × 2"
- When the master station is the QJ71MT91: Time of coupler parameter "Modbus DHCP timeout"

Precautions

"IP address" and "IP address USB port" cannot be set to the same value. Also, do not set the same value for the network part of the IP address (1st to 3rd octets when the subnet mask is set to 255.255.255.0).

11.7 MODBUS Standard Functions and MODBUS Devices

The NZ2FT-MT uses the MODBUS standard function to specify a MODBUS device and access the master station.
The MODBUS device can be specified as a bit address for reading/writing registers in units of bits and a register address for reading/writing in units of words.

Access method

For how to read/write registers during automatic communication (constant periodic communication), refer to the following.

- Master station is the RJ71EN71: Simple CPU communication function (📖 MELSEC iQ-R Ethernet User's Manual (Application))
- Master station is the QJ71MT91: Automatic communication parameter setting (📖 MODBUS/TCP Interface Module User's Manual (Details))

For how to read/write registers using a dedicated instruction when communicating at any time, refer to the following.

- Master station is the RJ71EN71: ECPRTCL instruction (📖 MELSEC iQ-R Ethernet User's Manual (Application))
- Master station is the QJ71MT91: MBRW and MBREQ instructions (📖 MODBUS/TCP Interface Module User's Manual (Details))

MODBUS standard function

The following table lists the MODBUS standard functions supported by the NZ2FT-MT for each master station function.
○: Support function, ×: Unsupported function

Function code		Function name	Processing description	Master module: RJ71EN71		Master module: QJ71MT91		
(Hexadecimal)	(Decimal)			Simple CPU communication	ECPRTCL instruction	Automatic communication	MBRW instruction	MBREQ instruction
01H	1	Read coils	Reads the status (on/off) of one or more coils. Specified target: Bit address of read/write area	○	○	○	○	○
02H	2	Read inputs	Reads the status (on/off) of one or more inputs. Specified target: Bit address of read-only area	○	○	○	○	○
03H	3	Read holding register areas	Reads one or more holding register values. Specified target: Register address of read/write area	○	○	○	○	○
04H	4	Read input register areas	Reads one or more input register values. Specified target: Register address of read-only area	○	○	○	○	○
05H	5	Write single coil	Writes a value (on/off) to a single coil. Specified target: Bit address of read/write area	×	○	×	×	○

Function code		Function name	Processing description	Master module: RJ71EN71		Master module: QJ71MT91		
(Hexadecimal)	(Decimal)			Simple CPU communication	ECPRTCL instruction	Automatic communication	MBRW instruction	MBREQ instruction
06H	6	Write single register	Writes a value to a single holding register. Specified target: Register address of read/write or read-only area	×	○	×	×	○
0FH	15	Write multiple coils	Writes values (on/off) to multiple coils. Specified target: Bit address of read/write area	○	○	○	○	○
10H	16	Write multiple register areas	Writes values to multiple holding register areas. Specified target: Register address of read/write or read-only area	○	○	○	○	○
16H	22	Mask write holding register	Masks the stored value in a single holding register with AND or OR and writes the value. Specified target: Register address of read/write or read-only area	×	○	×	×	○
17H	23	Read/write multiple register areas	Reads and writes multiple holding register areas. Specified target: Register address of read/write area	×	○	○	○	○

Bit address

The NZ2FT-MT accesses Packed process data of inputs and Packed process data for outputs stored in the bit address in units of bits by specifying the bit address.

Bit address		Possible access	Specification method*1			Data width	Item
			Master module: RJ71EN71		Master module: QJ71MT91		
(Hexadecimal)	(Decimal)		Communication pattern	Register type	Target MODBUS device type specification		
0000H to 1FFFH	0 to 8191	Read only	Read	Input	0200H: Read inputs	☞ Page 323 Data width used by the I/O module	Packed process data for inputs
8000H to 9FFFH	32768 to 40959	Read/write	Read	Coil	0100H: Read coils		Packed process data for outputs
			Write	Coil	0001H: Write single coil		

*1 For details on the specification method, refer to the following.
☞ Page 299 Simple CPU communication settings
☞ Page 302 Automatic communication parameter

Register address

The NZ2FT-MT accesses the data stored in units of words by specifying the register address.
The following lists the MODBUS standard functions used for each process.

Processing	MODBUS standard function to be used	Target register
Read in units of words	Function code 03: Read holding register areas	Possible access is read/write.
	Function code 04: Read holding register areas	Available access is read only.
Writing in units of words	Function code 06: Write single register area	Possible access is read/write or write only.
	Function code 16: Write multiple coils	
	Function code 22: Mask write holding register	
Read after writing in units of words	Function code 23: Read/write multiple register areas	Possible access is read/write.

Register address list

Values can be written to register addresses that can be read/written or can only be written, but values outside the range cannot be written.

Register address		Possible access	Specification method[*1]			Data width	Item
			Master module: RJ71EN71		Master module: QJ71MT91		
(Hexadecimal)	(Decimal)		Communication pattern	Register type	Target MODBUS device type specification		
0000H to 01FFH	0 to 511	Read only	Read	Input Register	0400H: Read input register areas	☞ Page 323 Data width used by the I/O module	Packed process data for inputs Input data is stored. Regardless of the I/O structure, access is always possible to all areas. Unused registers respond with 0. (☞ Page 333 C000H to FFFFH (49152 to 65535) Module parameters)
0800H to 09FFH	2048 to 2559	Read/write	Read	Holding Register	0500h: Read Holding Registers	☞ Page 323 Data width used by the I/O module	Packed process data for outputs The output data is stored. Regardless of the I/O structure, access is always possible to all areas. Unused registers send 0 during read access and write access is ignored.
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1000H to 1006H	4096 to 4102	Read only	Read	Input Register	0400h: Read Input Registers	Byte	Coupler identifier
100CH	4108	Read only	Read	Input Register	0400h: Read Input Registers	Word	The NZ2FT-MT status information is stored. ☞ Page 361 Coupler status
100DH	4109	Read only	Read	Input Register	0400h: Read Input Registers	Word	Life Signal (16-bit counter, in increments of 1ms)
100EH	4110	Read only	Read	Input Register	0400h: Read Input Registers	Word	Port Link Status
1010H	4112	Read only	Read	Input Register	0400h: Read Input Registers	Word	Process image length in bits for the output modules
1011H	4113	Read only	Read	Input Register	0400h: Read Input Registers	Word	Process image length in bits for the input modules
1017H	4119	Read only	Read	Input Register	0400h: Read Input Registers	Word	Register mapping revision It indicates the version of the register configuration.
101CH to 101FH	4124 to 4127	Read only	Read	Input Register	0400h: Read Input Registers	Byte	☞ Page 294 Collective process alarm message for I/O modules Valid when 1133H (4403) Process alarm is set to 1
1020H to 1027H	4128 to 4135	Read only	Read	Input Register	0400h: Read Input Registers	Byte	Coupler serial number
1028H to 102FH	4136 to 4143	Read only	Read	Input Register	0400h: Read Input Registers	Byte	☞ Page 314 1028H to 102FH (4136 to 4143) Module status
1030H	4144	Read only	Read	Input Register	0400h: Read Input Registers	Word	☞ Page 314 1030H (4144) Modbus watchdog, current time
1120H	4384	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 314 1120H (4384) Modbus watchdog, predefined time
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		

Register address		Possible access	Specification method[*1]			Data width	Item
			Master module: RJ71EN71		Master module: QJ71MT91		
(Hexadecimal)	(Decimal)		Communication pattern	Register type	Target MODBUS device type specification		
1121H	4385	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 315 1121H (4385) Data exchange Modbus watchdog, reset register
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1122H	4386	Read/write	Read	Holding Register	0500h: Read Holding Registers	DWord	☞ Page 315 1122H (4386) Lock force mode on web server
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1124H to 1125H	4388 to 4389	Read/write	Read	Holding Register	0500h: Read Holding Registers	Long	☞ Page 315 1124H to 1125H (4388 to 4389), 1140H to 1141H (4416 to 4417) Changing IP address via fieldbus
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1126H to 1127H	4390 to 4391	Read/write	Read	Holding Register	0500h: Read Holding Registers	Long	☞ Page 316 1126H to 1127H (4390 to 4391), 1142H to 1143H (4418 to 4419) Changing subnet mask via fieldbus
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1128H to 1129H	4392 to 4393	Read/write	Read	Holding Register	0500h: Read Holding Registers	Long	☞ Page 316 1128H to 1129H (4392 to 4393), 1144H to 1145H (4420 to 4421) Changing gateway via fieldbus
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1130H	4400	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 316 1130H (4400) Writing access in multi-client operation
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1131H	4401	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 316 1131H (4401) Modbus connection timeout in seconds
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1132H	4402	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 316 1132H (4402) Check the reference list before data exchange
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1133H	4403	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 316 1133H (4403) Process alarm
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		

Register address		Possible access	Specification method[*1]			Data width	Item
			Master module: RJ71EN71		Master module: QJ71MT91		
(Hexadecimal)	(Decimal)		Communication pattern	Register type	Target MODBUS device type specification		
1134H	4404	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 317 1134H (4404) Diagnostic alarm Do not change the default value (0).
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1135H	4405	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 317 1135H (4405) Output behaviour on fieldbus error
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1136H	4406	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 317 1136H (4406) Module behaviour on hot swap
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1137H	4407	Read/write	Read	Holding Register	0500h: Read Holding Registers	Word	☞ Page 317 1137H (4407) Data format
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
113CH to 113DH	4412 to 4413	Write only	Write	Holding Register	0005h: Write Holding Registers	DWord	☞ Page 317 113CH to 113DH (4412 to 4413) Boot module parameters
113EH to 113FH	4414 to 4415	Write only	Write	Holding Register	0005h: Write Holding Registers	DWord	☞ Page 317 113EH to 113FH (4414 to 4415) Save module parameters
1140H to 1141H	4416 to 4417	Read/write	Read	Holding Register	0500h: Read Holding Registers	Long	☞ Page 315 1124H to 1125H (4388 to 4389), 1140H to 1141H (4416 to 4417) Changing IP address via fieldbus
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1142H to 1143H	4418 to 4419	Read/write	Read	Holding Register	0500h: Read Holding Registers	Long	☞ Page 316 1126H to 1127H (4390 to 4391), 1142H to 1143H (4418 to 4419) Changing subnet mask via fieldbus
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
1144H to 1145H	4420 to 4421	Read/write	Read	Holding Register	0500h: Read Holding Registers	Long	☞ Page 316 1128H to 1129H (4392 to 4393), 1144H to 1145H (4420 to 4421) Changing gateway via fieldbus
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
27FEH	10238	Read only	Read	Input Register	0400h: Read Input Registers	Word	Number of entries in the current module list The number of I/O modules in Current module list (automatically created at startup) is displayed.

Register address		Possible access	Specification method*1			Data width	Item
			Master module: RJ71EN71		Master module: QJ71MT91		
(Hexadecimal)	(Decimal)		Communication pattern	Register type	Target MODBUS device type specification		
27FFH	10239	Read only	Read	Input Register	0400h: Read Input Registers	Word	Number of entries in the reference list The number of I/O modules defined in Reference list is displayed.
2800H to 287FH	10240 to 10367	Read/write	Read	Holding Register	0500H: Read holding register areas	DWord	☞ Page 318 2800H to 287FH (10240 to 10367) Reference list
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
2A00H to 2A7FH	10752 to 10879	Read only	Read	Input Register	0400h: Read Input Registers	DWord	☞ Page 318 2A00H to 2A7FH (10752 to 10879) Current module list
2B00H to 2B7FH	11008 to 11135	Read only	Read	Input Register	0400h: Read Input Registers	Word	☞ Page 318 2B00H to 2B7FH (11008 to 11135) Module offsets of packed process data
8000H to 87FFH	32768 to 34815	Read only	Read	Input Register	0400h: Read Input Registers	32 register areas per I/O module	☞ Page 318 8000H to 87FFH (32768 to 34815) Process data inputs
9000H to 97FFH	36864 to 38911	Read/write	Read	Holding Register	0500H: Read holding register areas	32 register areas per I/O module	☞ Page 318 9000H to 97FFH (36864 to 38911) Process data outputs
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		
B000H to B7FFH	45056 to 47103	Read only	Read	Input Register	0400h: Read Input Registers	Byte	☞ Page 319 B000H to B7FFH (45056 to 47103) Process alarms
C000H to FFFFH	49152 to 65535	Read/write	Read	Holding Register	0500H: Read holding register areas	Byte	☞ Page 319 C000H to FFFFH (49152 to 65535) Module parameters
			Write	Holding Register	0005h: Write Holding Registers		
			—	—	0505h: Read/Write Holding Registers		

*1 For details on the specification method, refer to the following.
☞ Page 299 Simple CPU communication settings
☞ Page 302 Automatic communication parameter

Register address details

■1028H to 102FH (4136 to 4143) Module status

The status of each detected I/O module is displayed. It is displayed in 2 bits per module in the corresponding position of the 128 bits.

00: Valid data from the normal I/O module, or the I/O module not mounted

01: Invalid data or I/O module hardware failure

10: Invalid data or I/O module with an electronic unit part that is different from the one in operation

11: Invalid data, I/O module disconnected during operation, or I/O module with an electronic unit part removed during operation

Both the normal I/O module and the I/O module not mounted indicate 00. Therefore, check 27FEH (10238) Number of entries in the current module list to see if the number of detected I/O modules matches the actual number.

Data is stored in the following positions depending on the mounting position of I/O modules in order of proximity to the NZ2FT-MT.

Register address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
1028H	8th module		7th module		6th module		5th module		4th module		3rd module		2nd module		1st module	
1029H	16th module		15th module		14th module		13th module		12th module		11th module		10th module		9th module	
102AH	24th module		23rd module		22nd module		21st module		20th module		19th module		18th module		17th module	
102BH	32nd module		31st module		30th module		29th module		28th module		27th module		26th module		25th module	
102CH	40th module		39th module		38th module		37th module		36th module		35th module		34th module		33rd module	
102DH	48th module		47th module		46th module		45th module		44th module		43rd module		42nd module		41st module	
102EH	56th module		55th module		54th module		53rd module		52nd module		51st module		50th module		49th module	
102FH	64th module		63rd module		62nd module		61st module		60th module		59th module		58th module		57th module	

Ex.

If the I/O module whose mounting position is third in order of proximity to the NZ2FT-MT is invalid, 10 is stored at the position of the corresponding I/O module.

Register address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
1028H	00		00		00		00		00		10		00		00	
1029H	00		00		00		00		00		00		00		00	
102AH	00		00		00		00		00		00		00		00	
102BH	00		00		00		00		00		00		00		00	
102CH	00		00		00		00		00		00		00		00	
102DH	00		00		00		00		00		00		00		00	
102EH	00		00		00		00		00		00		00		00	
102FH	00		00		00		00		00		00		00		00	

■1030H (4144) Modbus watchdog, current time

Remaining time for Watchdog monitoring of Process data (stored value × 10ms) is shown. From the input value to 0, it is decremented by 1 every 10ms.

Since 0 is the state in which the Watchdog timeout has occurred, Watchdog monitoring must be restarted.

To restart Watchdog monitoring, turn off and on b8 of 1121H (4385) Data exchange Modbus watchdog, reset register. (☞ Page 269 Modbus automatic communication timeout monitoring)

For FFFFH, Watchdog monitoring is disabled.

■1120H (4384) Modbus watchdog, predefined time

The setting is the same as that from the NZ2FT-MT parameter "Status Modbus watchdog".

Set the value in units of 10ms. The value cannot be written during the Watchdog timeout.

If a value is written during Watchdog monitoring, it will also be stored in 1030H (4144) Modbus watchdog, current time.

If 0 (default) is entered, Watchdog monitoring is disabled, and FFFFH is stored in 1030H (4144) Modbus watchdog, current time.

■1121H (4385) Data exchange Modbus watchdog, reset register

Only b0 can be operated during Watchdog monitoring. Only b8 can be operated during the Watchdog timeout. Manipulating bits from a state that is not Watchdog monitoring or Watchdog timeout will not work.

When b0 is turned off and on, the values are stored from 1120H (4384) Modbus watchdog, predefined time to 1030H (4144) Modbus watchdog, current time, and Watchdog monitoring is reset. To enable Watchdog monitoring and continue Process data communication, turn off and on b0 again during Watchdog monitoring.

When b8 is turned off and on, the values are stored from 1120H (4384) Modbus watchdog, predefined time to 1030H (4144) Modbus watchdog, current time, and the time-out Watchdog monitoring is restarted.

■1122H (4386) Lock force mode on web server

The setting is the same as that from the NZ2FT-MT parameter "Lock force mode".

Transition to the Force mode is locked or unlocked. (☞ Page 76 Force mode)

- Transition to the Force mode is locked by writing the string "LOCK" (4C4FH, 434BH).
- Transition to the Force mode is unlocked by writing the string "FREE" (4652H, 4545H).

In the default setting, transition to the Force mode can be made after the login to the Web server.

For reading this register, b8 is read as 0 for unlocked at force mode or 1 for locked at force mode instead of strings.

■1124H to 1125H (4388 to 4389), 1140H to 1141H (4416 to 4417) Changing IP address via fieldbus

The setting is the same as that from the NZ2FT-MT parameters "IP address 1" and "IP address 2".

1124H to 1125H (4388 to 4389) indicates the IP address of P1, and 1140H to 1141H (4416 to 4417) indicates the IP address of P2.

Ex.

When the IP address of P1 is 192.168.10.100

Item	1124H (4388)		1125H (4389)	
IP address (decimal)	192	168	10	100
IP address (hexadecimal)	C0H	A8H	AH	64H
Hexadecimal	C0A8H		A64H	
Decimal	49320		2660	

The IP address can be checked and changed via the network. The following describes how to change the IP address.

Ex.

When changing the IP address of P1 from 192.168.1.1 to 192.168.2.1

1. Change the subnet mask to 255.255.0.0 in the register 1126H to 1127H.
2. Change the IP address to 192.168.2.1 in the register 1124H to 1125H.
3. Review the communication parameter settings of the master station.
4. Change the gateway to 192.168.2.x in the register 1128H to 1129H.
5. Restore the subnet mask to 255.255.255.0 in the register 1126H to 1127H.

Point

If the IP address is changed, review the communication parameters of the master station. (☞ Page 299 Settings on the master station (RJ71EN71), Page 302 Settings on the master station (QJ71MT91))

■1126H to 1127H (4390 to 4391), 1142H to 1143H (4418 to 4419) Changing subnet mask via fieldbus

The setting is the same as that from the NZ2FT-MT parameters "Subnet mask 1" and "Subnet mask 2".

The subnet mask can be checked and changed via the network.

1126H to 1127H (4390 to 4391) indicates the subnet mask of P1, and 1142H to 1143H (4418 to 4419) indicates the subnet mask of P2.

■1128H to 1129H (4392 to 4393), 1144H to 1145H (4420 to 4421) Changing gateway via fieldbus

The setting is the same as that from the NZ2FT-MT parameters "Gateway 1" and "Gateway 2".

The gateway can be checked and changed via the network.

1128H to 1129H (4392 to 4393) indicates the gateway of P1, and 1144H to 1145H (4420 to 4421) indicates the gateway of P2.

■1130H (4400) Writing access in multi-client operation

The setting is the same as that from the NZ2FT-MT parameter "Writing access in multi-client operation".

When the NZ2FT-MT parameter "Additional TCP port" is set and two master stations are connected, set which master station allows writing.

Bit	Description
0	■When 0 is set (corresponds to "for all connections" in the NZ2FT-MT parameter "Writing access in multi client operation") Writing is permitted from both master stations. ■When 1 is set Writing is permitted from one master station. If writing is permitted, it will be allowed until communication is disconnected. When the communication that allows writing is disconnected, writing from the master station that requested the next write is permitted.
1	■When 0 is set (corresponds to "For client with first write access" in the NZ2FT-MT parameter "Writing access in multi client operation") Requests from the master station that was previously requested to write is permitted. If writing is permitted, it will be allowed until communication is disconnected. Exception code 01H is returned to the master station where the write request was not permitted. ■When 1 is set (corresponds to "For client with first connection" in the NZ2FT-MT parameter "Writing access in multi client operation") Write requests from the master station with which the connection was established earlier is permitted. When b0 = 1, nothing is responded to the master station where the write request was not permitted.
2 to 15	System area

■1131H (4401) Modbus connection timeout in seconds

The setting is the same as that from the NZ2FT-MT parameter "Modbus connection timeout".

Monitors the non-communication status of automatic communication with the master station, and sets the time (seconds) until disconnection due to a timeout.

When 0 is set, the operation is disabled.

■1132H (4402) Check the reference list before data exchange

The setting is the same as that from the NZ2FT-MT parameter "Check reference list before data exchange".

When 0 is set, data communication starts without checking Reference list (2800H or later) against Current module list (2A00H or later). In this case, Reference list need not be created.

When 1 is set, data communication starts only when Reference list (2800H or later) matches Current module list (2A00H or later). When both lists do not match, the NZ2FT-MT operates according to 1135H (4405) Field bus or reference list error behaviour.

■1133H (4403) Process alarm

The setting is the same as that from the NZ2FT-MT parameter "Process alarm".

Set whether to turn on the bit of 101CH to 101FH (4124 to 4127) Collective process alarm message for the I/O modules when Process alarm occurs.

When 0 is set, Collective process alarm message for the I/O modules will not turn on when Process alarm occurs.

When 1 is set, Collective process alarm message for the I/O modules turns on when Process alarm occurs.

■1134H (4404) Diagnostic alarm

Do not change the default value (0).

■1135H (4405) Output behaviour on fieldbus error

The setting is the same as that from the NZ2FT-MT parameter "Output behaviour on fieldbus error".

Set the output operation when a fieldbus error or an error of Reference list occurs.

Value	Description
0	All outputs are 0.
1	All outputs are Substitute value.
2	All outputs hold the previous Process value.

■1136H (4406) Module behaviour on hot swap

The setting is the same as that from the NZ2FT-MT parameter "Module behaviour on hot swap".

When 0 is set, Process data communications continue.

When 1 is set, the operation follows the setting when a fieldbus error occurs.

■1137H (4407) Data format

The setting is the same as that from the NZ2FT-MT parameter "Data format".

When 0 is set, the data will be transferred in big endian (Motorola format).

When 1 is set, data is transferred in little-endian (Intel format).

■113CH to 113DH (4412 to 4413) Boot module parameters

These parameters are for loading (LOAD) the default parameters of all I/O modules. The parameters are the same as those of the NZ2FT-MT below.

- Set "Default" to "Save module parameter on coupler".
- Select "Restore default values" from the "Module parameters" menu.

Write and set the string "LOAD".

Item	Big endian (Motorola format)				Little endian (Intel format)			
	113CH		113DH		113CH		113DH	
String	L	O	A	D	D	A	O	L
ASCII (decimal)	76	79	65	68	68	65	79	76
ASCII (hexadecimal)	4CH	4FH	41H	44H	44H	41H	4FH	4CH
Hexadecimal	4C4FH		4144H		4441H		4F4CH	
Decimal	19535		16708		17473		20300	

■113EH to 113FH (4414 to 4415) Save module parameters

These parameters are for recording (SAVE) Module parameters (C000H to FFFFH) of all I/O modules in the non-volatile memory of the NZ2FT-MT.

Even if the parameter settings are changed after recording, the recorded parameter settings will be used to operate when the NZ2FT-MT is reset.

The parameters are the same as those of the NZ2FT-MT below.

- Set "Yes" to "Save module parameter on coupler".
- Select "Save module parameters" from the "Module parameters" menu.

Write and set the string "SAVE".

Item	Big endian (Motorola format)				Little endian (Intel format)			
	113EH		113FH		113EH		113FH	
String	S	A	V	E	E	V	A	S
ASCII (decimal)	83	65	86	69	69	86	65	83
ASCII (hexadecimal)	53H	41H	56H	45H	45H	56H	41H	53H
Hexadecimal	5341H		5645H		4556H		4153H	
Decimal	21313		22085		17750		16723	

■2800H to 287FH (10240 to 10367) Reference list

Module ID (identifier) of each module is stored in 4 bytes (2 register areas). (☞ Page 270 Check reference list before data exchange)

When 1 is set for 1132H (4402) Check reference list before data exchange, Reference list and Current module list must match before the data communication starts.

■2A00H to 2A7FH (10752 to 10879) Current module list

Module ID (identifier) of the module that is connected when the NZ2FT-MT starts is stored in 4 bytes (2 register areas). (☞ Page 270 Check reference list before data exchange)

To simplify the setting, Current module list can be copied to Reference list.

■2B00H to 2B7FH (11008 to 11135) Module offsets of packed process data

The offset value of Process data of the I/O module is stored starting with the bit address (0000H).

Two registers are used for each I/O module, and they are stored in order of output/input.

When there are no outputs or inputs to the I/O module, FFFFH is stored.

Ex.

When the NZ2FTS4-4DE, NZ2FTS-60DA4, NZ2FTS3-8DE, NZ2FTS-D62P2 are installed in order of proximity to NZ2FT-MT

Slot	I/O module	Module offsets of packed process data	
		Register address	Value
1	NZ2FTS4-4DE	2B00H	FFFFH
		2B01H	0000H
2	NZ2FTS-60DA4	2B02H	8000H
		2B03H	FFFFH
3	NZ2FTS3-8DE	2B04H	FFFFH
		2B05H	0008H
4	NZ2FTS-D62P2	2B06H	8040H
		2B07H	0010H
5	—	2B08H	FFFFH
		2B09H	FFFFH
⋮	⋮	⋮	⋮
64	—	2B7EH	FFFFH
		2B7FH	FFFFH

■8000H to 87FFH (32768 to 34815) Process data inputs

For each module, 64 bytes (32 register areas) are reserved. (☞ Page 334 C000H to FFFFH (49152 to 65535) Module parameters)

For example, if the mounting position of the module is the third in order of proximity to the NZ2FT-MT, the third module starts at register address 8040H.

■9000H to 97FFH (36864 to 38911) Process data outputs

For each module, 64 bytes (32 register areas) are reserved. (☞ Page 336 C000H to FFFFH (49152 to 65535) Module parameters)

For example, if the mounting position of the module is the third in order of proximity to the NZ2FT-MT, the third module starts at register address 9040H.

■B000H to B7FFH (45056 to 47103) Process alarms

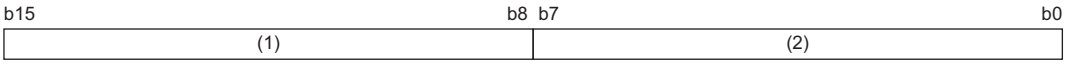
For Process alarms of each module, 64 bytes (32 register areas) are reserved. For example, if the mounting position of the module is the third in order of proximity to the NZ2FT-MT, the third module starts at address B040H and 4 bytes are stored.
If there is a bit that is turned on in register address 101CH to 101FH (4124 to 4127) Collective process alarm message for I/O modules, Process alarm is checked by reading the corresponding Process alarms. After reading Process alarms, the bits of the corresponding I/O module with register addresses 101CH to 101FH are turned off.
When all Process alarms are read, the bits of all I/O modules with register addresses 101CH to 101FH are turned off.
For details on how to read Process alarm data and the data structure, refer to the following.
☞ Page 294 Checking warning output (Process alarm), Page 294 Process alarm data

■C000H to FFFFH (49152 to 65535) Module parameters

The parameter data of 256 register areas is allocated for each module.
For example, if the mounting position of the module is the third in order of proximity to the NZ2FT-MT, the third module starts at register address C200H.
The parameters of each module can be set from the Web server or master station.
One register is assigned to each parameter, and two consecutive registers are assigned to a 32-bit length parameter (such as the NZ2FTS-D62P2 parameter "End value").
For example, in the third module in order of mounting position proximity to the NZ2FT-MT, the eighth parameter is C207H (provided that there is no 32-bit length parameter).
When setting 32-bit length parameters, pay attention to the send method (Data format) of communication data. (☞ Page 304 Parameter list)

Response message when completed with an error

When a request message from the master station is completed with an error in the NZ2FT-MT, the function code and MODBUS abnormal response code (error code common to the MODBUS protocol) are stored in the response message. The following indicates the format of the response message when completed with an error.



(1) Function code
(2) MODBUS abnormal response code

Function code

The following indicates the function codes stored in the upper byte of the response message when completed with an error.

Function code	Function name	Processing description
81H	Read coils	Coil reading was completed with an error.
82H	Read inputs	Input reading was completed with an error.
83H	Read holding register areas	Holding register reading was completed with an error.
84H	Read input register areas	Input register reading was completed with an error.
85H	Write single coil	Single coil writing was completed with an error.
86H	Write single register	Holding register writing was completed with an error.
8FH	Write multiple coils	Multiple coil writing was completed with an error.
90H	Write multiple register areas	Multiple holding register writing was completed with an error.
96H	Mask write holding register	Holding register mask writing was completed with an error.
97H	Read/write multiple register areas	Multiple register reading/writing was completed with an error.

MODBUS abnormal response code

The following indicates the MODBUS abnormal response codes stored in the lower byte of the response message when completed with an error.

MODBUS abnormal response code	Error name	Error definition and cause	Action	
			Master station	NZ2FT-MT
01H	Function code error	The NZ2FT-MT received an unsupported function code.	Check the function code supported by the NZ2FT-MT, and review the request message sent from the master station. (☞ Page 307 MODBUS standard function)	—
		Connection cannot be established with the coupler. While in a state where the parameter "Writing access in multi-client operation" is set to "For client with first write access" or "For client with first connection", writing was performed from multiple master stations or writing was performed using a port number different from that from a single master station.	Take one of the following actions.	
			• If a different port number is used when communicating with a single master station, use only one port number. • If this error occurs even though one port number is used from a single master station, it is possible that a different master station is writing to the NZ2FT-MT. Review the settings of the other master station so that the other master station does not write to the NZ2FT-MT.	If communication with multiple master stations is required, change the setting of the parameter "Writing access in multi-client operation" to "For all connections".
02H	Device address error	There is an error in the address specification of the MODBUS device.	Check the type and size of the MODBUS device supported by the NZ2FT-MT, and correct the address specification of the request message sent from the master. (☞ Page 309 Bit address, Page 309 Register address)	—
03H	Data error	There is an error in the content of the protocol data part of the request message.	Review the data part of the request message sent from the master station.	—
04H	Processing failure	The NZ2FT-MT could not process the request message because an error occurred during processing.	Review the data part of the request message.	Eliminate the error factor occurring in the NZ2FT-MT. If the NZ2FT-MT issues this code, identify the problem from the error that occurred during troubleshooting, and take corrective action.
06H	Slave busy	The request message processing could not be executed because the NZ2FT-MT is executing other processing.	Retry at a later time.	If the NZ2FT-MT issues this code, correct the number of request messages that can be accepted at the same time to 64 or less.

11.8 Access to Process Data

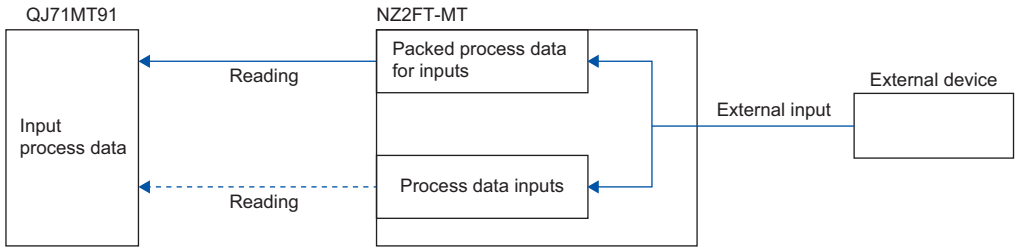
The I/O data of the I/O module is stored in Process data in the NZ2FT-MT MODBUS device, and data is communicated with the buffer memory or device of the master module by automatic communication (constant periodic communication).

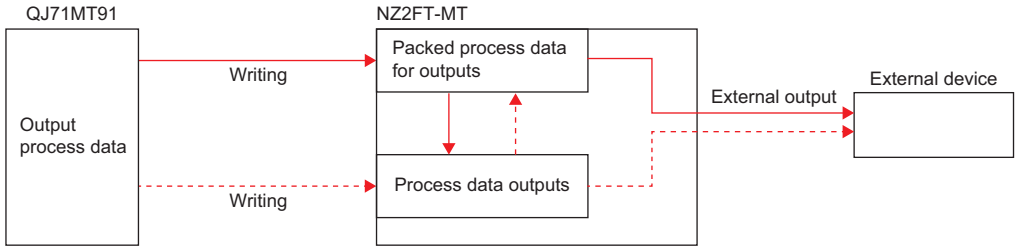
Data configuration

The MODBUS device can be specified as a bit address and a register address. (☞ Page 307 MODBUS Standard Functions and MODBUS Devices)

The same data is always reflected to Packed process data for inputs and Process data inputs of Input data by the NZ2FT-MT. The master station reads one of them.

When Process data is written to one of Packed process data for outputs and Process data outputs of Output data, Process data is reflected to the other by the NZ2FT-MT.





Point

- Process data can be checked from the Web server. (☞ Page 72 "Process data").
- The communication data format can be changed to little-endian or big-endian by setting the parameter. (☞ Page 304 Parameter list)

Data width used by the I/O module

The following table shows the data width used by each I/O module in the NZ2FT-MT during automatic communication (constant periodic communication).

I/O module	Packed Process data		Process data	
	Input	Output	Input	Output
NZ2FTS4-4DE	8 bits	—	32 words	32 words allocated
NZ2FTS3-8DE	8 bits	—	32 words	32 words allocated
NZ2FTS1-16DE	16 bits	—	32 words	32 words allocated
NZ2FTS4-4D	8 bits	—	32 words	32 words allocated
NZ2FTS3-8D	8 bits	—	32 words	32 words allocated
NZ2FTS1-16D	16 bits	—	32 words	32 words allocated
NZ2FTS2-4A	8 bits	—	32 words	32 words allocated
NZ2FTS4-4TE	—	8 bits	32 words allocated	32 words
NZ2FTS2-8TE	—	8 bits	32 words allocated	32 words
NZ2FTS1-16TE	—	16 bits	32 words allocated	32 words
NZ2FTS4-4T	—	8 bits	32 words allocated	32 words
NZ2FTS2-8T	—	8 bits	32 words allocated	32 words
NZ2FTS1-16T	—	16 bits	32 words allocated	32 words
NZ2FTS3-4R	—	8 bits	32 words allocated	32 words
NZ2FTS-60AD4	4 words	—	32 words	32 words allocated
NZ2FTS-60DA4	—	4 words	32 words allocated	32 words
NZ2FTS-60RD4	4 words	—	32 words	32 words allocated
NZ2FTS-60TD4	4 words	—	32 words	32 words allocated
NZ2FTS-D62P2	6 words	6 words	32 words	32 words
NZ2FTS-D66D1	3 words	—	32 words	32 words allocated
NZ2FT-C24	8 words	8 words	32 words	32 words

Allocation of master station (RJ71EN71) CPU module to device

When the master station is the RJ71EN71, Process data in the NZ2FT-MT register is stored in the CPU module device of the master station by automatic communication (constant periodic communication) using the simple CPU communication.

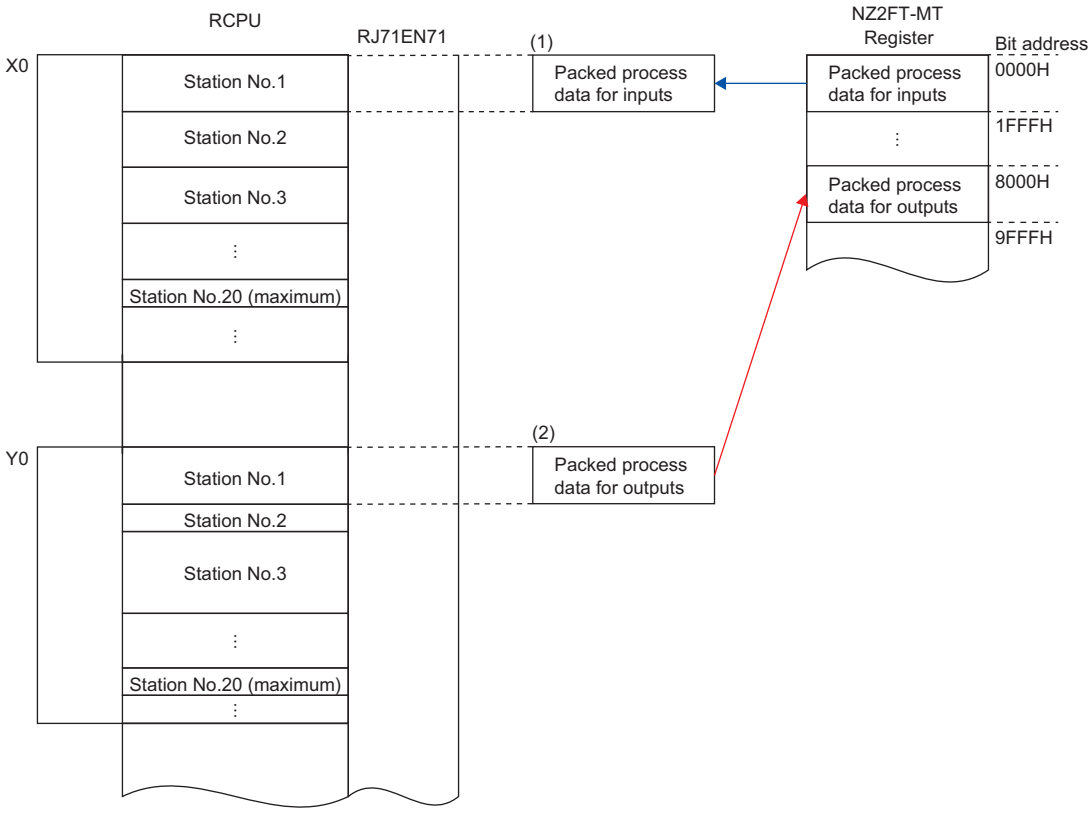
Point

If the same port number is specified for the simple CPU communication setting, set 64, and if a different port number is specified for the simple CPU communication setting, set up to 8. (☞ Page 299 Simple CPU communication settings)

Ex.

When assigning the following in the bit address of the register of the NZ2FT-MT (in units of bits) to station 1 of the CPU module device

- (1) "Packed process data for inputs" of the digital input module
- (2) "Packed process data for outputs" of the digital output module



Precautions

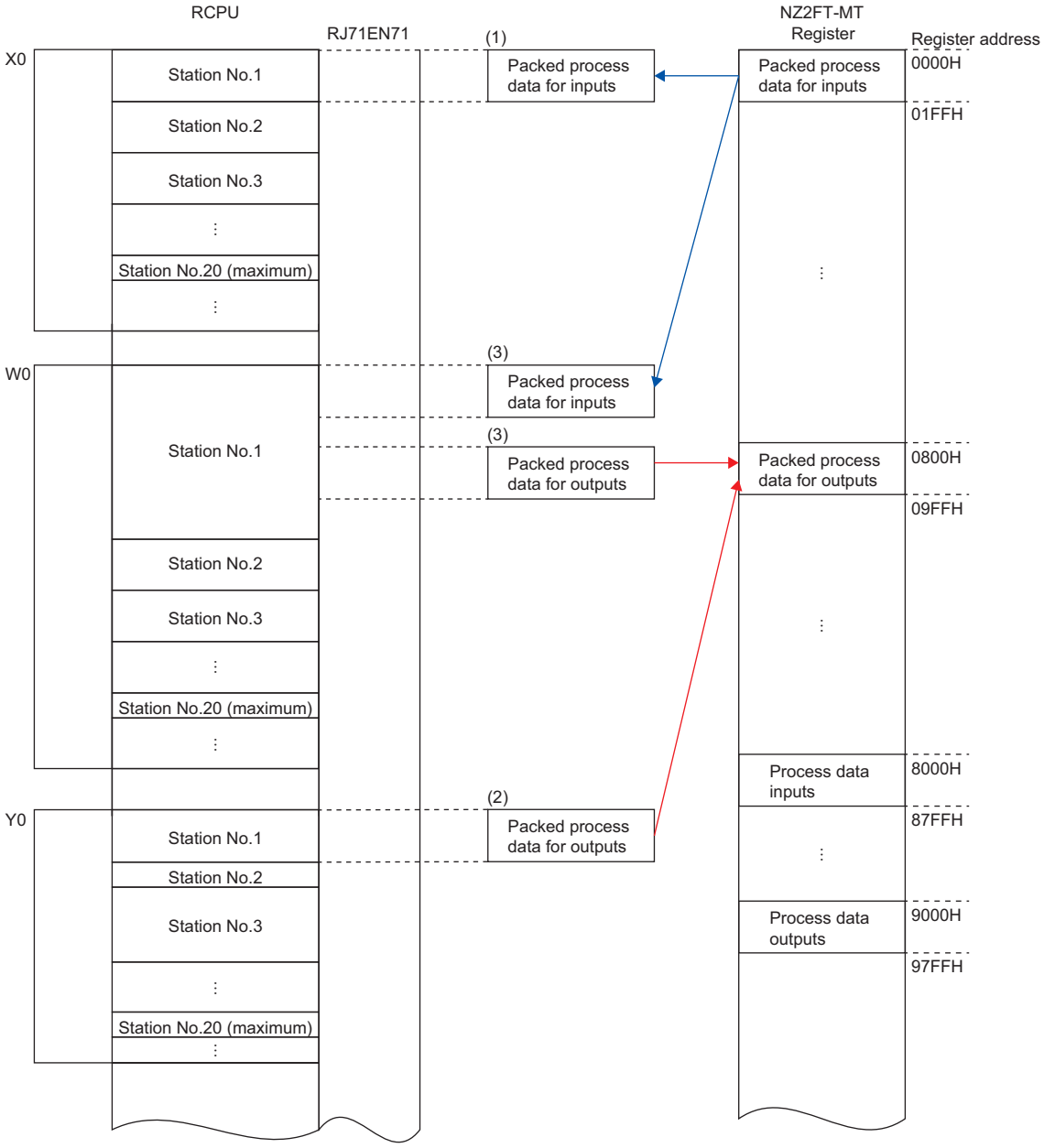
When the bit device in the simple CPU communication setting is Y, the output data cannot be specified in units of 1 point. Specify the output data in units of 16 points.

For example, if the current output data is FFFEH and 0001H is to be output additionally, specify FFFFH. If 0001H is specified for the output data, the output data will be 0001H instead of FFFFH, and all existing bits will become 0.

Ex.

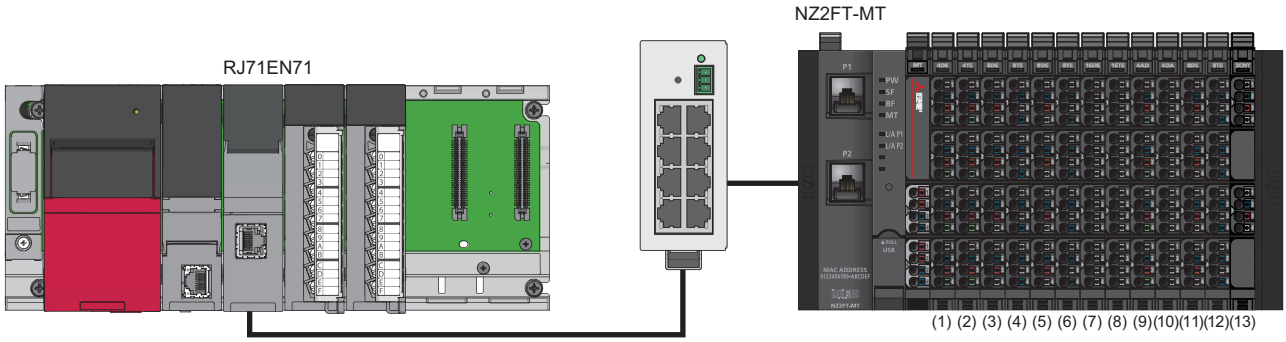
When assigning the following in the register address of the register of the NZ2FT-MT (in units of words) to station 1 of the CPU module device

- (1) "Packed process data for inputs" of the digital input module
- (2) "Packed process data for outputs" of the digital output module
- (3) "Packed process data for inputs" and "Packed process data for outputs" of the analog module



Ex.

The following system configuration describes the assignment of the master station CPU module to a device and the data structure of Process data.

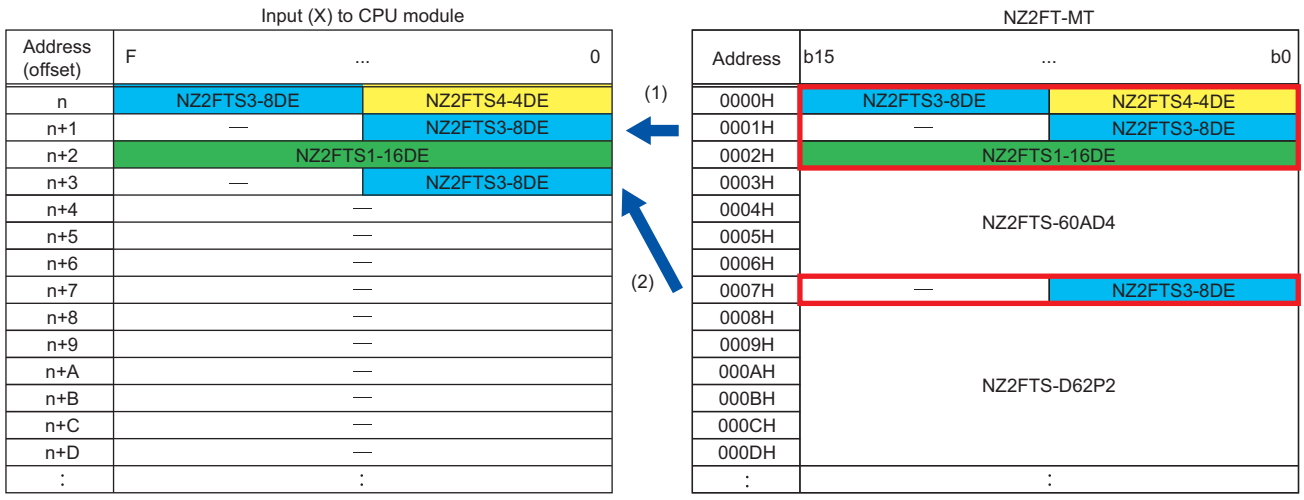


(1) NZ2FTS4-4DE
(2) NZ2FTS4-4TE
(3) NZ2FTS3-8DE
(4) NZ2FTS2-8TE
(5) NZ2FTS3-8DE
(6) NZ2FTS2-8TE
(7) NZ2FTS1-16DE
(8) NZ2FTS1-16TE
(9) NZ2FTS-60AD4
(10) NZ2FTS-60DA4
(11) NZ2FTS3-8DE
(12) NZ2FTS2-8TE
(13) NZ2FTS-D62P2

Packed process data for inputs

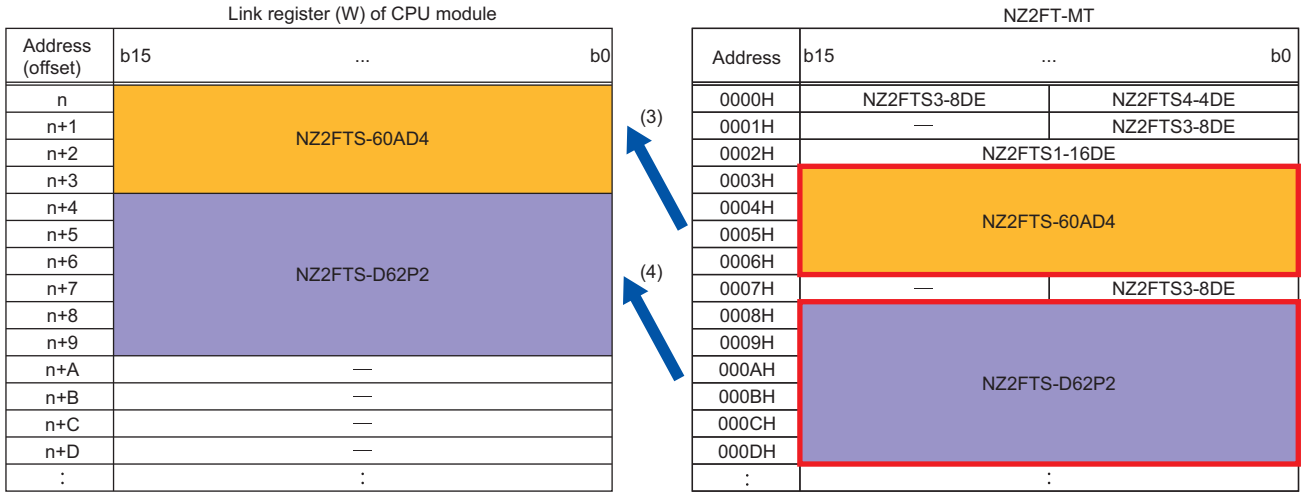
This section describes the assignment of Packed process data for inputs to the CPU module and the data structure of the NZ2FT-MT register.

The following shows the assignment to the input (X) of the CPU module.



(1) Simple CPU communication setting setting No.1
(2) Simple CPU communication setting setting No.2

The following shows the assignment to the link register (W) of the CPU module.



(3) Simple CPU communication setting setting No.3
(4) Simple CPU communication setting setting No.4

The structure of Packed process data for inputs is as follows.

- In the simple CPU communication settings, assign the bit address of the digital input module to the input (X) of the CPU module. (Setting No.1)
- If multiple digital input modules are installed consecutively, they can be collectively assigned to the input (X). (Setting No.1)
- If an I/O module with word Packed process data (Input), such as an analog input module or communication module, is installed between the digital input modules, assign it to the input (X) using a different setting. (Setting No.2)
- In the simple CPU communication settings, assign the register address of the I/O module that has the word Packed process data (Input) to the link register (W) of the CPU module. (Setting No.3)
- If multiple I/O modules with word Packed process data (Input) are installed consecutively, they can be collectively assigned to the link register (W).
- If a digital input module is installed between I/O modules that have word Packed process data (Input), use a different setting to allocate it to the link register (W). (Setting No.4)

- The size of Packed process data (Input) of each I/O module depends on the I/O module. (☞ Page 323 Data width used by the I/O module)
- There is no digital output module assigned to the input (X).
- For details on assignment of the I/O module with Packed process data (Output) to the link register (W), refer to the following.

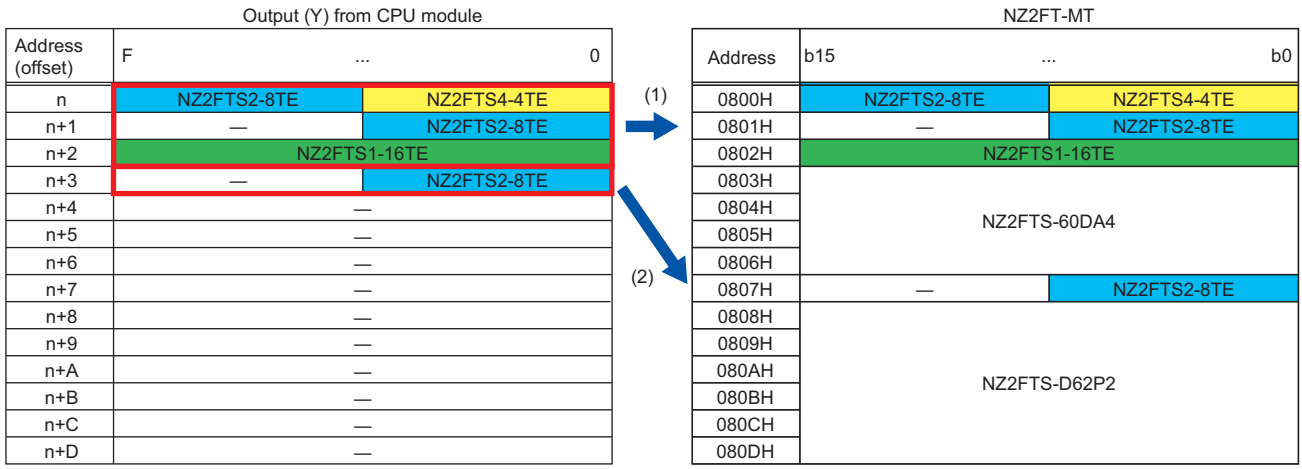
☞ Page 328 Packed process data for outputs

- The I/O modules with the Packed process data (Input) size of 8 bits or less are assigned next to the previous I/O module.
- The I/O modules with the Packed process data (Input) size of 16 bits or more are assigned from the start of the next word.
- Packed process data (Input) of the 4-point input digital input module uses only 4 points from b0 to b3, and 4 bits from b4 to b7 are reserved only in the area.

Packed process data for outputs

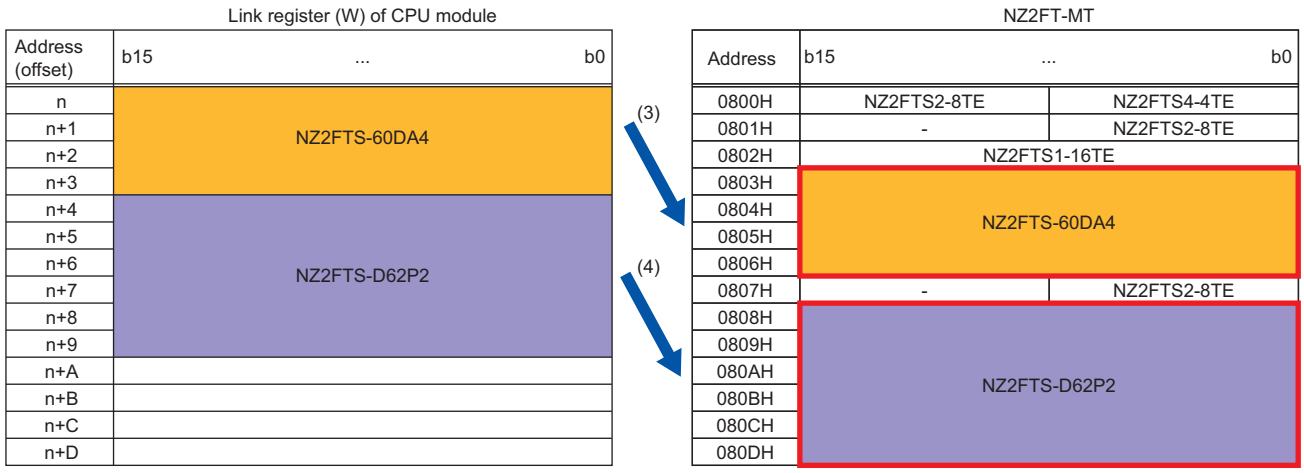
This section describes the assignment of Packed process data for outputs to the CPU module and the data structure of the NZ2FT-MT register.

The following shows the assignment to the output (Y) of the CPU module.



(1) Simple CPU communication setting setting No.5
(2) Simple CPU communication setting setting No.6

The following shows the assignment to the link register (W) of the CPU module.



(3) Simple CPU communication setting setting No.7
(4) Simple CPU communication setting setting No.8

The structure of Packed process data for outputs is as follows.

- In the simple CPU communication settings, assign the bit address of the digital output module to the output (Y) of the CPU module. (Setting No.5)
- If multiple digital output modules are installed consecutively, they can be collectively assigned to the output (Y). (Setting No.5)
- If an I/O module with word Packed process data (Output), such as an analog output module or communication module, is installed between the digital output modules, assign it to the output (Y) using a different setting. (Setting No.6)

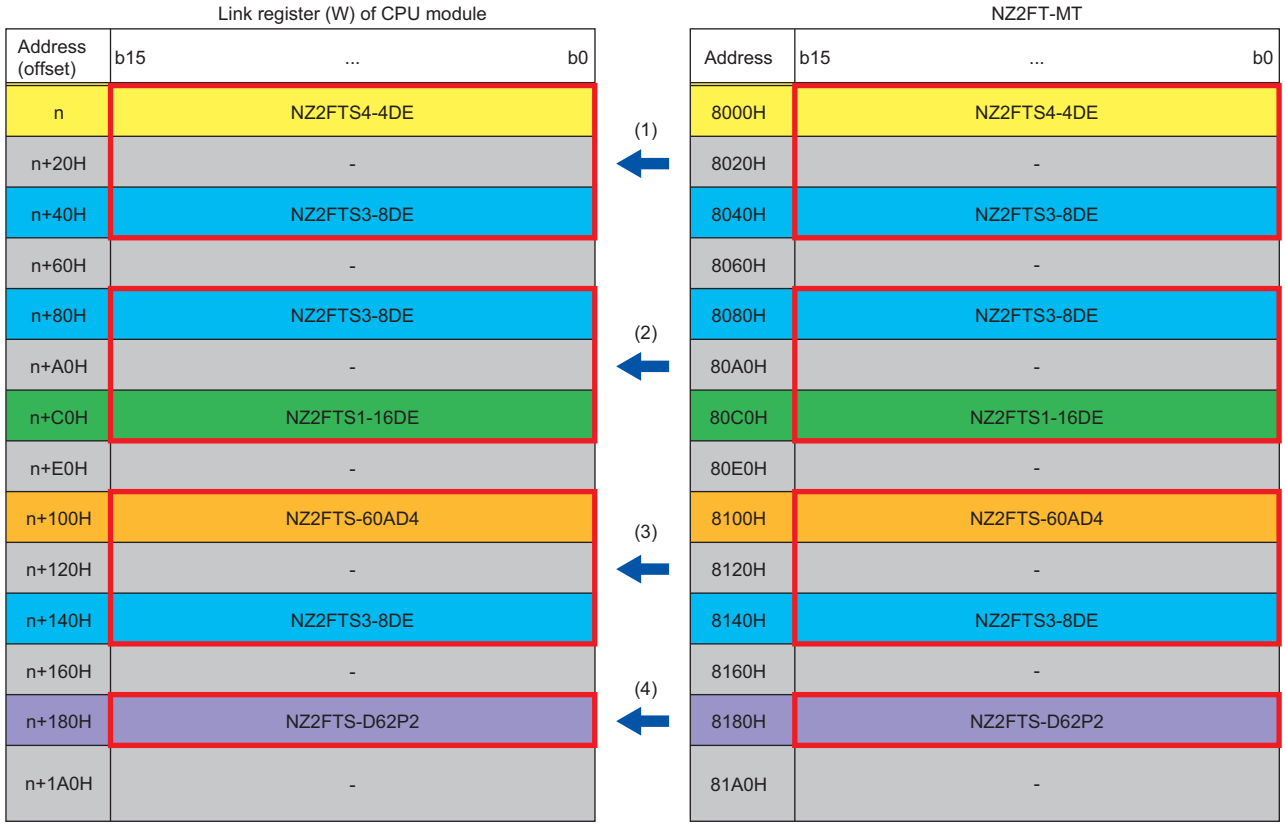
- In the simple CPU communication settings, assign the register address of the I/O module that has the word Packed process data (Output) to the link register (W) of the CPU module. (Setting No.7)
- If multiple I/O modules with word Packed process data (Output) are installed consecutively, they can be collectively assigned to the link register (W).
- If a digital output module is installed between I/O modules that have word Packed process data (Output), use a different setting to allocate it to the link register (W). (Setting No.8)
- The size of Packed process data (Output) of each I/O module depends on the I/O module. (☞ Page 323 Data width used by the I/O module)
- There is no assignment of the digital input module to the output (Y).
- For details on assignment of the I/O module with Packed process data (Input) to the link register (W), refer to the following.

☞ Page 327 Packed process data for inputs

- The I/O modules with the Packed process data (Output) size of 8 bits or less are assigned next to the previous I/O module.
- The I/O modules with the Packed process data (Output) size of 16 bits or more are assigned from the start of the next word.
- Packed process data (Output) of the 4-point output digital output module uses only 4 points from b0 to b3, and 4 bits from b4 to b7 are reserved only in the area.

Process data inputs

This section describes the assignment of Process data inputs to the CPU module and the data structure of the NZ2FT-MT register.

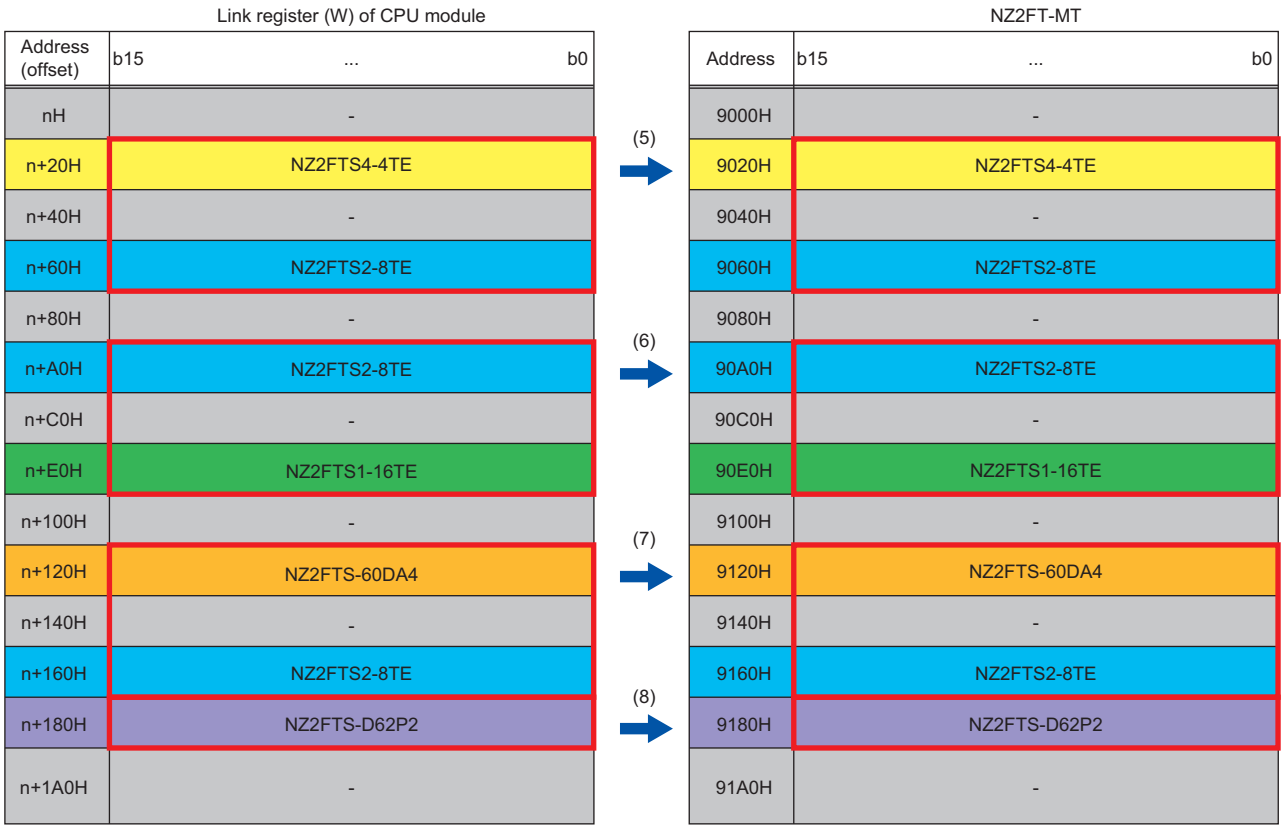


(1) Simple CPU communication setting setting No.1
(2) Simple CPU communication setting setting No.2
(3) Simple CPU communication setting setting No.3
(4) Simple CPU communication setting setting No.4

- In the simple CPU communication settings, assign the register address of the I/O module to the link register (W) of the CPU module.
- Process data of the input module is arranged in order of mounting position proximity to the NZ2FT-MT.
- An area of 32 words of Process data inputs is assigned for each I/O module.
- Data of the register where an output module is connected is all 0.
- Area of the number of input points is used in order from the lower bit. The remaining areas are not used.

Process data outputs

This section describes the assignment of Process data outputs to the CPU module and the data structure of the NZ2FT-MT register.



(5) Simple CPU communication setting setting No.5
(6) Simple CPU communication setting setting No.6
(7) Simple CPU communication setting setting No.7
(8) Simple CPU communication setting setting No.8

- In the simple CPU communication settings, assign the register address of the I/O module to the link register (W) of the CPU module.
- Process data of the output module is arranged in order of mounting position proximity to the NZ2FT-MT.
- Area of 32 words is assigned for each I/O module.
- Set all 0 to the areas where the input modules are connected.
- Area of the number of output points is used in order from the lower bit. The remaining areas are not used.

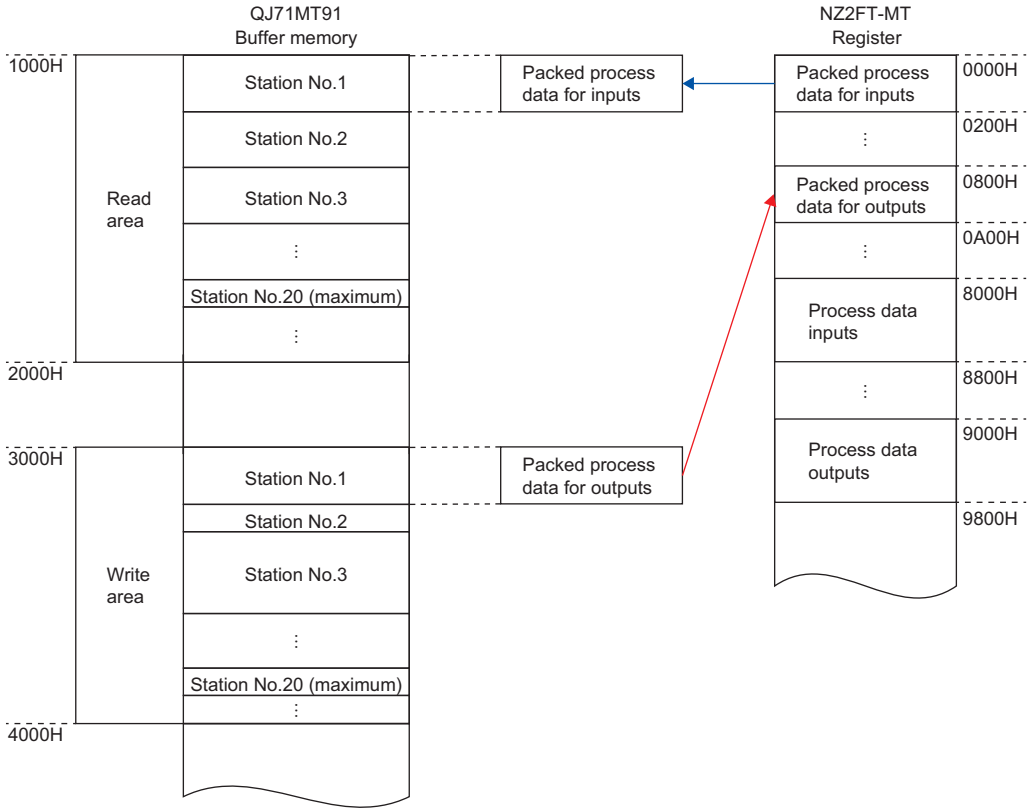
Assignment of the master station (QJ71MT91) to the buffer memory

When the master station is the QJ71MT91, Process data in the NZ2FT-MT register is stored in the following buffer memory addresses of the QJ71MT91 by automatic communication.

Data read from Process data of the NZ2FT-MT can be assigned freely to the read area. Similarly, data to be written to Process data of the NZ2FT-MT can be assigned freely to the write area.

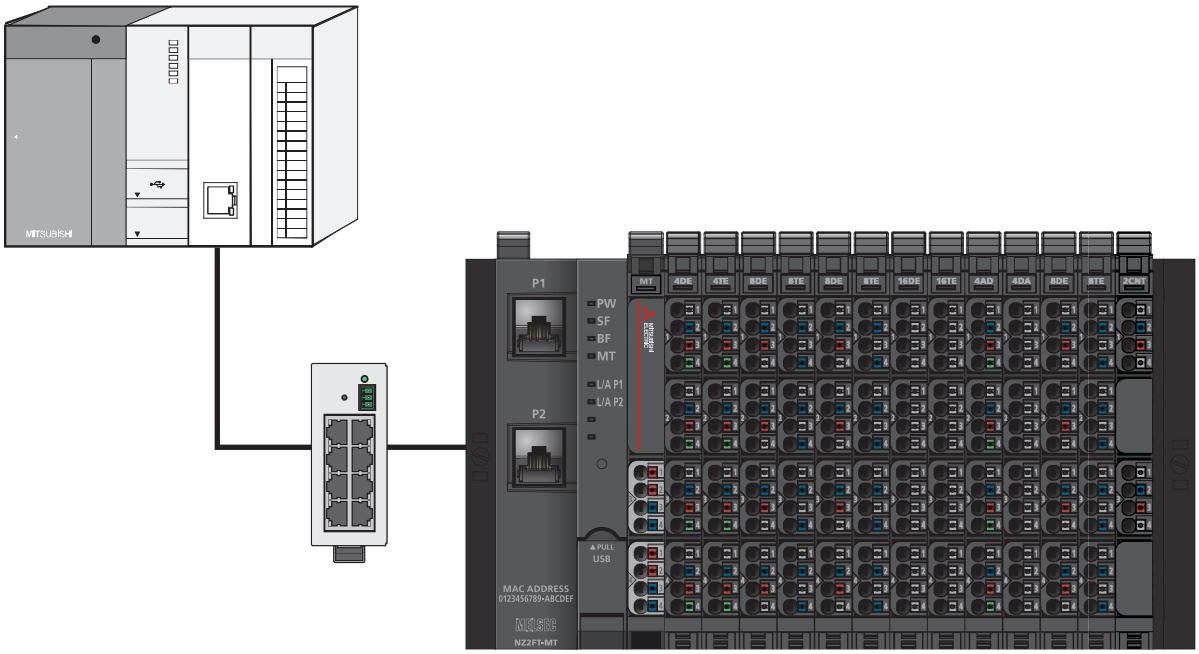
Item	Buffer memory address	Description
Automatic communication function buffer input area	Un\G4096 to Un\G8191	Area for reading register address values of the NZ2FT-MT
Automatic communication function buffer output area	Un\G12288 to Un\G16383	Area for writing values to the register address of the NZ2FT-MT

When the input is Packed process data for inputs and the output is Packed process data for outputs



Ex.

The following system configuration describes the assignment of the QJ71MT91 to the buffer memory and the data structure of Process data of the NZ2FT-MT.

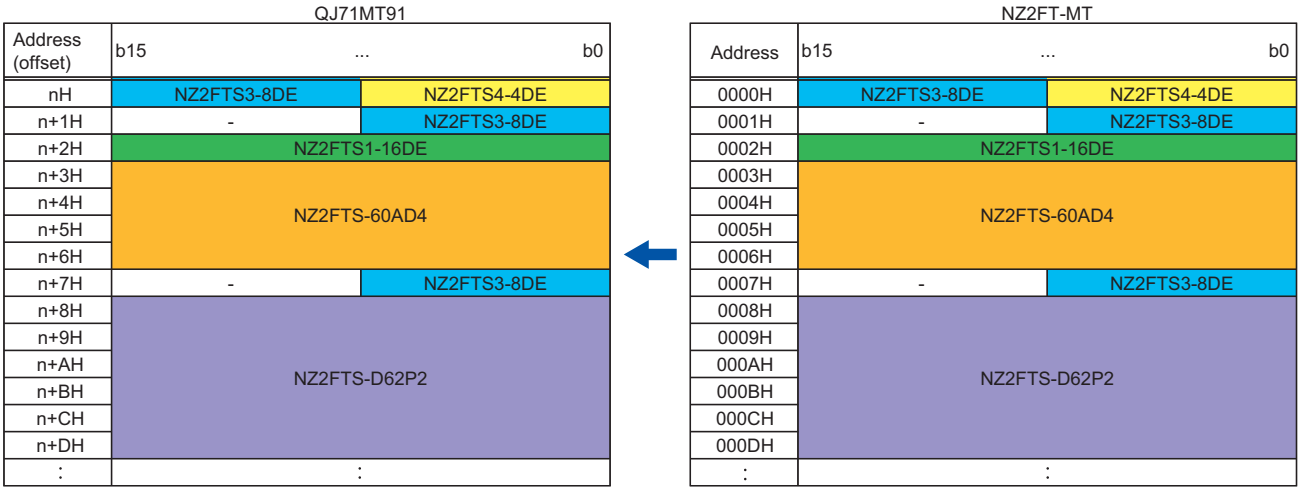


(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)

(1) NZ2FTS4-4DE
(2) NZ2FTS4-4TE
(3) NZ2FTS3-8DE
(4) NZ2FTS2-8TE
(5) NZ2FTS3-8DE
(6) NZ2FTS2-8TE
(7) NZ2FTS1-16DE
(8) NZ2FTS1-16TE
(9) NZ2FTS-60AD4
(10) NZ2FTS-60DA4
(11) NZ2FTS3-8DE
(12) NZ2FTS2-8TE
(13) NZ2FTS-D62P2

Packed process data for inputs

The following indicates the assignment of the QJ71MT91 to the buffer memory and the data structure of the NZ2FT-MT register.

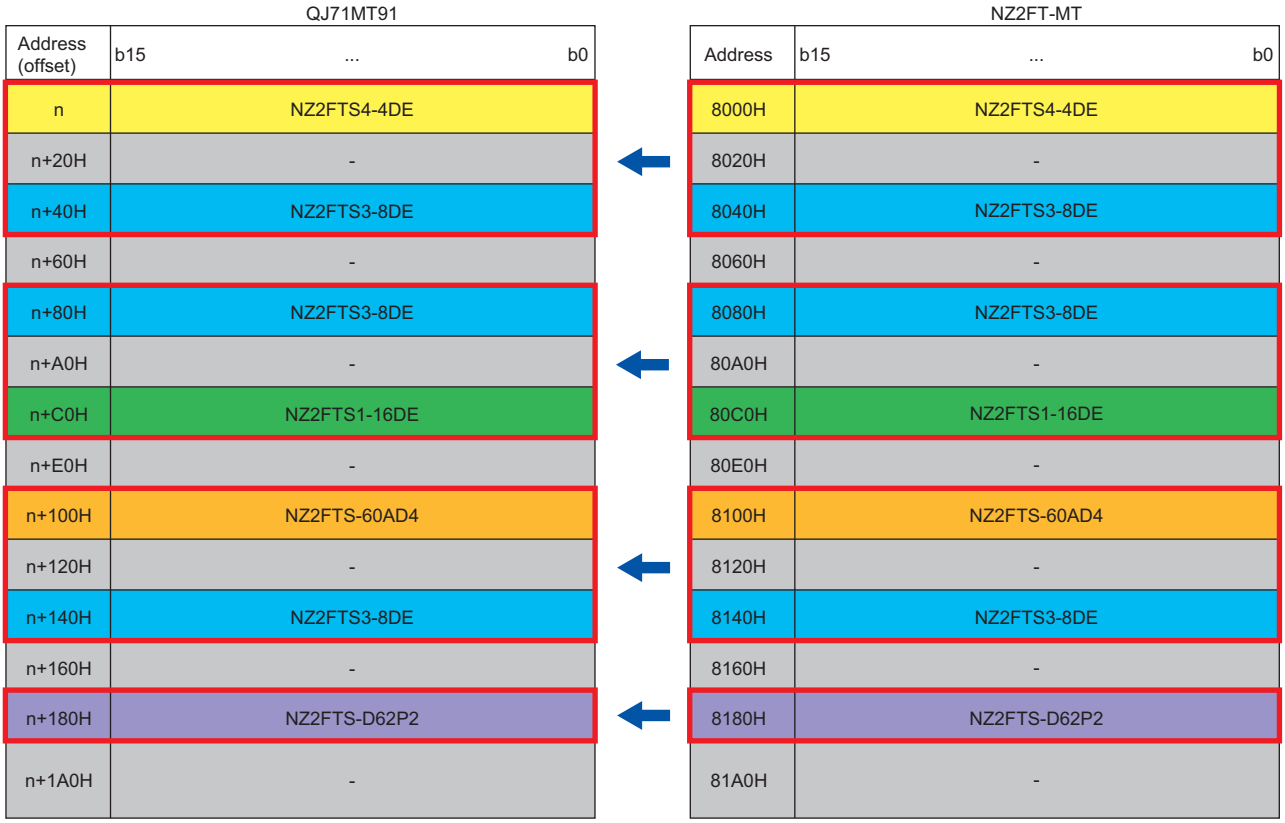


The structure of Packed process data for inputs is as follows.

- Process data of the input module is arranged in order of mounting position proximity to the NZ2FT-MT.
- The size of Packed process data of each I/O module depends on the I/O module. (☞ Page 323 Data width used by the I/O module)
- There is no assignment for output modules.
- The I/O modules with the Packed process data size of 8 bits or less are assigned next to the previous I/O module.
- The I/O modules with the Packed process data size of 16 bits or more are assigned from the start of the next word.
- Process data of the NZ2FTS4-4DE uses only 4 bits of b0 to b3, and 4 bits of b4 to b7 are allocated for only the area.

Process data inputs

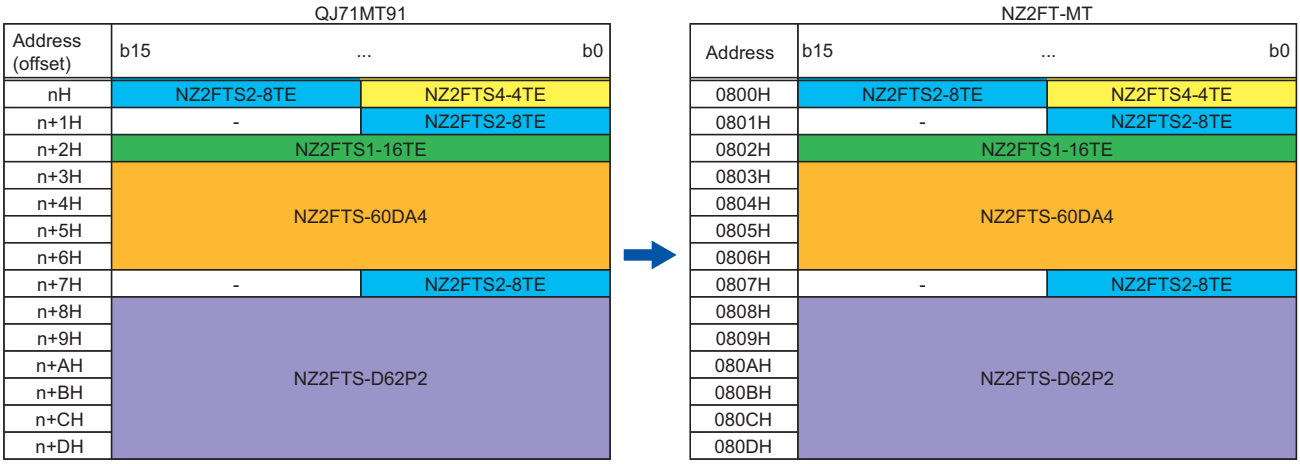
The following indicates the assignment of the QJ71MT91 to the buffer memory and the data structure of the NZ2FT-MT register.



- Process data of the input module is arranged in order of mounting position proximity to the NZ2FT-MT.
- Area of 32 words is assigned for each I/O module.
- Data of the register where an output module is connected is all 0.
- Area of the number of input points is used in order from the lower bit. The remaining areas are not used.

Packed process data for outputs

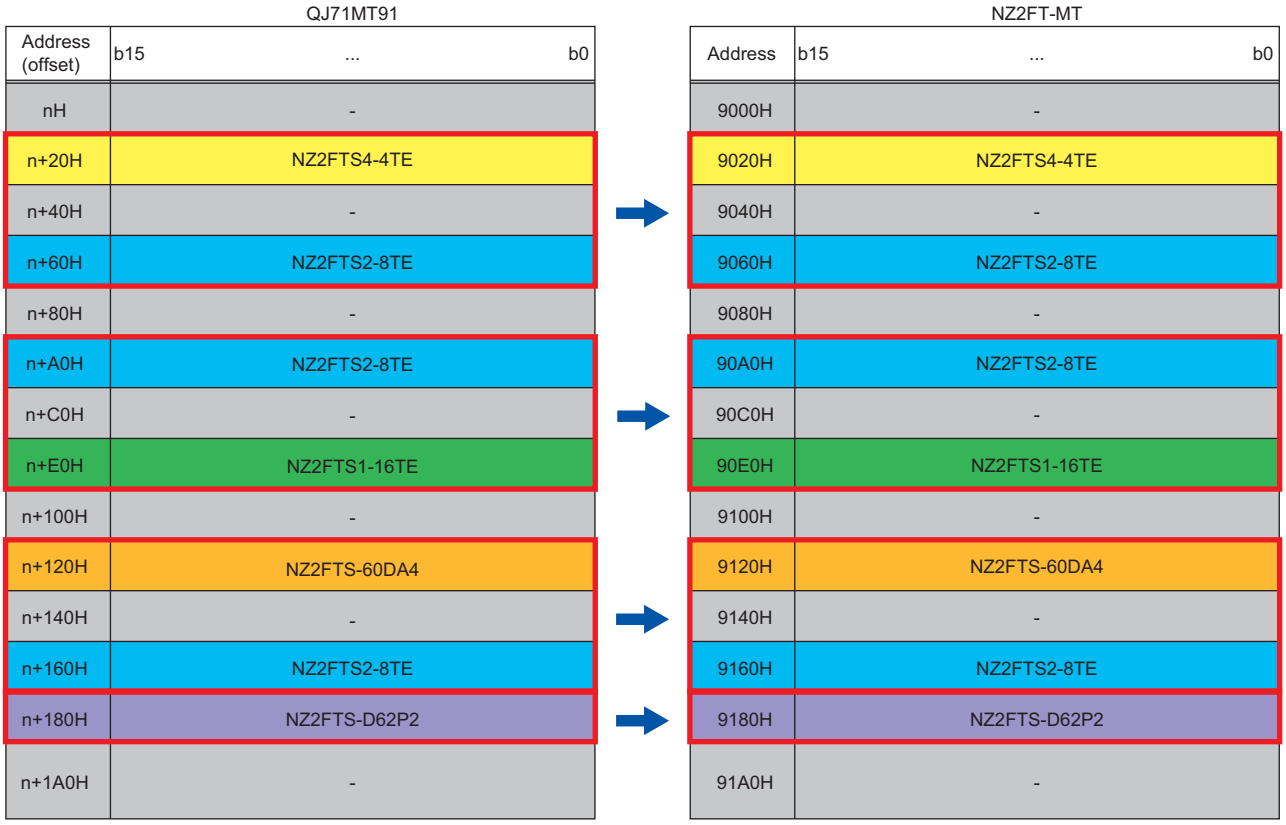
The following indicates the assignment of the QJ71MT91 to the buffer memory and the data structure of the NZ2FT-MT register.



- Process data of the output module is arranged in order of mounting position proximity to the NZ2FT-MT.
- The size of Packed process data of each I/O module depends on the I/O module. (☞ Page 323 Data width used by the I/O module)
- There is no assignment for input modules.
- The I/O modules with the Packed process data size of 8 bits or less are assigned next to the previous I/O module.
- The I/O modules with the Packed process data size of 16 bits or more are assigned from the start of the next word.
- Process data of the NZ2FTS4-4TE uses only 4 bits of b0 to b3, and 4 bits of b4 to b7 are allocated for only the area.

Process data outputs

The following indicates the assignment of the QJ71MT91 to the buffer memory and the data structure of the NZ2FT-MT register.



- Process data of the output module is arranged in order of mounting position proximity to the NZ2FT-MT.
- Area of 32 words is assigned for each I/O module.
- Set all 0 to the areas where the input modules are connected.
- Area of the number of output points is used in order from the lower bit. The remaining areas are not used.

11.9 Program Example of NZ2FT-MT

The following program examples are shown.

☞ Page 338 Example using the NZ2FTS-60AD4 (master module: RJ71EN71)
☞ Page 342 Example using the NZ2FTS-60RD4 (master module: RJ71EN71)
☞ Page 346 Example using the NZ2FTS-60AD4 (master module: QJ71MT91)
☞ Page 351 Example using the NZ2FTS-60RD4 (master module: QJ71MT91)

Precautions for programming

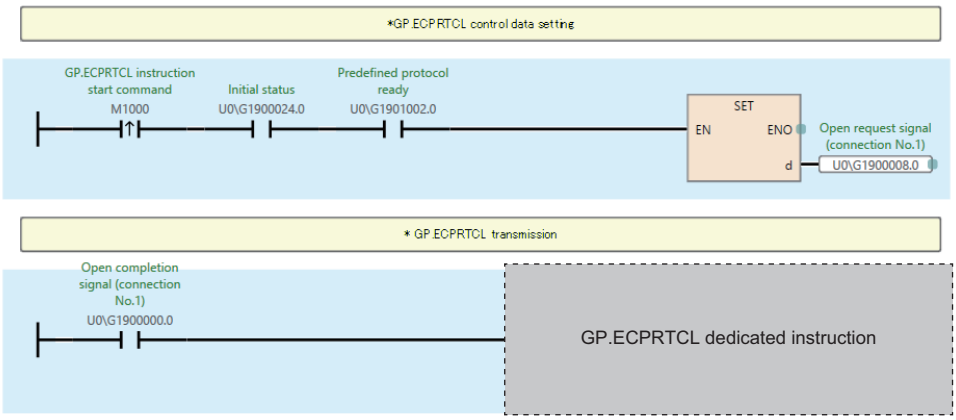
In MODBUS/TCP transmission programs, interlock is provided with the following device.

When the master module is the RJ71EN71

- M1000: GP.ECPRTCL instruction start command

Ex.

The ECPRTCL instruction is executed by turning on the M1000 (GP.ECPRTCL instruction start command).



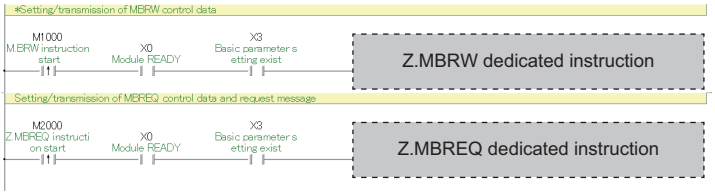
When the master module is the QJ71MT91

- M1000: Z.MBRW instruction start command
- M2000: Z.MBREQ instruction start command

Ex.

The MBRW instruction is executed by turning on the M1000 (Z.MBRW instruction start command).

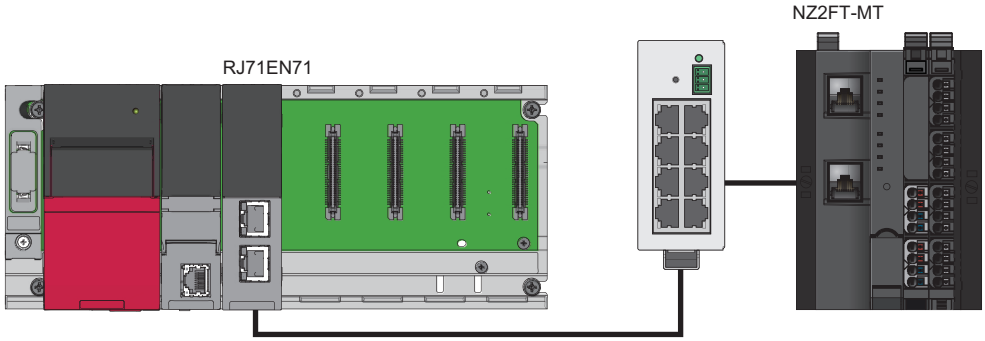
The MBREQ instruction is executed by turning on the M2000 (Z.MBREQ instruction start command).



Example using the NZ2FTS-60AD4 (master module: RJ71EN71)

The following example is for a program to read AI values that are obtained from A/D conversion performed on AI 0 (Channel 0) to AI 3 (Channel 3) of the analog input module.

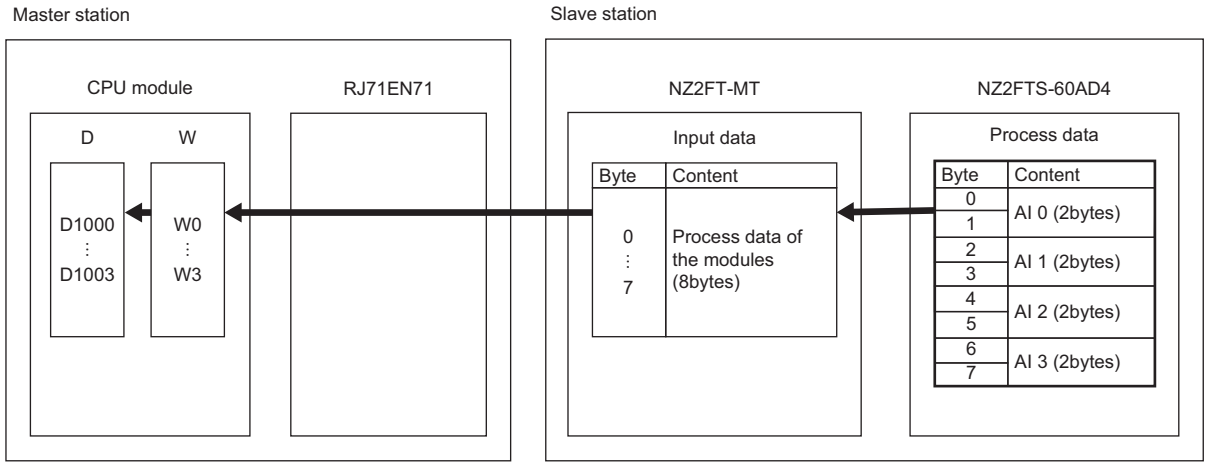
System configuration



Item		Model
Master station (IP address: 192.168.1.100)	Power supply module	R61P
	CPU module	R04CPU
	Ethernet interface module	RJ71EN71
Slave station (IP address: 192.168.1.200)	MODBUS/TCP coupler	NZ2FT-MT
	4ch analog input module	NZ2FTS-60AD4

Device assignment

The following figure shows the device assignment for simple CPU communication. (☞ Page 299 Settings on the master station (RJ71EN71))



Master station setting

For the parameter settings of the RJ71EN71, refer to the following.

- Automatic communication by simple CPU communication function (constant periodic communication): ☞ Page 299 Settings on the master station (RJ71EN71)
- Communication using the predefined protocol at any time (ECPRTCL instruction): 🕮 MELSEC iQ-R Ethernet User's Manual (Application)

Slave station setting

Set the parameters of the NZ2FTS-60AD4 as follows. (☞ Page 484 Parameter settings)

Item	AI 0 (Channel 0)	AI 1 (Channel 1)	AI 2 (Channel 2)	AI 3 (Channel 3)
Frequency suppression	Disabled			
Data format	High resolution format			
Measurement range	0...20mA	-10...10V	0...20mA	-10...10V

Program example

■Device to be used

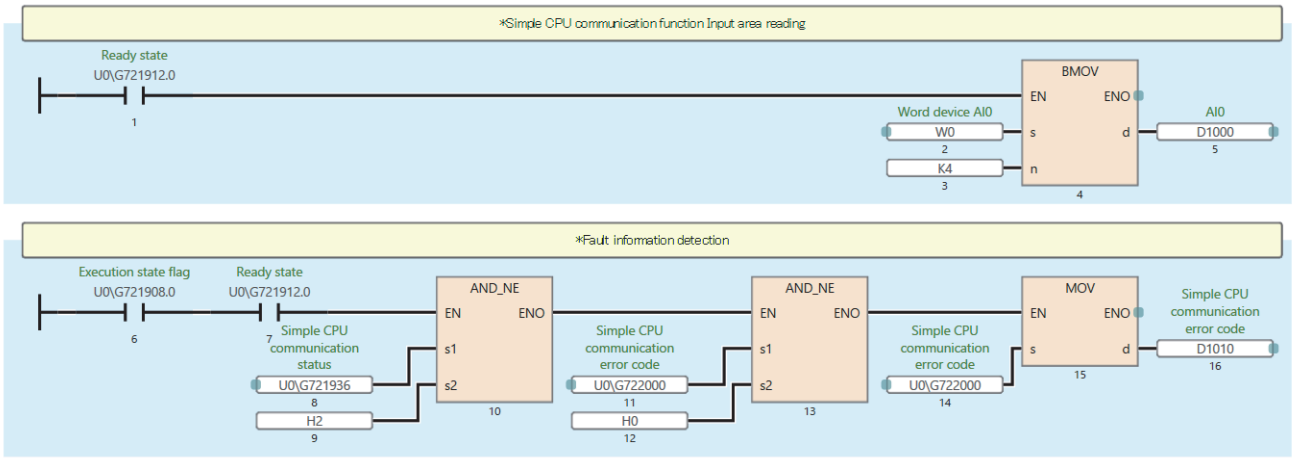
Device	Description	
D1000	Command (BMOV)	AI0
D1001		AI1
D1002		AI2
D1003		AI3
D1010	Command (MOV)	Simple CPU communication error code
W0	Simple CPU communication function	Word device AI0
W1		Word device AI1
W2		Word device AI2
W3		Word device AI3
U0\G721896		Request to start communication at request
U0\G721908.0		Execution status flag
U0\G721912.0		Ready state
U0\G721936		Simple CPU communication status
U0\G722000		Simple CPU communication error code

Device	Description	
M1000	Dedicated instruction GP.ECPRTCL	GP.ECPRTCL instruction start command
M1		GP.ECPRTCL instruction completion signal
M2		GP.ECPRTCL instruction error signal
D2300		GP.ECPRTCL instruction control data
D2000		Request: Transaction ID
D2001		Request: Module ID
D2002		Request: Head input register number
D2003		Request: Read points
D2010		Normal response: Transaction ID
D2011		Normal response: Module ID
D2012		Normal response: Device data
D2013		Normal response: Device data AI0
D2014		Normal response: Device data AI1
D2015		Normal response: Device data AI2
D2016		Normal response: Device data AI3
D2200		Error response: Transaction ID
D2201		Error response: Module ID
D2202		Error response: Exception Code
U0\G1900000.0		Open completion signal (connection No.1)
U0\G1900008.0		Open request signal (connection No.1)
U0\G1900024.0		Initial status
U0\G1901002.0		Predefined protocol ready

■Simple CPU communication function program example

A request message for reading an AI value is automatically sent from the master station to a slave station.

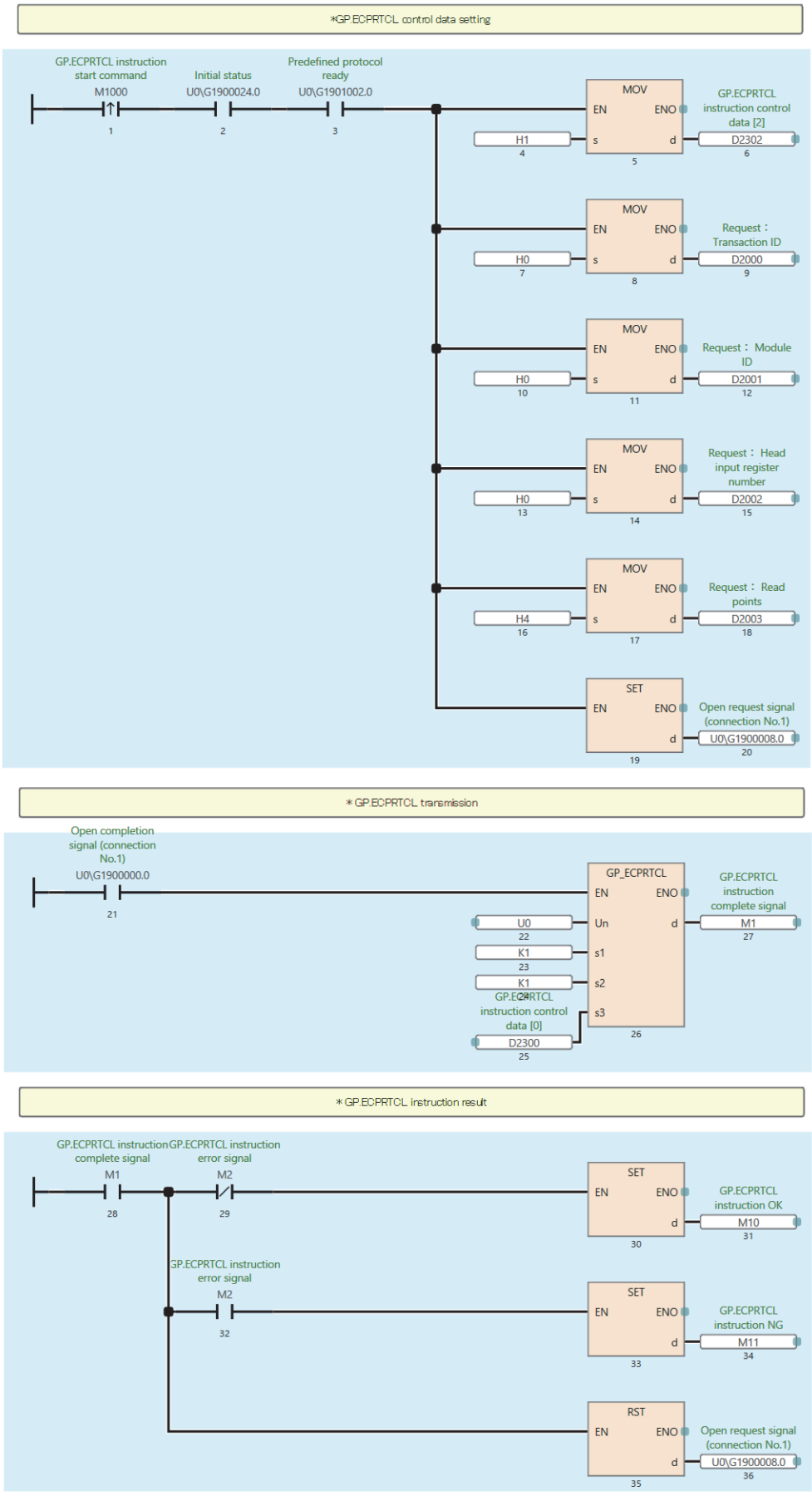
The values of AI 0 to AI 3 are stored in D1000 to D1003.



■Dedicated instruction GP.ECPRTCL program example

MODBUS devices are read from the slave station specified with the target IP address.

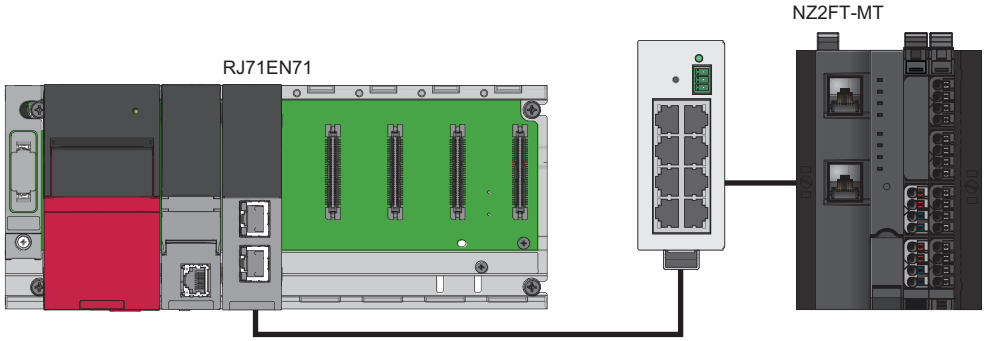
The values of AI 0 to AI 3 are stored in D2013 to D2016.



Example using the NZ2FTS-60RD4 (master module: RJ71EN71)

This program reads Process alarm data when Process alarm occurs in RTD 0 (Channel 0) to RTD 3 (Channel 3) of the temperature input module.

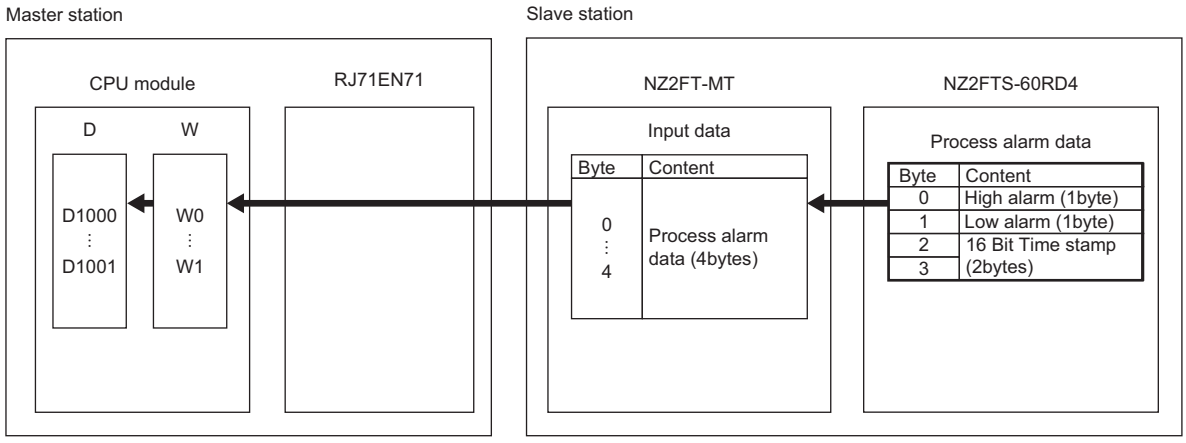
System configuration



Item		Model
Master station (IP address: 192.168.1.100)	Power supply module	R61P
	CPU module	R04CPU
	Ethernet interface module	RJ71EN71
Slave station (IP address: 192.168.1.200)	MODBUS/TCP coupler	NZ2FT-MT
	4ch analog temperature input module (RTD)	NZ2FTS-60RD4

Device assignment

The following figure shows the device assignment for communication using the ECPRTCL instruction. (☞ Page 294 Checking warning output (Process alarm))



Master station setting

For the parameter settings of the RJ71EN71, refer to the following.

- Communication using the predefined protocol at any time (ECPRTCL instruction): 📖 MELSEC iQ-R Ethernet User's Manual (Application)

Slave station setting

Set the slave station parameters as follows.

■NZ2FT-MT

Item	Description
IP address	192.168.1.200
Subnet mask	255.255.255.0
Gateway	0.0.0.0
IP configuration	Static
Modbus DHCP timeout	30s
Additional TCP port	0
Modbus Dual LAN Mode	Disabled
Webserver via Ethernet	Enabled
Modbus watchdog	0
Modbus connection timeout	1
Writing access in multi-client operation	For all connections
Check reference list before data exchange	Disabled
Process alarm	Enabled
Diagnostic alarm	Disabled
Output behaviour on fieldbus error	All outputs off
Module behaviour on hot swap	Continue data exchange
Data format	Intel
Lock force mode	Force mode unlocked

For details on each parameter, refer to the following.

☞ Page 304 Parameter list

■NZ2FTS-60RD4

Item	RTD 0 (Channel 0)	RTD 1 (Channel 1)	RTD 2 (Channel 2)	RTD 3 (Channel 3)
Temperature unit	Degree Celsius			
Measurement range	PT100 -200 ... 850 Degree Celsius	NI100 -60 ... 250 Degree Celsius	Cu10 -100 ... 260 Degree Celsius	Resistance 40 Ohm
Connection type	2-wire			
Conversion time	80ms			
Channel diagnostics	Disabled			
Limit value monitoring	Enabled			
High limit value	200.000℃			
Low limit value	-200.000℃			

For details on each parameter, refer to the following.

☞ Page 505 Parameter settings

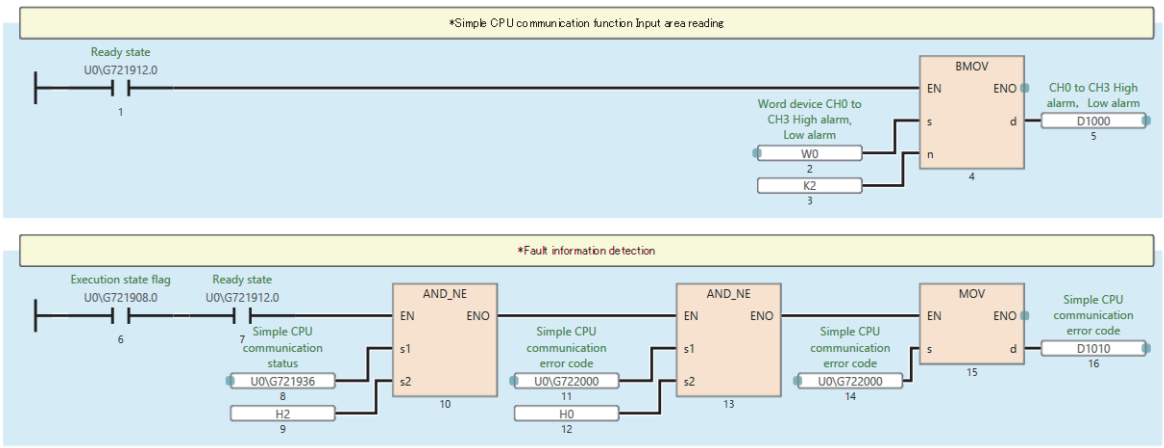
Program example

■Device to be used

Device	Description	
D1000	Command (BMOV)	CH0 to CH3 High alarm, Low alarm
D1001		16 Bit Time stamp
D1010	Command (MOV)	Simple CPU communication error code
W0	Simple CPU communication function	Word device CH0 to CH3 High alarm, Low alarm
W1		Word device 16 Bit Time stamp
U0\G721896		Request to start communication at request
U0\G721908.0		Execution status flag
U0\G721912.0		Ready state
U0\G721936		Simple CPU communication status
U0\G722000		Simple CPU communication error code
M1000	Dedicated instruction GP.ECPRTCL	GP.ECPRTCL instruction start command
M1		GP.ECPRTCL instruction completion signal
M2		GP.ECPRTCL instruction error signal
D2300		GP.ECPRTCL instruction control data
D2000		Request: Transaction ID
D2001		Request: Module ID
D2002		Request: Head input register number
D2003		Request: Read points
D2010		Normal response: Transaction ID
D2011		Normal response: Module ID
D2012		Normal response: Device data
D2013		Normal response: Device data CH0 to CH3 High alarm, Low alarm
D2014		Normal response: Device data 16 Bit Time stamp
D2200		Error response: Transaction ID
D2201		Error response: Module ID
D2202		Error response: Exception Code
U0\G1900000.0		Open completion signal (connection No.1)
U0\G1900008.0		Open request signal (connection No.1)
U0\G1900024.0		Initial status
U0\G1901002.0		Predefined protocol ready

■Simple CPU communication function program example

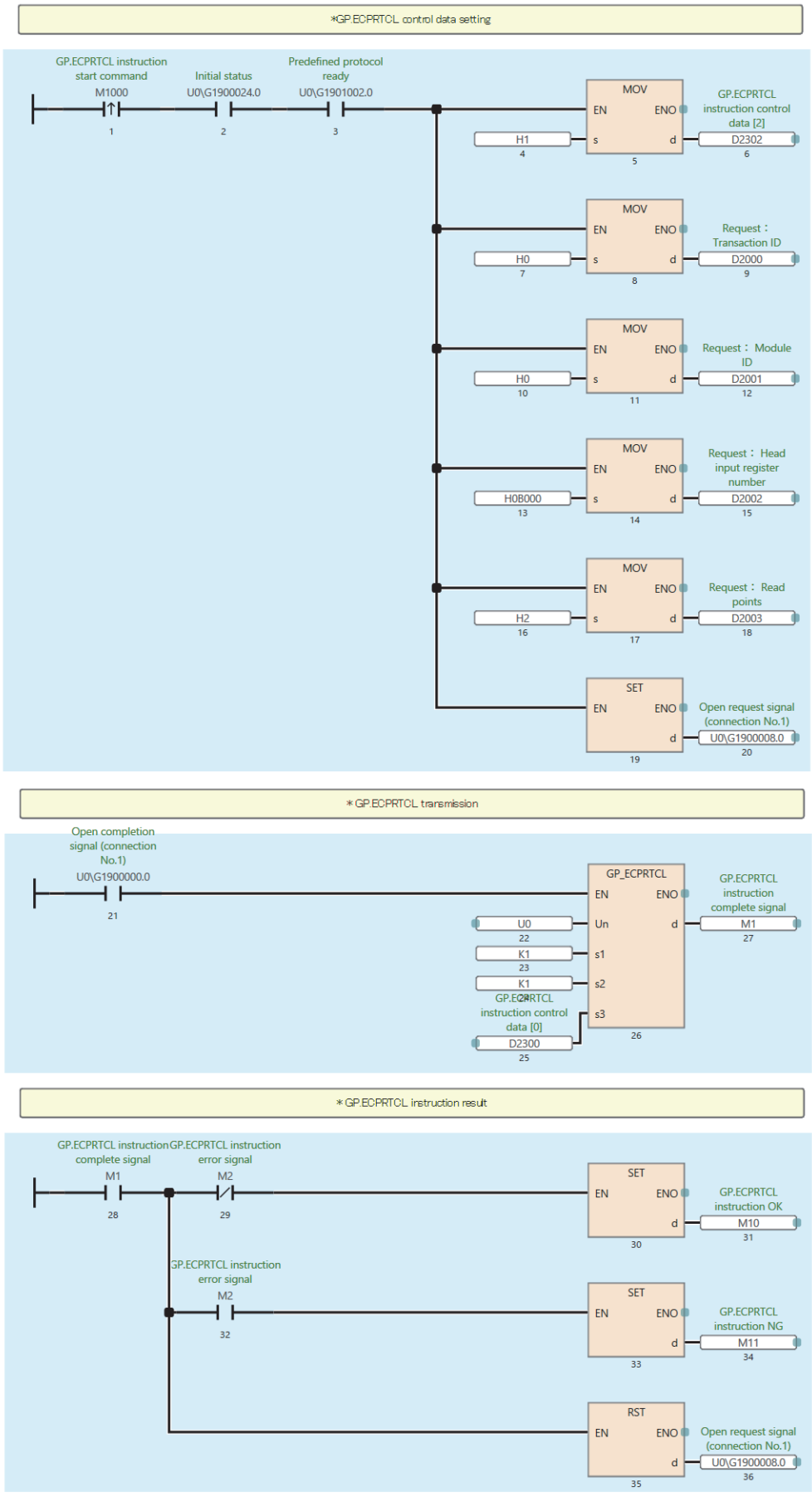
A request message for reading Process alarm data is automatically sent from the master station to a slave station.
High alarm and Low alarm of RTD 0 to RTD 3 are stored in D1000, and 16 Bit Time stamp is stored in D1001.



■Dedicated instruction GP.ECPRTCL program example

MODBUS devices are read from the slave station specified with the target IP address.

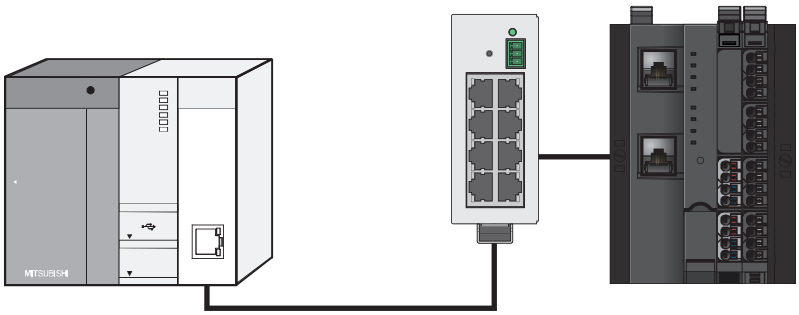
High alarm and Low alarm of RTD 0 to RTD 3 are stored in D2013, and 16 Bit Time stamp is stored in D2014.



Example using the NZ2FTS-60AD4 (master module: QJ71MT91)

The following example is for a program to read AI values that are obtained from A/D conversion performed on AI 0 (Channel 0) to AI 3 (Channel 3) of the analog input module.

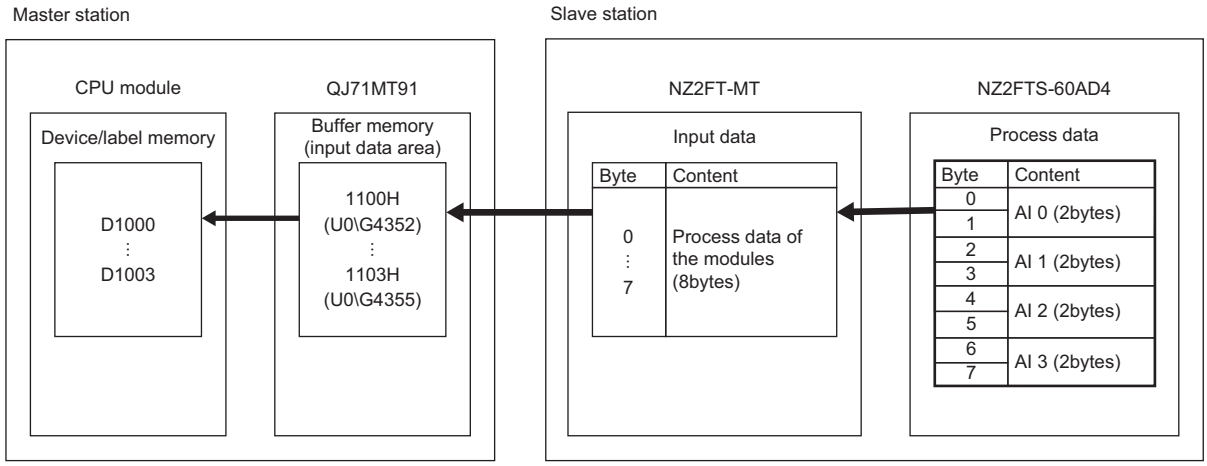
System configuration



Item		Model
Master station (IP address: 192.168.1.100)	CPU module	Q04UDHCPU
	Power supply module	Q61P
	MODBUS/TCP interface module	QJ71MT91
Slave station (IP address: 192.168.1.200)	MODBUS/TCP coupler	NZ2FT-MT
	4ch analog input module	NZ2FTS-60AD4

Device assignment

The following figure shows the device assignment for the automatic communication function. (☞ Page 331 Assignment of the master station (QJ71MT91) to the buffer memory).



Master station setting

For the setting method of master station parameters, refer to the following.

☞ Page 302 Settings on the master station (QJ71MT91)

Slave station setting

The following table lists the parameter settings of the NZ2FTS-60AD4. (☞ Page 484 Parameter settings)

Item	Description			
	AI 0 (Channel 0)	AI 1 (Channel 1)	AI 2 (Channel 2)	AI 3 (Channel 3)
Frequency suppression	Disabled			
Data format	High resolution format			
Measurement range	0...20mA	-10...10V	0...20mA	-10...10V

Program example

Use the following devices.

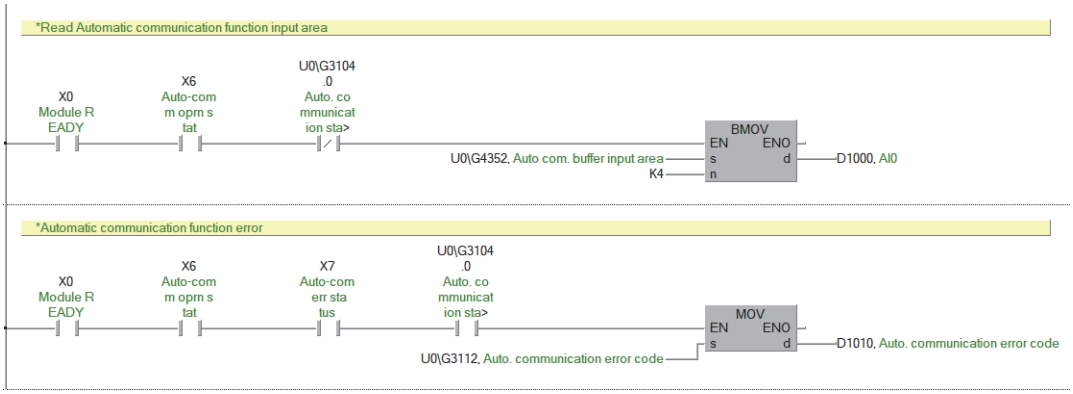
Device	Description	
X0	Module ready signal	
X6	Automatic communication function	Automatic communication function operating status
X7		Automatic communication function error status
D1000		AI 0
D1001		AI 1
D1002		AI 2
D1003		AI 3
D1010		Automatic communication function error code
U0\G3104.0		Automatic communication function operating status storage area
X3	Dedicated instruction Z.MBRW	Presence of basic parameter registration
M0		Z.MBRW instruction completion
M1		Z.MBRW instruction result
M1000		Z.MBRW instruction start command
D2000		AI 0
D2001		AI 1
D2002		AI 2
D2003		AI 3
W0		Write data storage device
D2100		Execution type
D2101		Completion status
D2102		MODBUS abnormal response code
D2103		Target IP address (lower order)
D2104		Target IP address (higher order)
D2105		Module ID
D2106		Target slave port number
D2107		Corresponding monitoring timer value
D2108		Target MODBUS device type specification
D2109		Target file number
D2110		Target MODBUS device start number
D2111		Number of access points
D2112		Read data storage size
D2113		Target file number
D2114		Target MODBUS start number
D2115		Number of access points
D2116		Write data storage size

Device	Description	
X3	Dedicated instruction Z.MBREQ	Presence of basic parameter registration
M10		Z.MBREQ instruction completion
M11		Z.MBREQ instruction result
M2000		Z.MBREQ instruction start command
D3002		AI 0
D3003		AI 1
D3004		AI 2
D3005		AI 3
D3100		Execution type
D3101		Completion status
D3102		(Fixed value)
D3103		Target IP address (lower order)
D3104		Target IP address (higher order)
D3105		Module ID
D3106		Target slave port number
D3107		Corresponding monitoring timer value
D3200		Request message size (bytes)
D3201 to D3203		Request message
D3000		Response read data
D3001.7		Abnormal response bit

■Program example of automatic communication function

A request message for reading an AI value is automatically sent from the master station to a slave station.

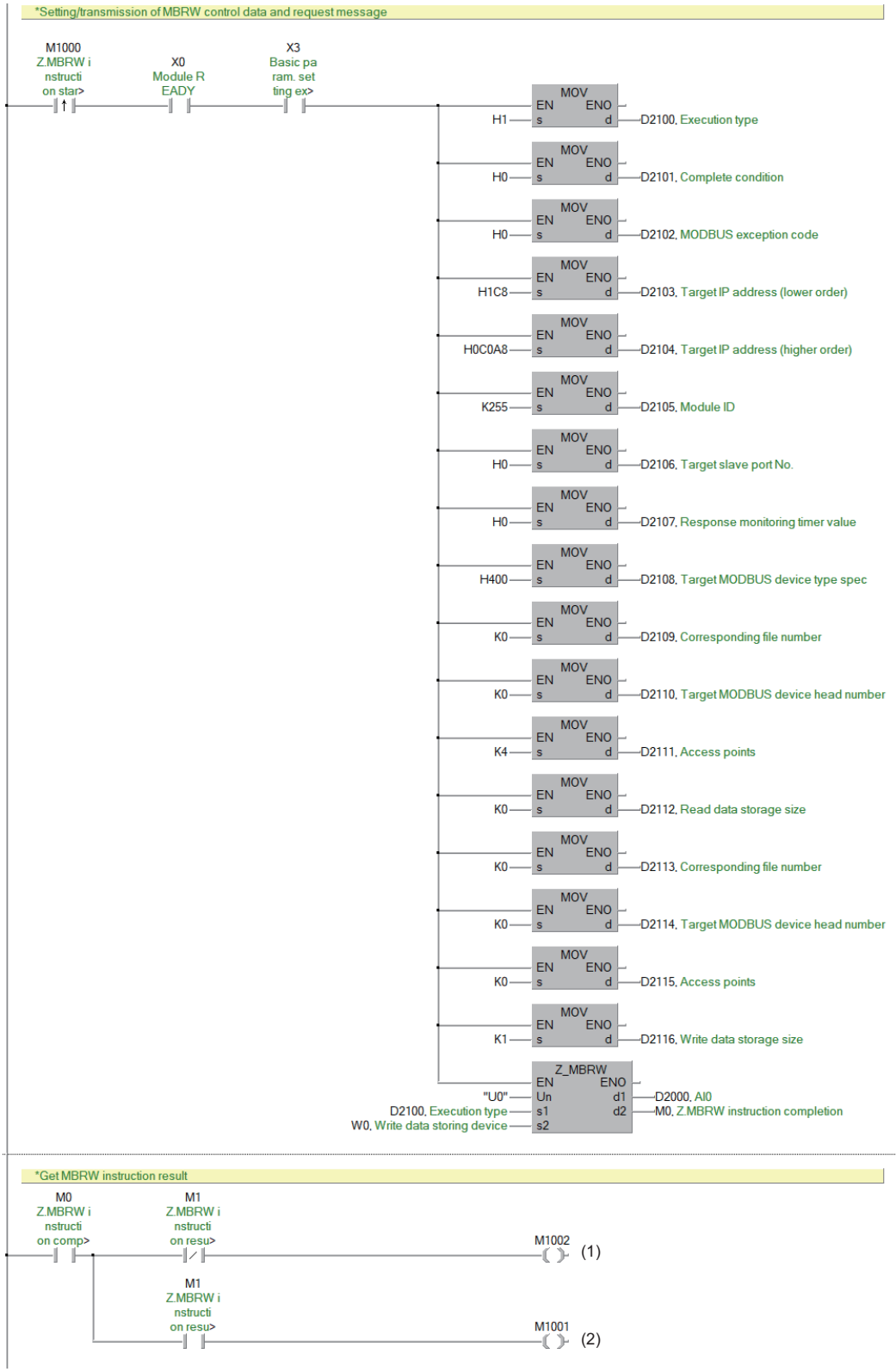
The values of AI 0 to AI 3 are stored in D1000 to D1003.



■Dedicated instruction Z.MBRW program example

MODBUS devices are read from the slave station specified with the target IP address.

The values of AI 0 to AI 3 are stored in D2000 to D2003.



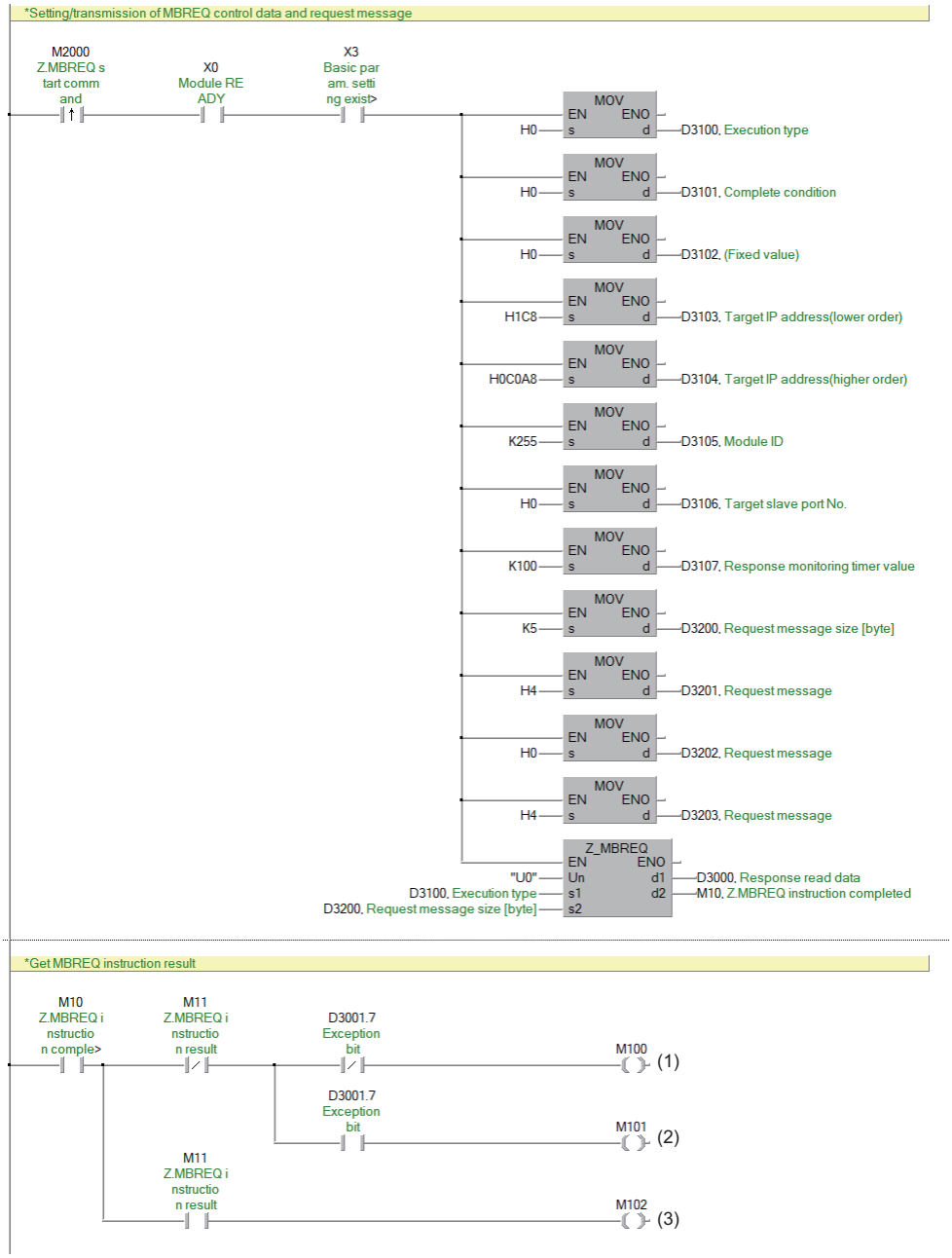
(1) Processing when completed successfully

(2) Processing when completed with an error

■Dedicated instruction Z.MBREQ program example

The slave station specified with the target IP address is communicated in the request message format of PDU (protocol data unit).

The values of AI 0 to AI 3 are stored in D3002 to D3005.



(1) Processing when completed/responded successfully

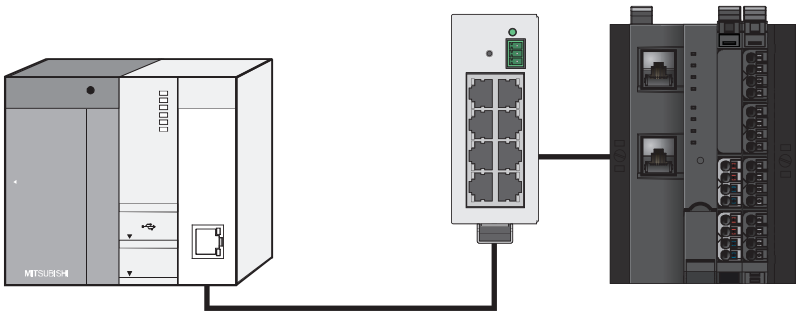
(2) Processing when completed successfully with an abnormal response

(3) Processing when completed with an error

Example using the NZ2FTS-60RD4 (master module: QJ71MT91)

This program reads Process alarm data when Process alarm occurs in RTD 0 (Channel 0) to RTD 3 (Channel 3) of the temperature input module.

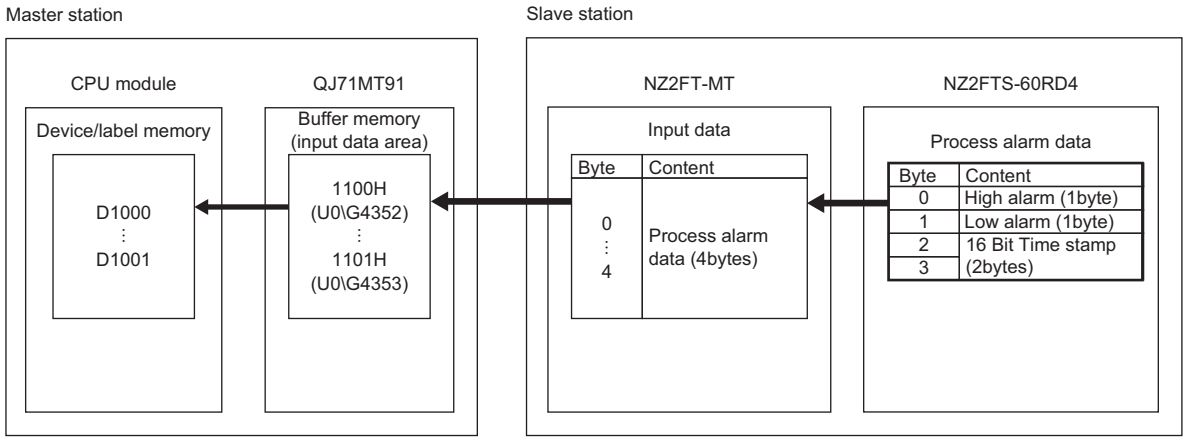
System configuration



Item		Model
Master station (IP address: 192.168.1.100)	CPU module	Q04UDHCPU
	Power supply module	Q61P
	MODBUS/TCP interface module	QJ71MT91
Slave station (IP address: 192.168.1.200)	MODBUS/TCP coupler	NZ2FT-MT
	4ch analog temperature input module (RTD)	NZ2FTS-60RD4

Device assignment

The following figure shows the device assignment for the automatic communication function. (☞ Page 294 Checking warning output (Process alarm))



Master station setting

For the setting method of master station parameters, refer to the following.

☞ Page 302 Settings on the master station (QJ71MT91)

Slave station setting

The following table lists the parameter settings of the slave station.

■NZ2FT-MT

Item	Description
IP address	192.168.1.200
Subnet mask	255.255.255.0
Gateway	0.0.0.0
IP configuration	Static
Modbus DHCP timeout	30s
Additional TCP port	0
Webserver via Ethernet	Enabled
Save module parameters on coupler	No
Status Modbus watchdog	0
Modbus connection timeout	1
Writing access in multi-client operation	For all connections
Check reference list before data exchange	Disabled
Process alarm	Enabled
Diagnostic alarm	Disabled
Output behaviour on fieldbus error	All outputs off
Module behaviour on hot swap	Continue data exchange
Data format	Intel
Lock force mode	Force mode unlocked

For the setting values of each parameter, refer to the following.

☞ Page 304 Parameter list

■NZ2FTS-60RD4

Item	Description			
	RTD 0 (Channel 0)	RTD 1 (Channel 1)	RTD 2 (Channel 2)	RTD 3 (Channel 3)
Temperature unit	Degree Celsius			
Measurement range	PT100 -200 ... 850 Degree Celsius	NI100 -60 ... 250 Degree Celsius	Cu10 -100 ... 260 Degree Celsius	Resistance 40 Ohm
Connection type	2-wire	2-wire	2-wire	2-wire
Conversion time	80ms	80ms	80ms	80ms
Channel diagnostics	Disabled	Disabled	Disabled	Disabled
Limit value monitoring	Enabled	Enabled	Enabled	Enabled
High limit value	200.000℃	200.000℃	200.000℃	20.000 Ohm
Low limit value	-200.000℃	-200.000℃	-200.000℃	-20.000 Ohm

For the setting values of each parameter, refer to the following.

☞ Page 505 Parameter settings

Program example

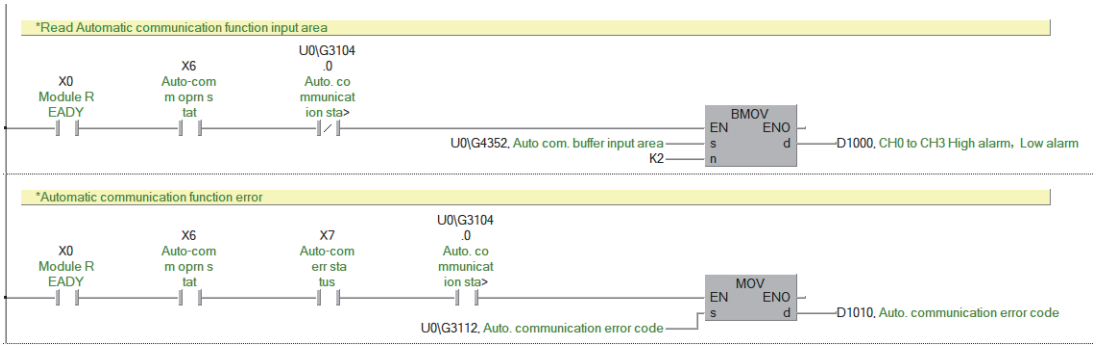
Use the following devices.

Device	Description	
X0	Module ready signal	
X6	Automatic communication function	Automatic communication function operating status
X7		Automatic communication function error status
D1000		CH0 to CH3 High alarm, Low alarm
D1001		16 Bit Time stamp
D1010		Automatic communication function error code
U0\G3104.0		Automatic communication function operating status storage area
X3	Dedicated instruction Z.MBRW	Presence of basic parameter registration
M0		Z.MBRW instruction completion
M1		Z.MBRW instruction result
M1000		Z.MBRW instruction start command
D2000		CH0 to CH3 High alarm, Low alarm
D2001		16 Bit Time stamp
W0		Write data storage device
D2100		Execution type
D2101		Completion status
D2102		MODBUS abnormal response code
D2103		Target IP address (lower order)
D2104		Target IP address (higher order)
D2105		Module ID
D2106		Target slave port number
D2107		Corresponding monitoring timer value
D2108		Target MODBUS device type specification
D2109		Target file number
D2110		Target MODBUS device start number
D2111		Number of access points
D2112		Read data storage size
D2113		Target file number
D2114		Target MODBUS start number
D2115		Number of access points
D2116		Write data storage size

Device	Description	
X3	Dedicated instruction Z.MBREQ	Presence of basic parameter registration
M10		Z.MBREQ instruction completion
M11		Z.MBREQ instruction result
M2000		Z.MBREQ instruction start command
D3002		CH0 to CH3 High alarm, Low alarm
D3003		16 Bit Time stamp
D3100		Execution type
D3101		Completion status
D3102		(Fixed value)
D3103		Target IP address (lower order)
D3104		Target IP address (higher order)
D3105		Module ID
D3106		Target slave port number
D3107		Corresponding monitoring timer value
D3200		Request message size (bytes)
D3201 to D3203		Request message
D3000		Response read data
D3001.7		Abnormal response bit

■Program example of automatic communication function

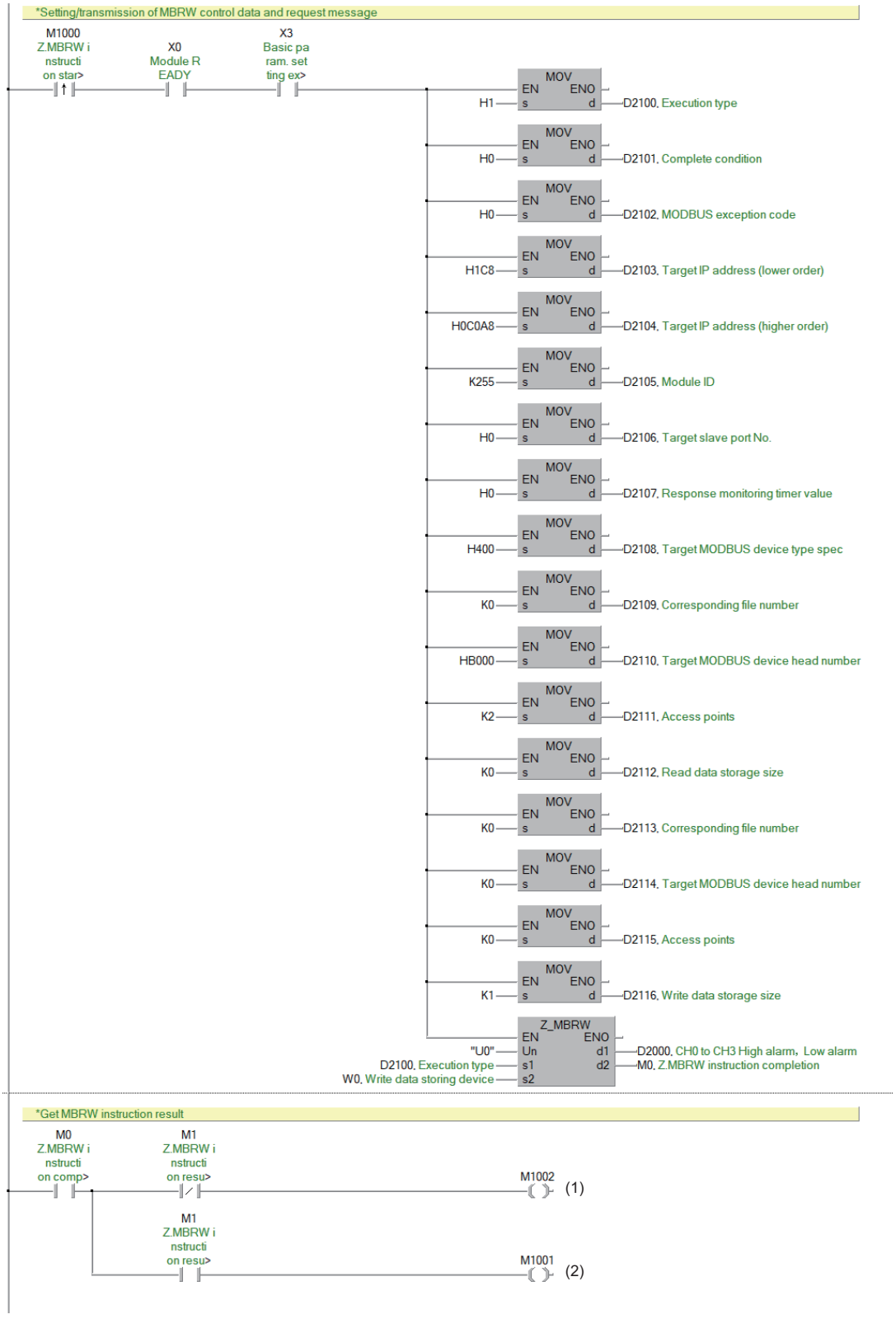
A request message for reading Process alarm data is automatically sent from the master station to a slave station.
High alarm and Low alarm of RTD 0 to RTD 3 are stored in D1000, and 16 Bit Time stamp is stored in D1001.



■Dedicated instruction Z.MBRW program example

MODBUS devices are read from the slave station specified with the target IP address.

High alarm and Low alarm of RTD 0 to RTD 3 are stored in D2000, and 16 Bit Time stamp is stored in D2001.



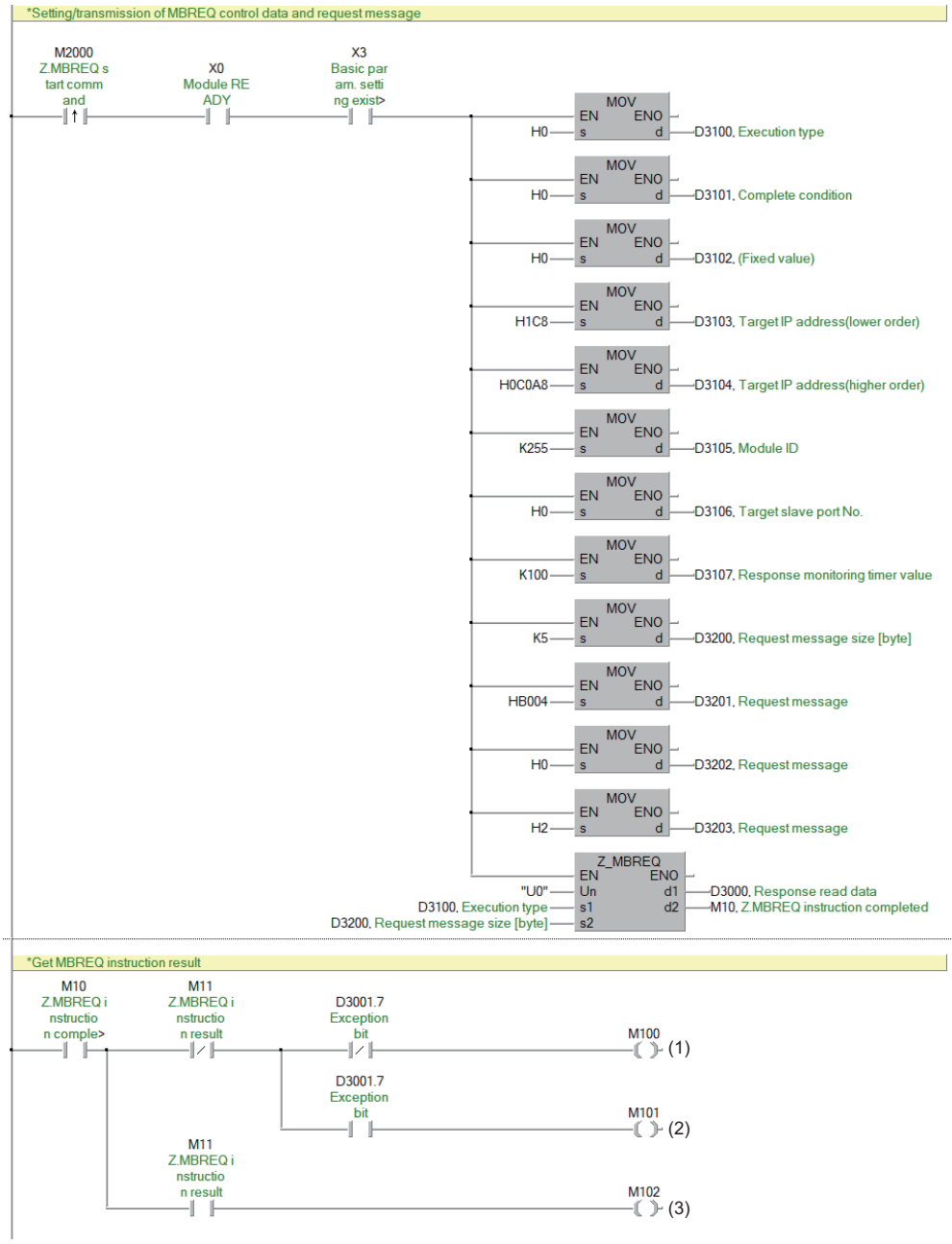
(1) Processing when completed successfully

(2) Processing when completed with an error

■Dedicated instruction Z.MBREQ program example

The slave station specified with the target IP address is communicated in the request message format of PDU (protocol data unit).

High alarm and Low alarm of RTD 0 to RTD 3 are stored in D3002, and 16 Bit Time stamp is stored in D3003.



(1) Processing when completed/responded successfully

(2) Processing when completed successfully with an abnormal response

(3) Processing when completed with an error

11.10 Troubleshooting

This section describes troubleshooting of the NZ2FT-MT.

Point

If troubleshooting does not solve the problem, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Checking with LEDs

This section describes troubleshooting with LEDs of the NZ2FT-MT. (☞ Page 264 Part Names)

When the PW LED turns off

Check the following items in order from the top.

Item	Action
Is the module status LED of the I/O module on in green?	Repair or replace the NZ2FT-MT. The possible cause is an internal fuse failure.
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 of the external power supply within the range of performance specifications.

When the SF LED turns on in red

Check the following items in order from the top.

Item	Action
Are the NZ2FT-MT and I/O module connected with no clearance between them?	Connect the NZ2FT-MT and the I/O module with no clearance between them.
Is the electronic unit part detached?	Insert the electronic unit part.

When the SF LED is flashing in red

Check the following item.

Item	Action
Has the Force mode been selected?	The slave station is in the Force mode. Clear the Force mode.

When the BF LED turns on in red

Check the following items in order from the top.

Item	Action
Are the Ethernet cables between the master station, hub, NZ2FT-MT (or between the master station and NZ2FT-MT directly connected) inserted as far as they will go?	Push in the Ethernet cable of each connection section until it clicks.
Has the Ethernet cable been disconnected?	Replace the Ethernet cable.
Is there any noise affecting the system?	If the effect from noise is suspected, take the following actions. • Install a noise filter between the external power supply and the NZ2FT-MT. (☞ Page 43 Wiring precautions) • Attach a ferrite core to the Ethernet cable. (☞ Page 46 Wiring precautions) When the master station is the QJ71MT91, if a send/receive processing interruption (error code: 73D5H), an open failure (error code: 73D8H), or a timeout error of response monitoring timer (error code: 7378H) occurs, the master module in use may be being affected by noise.
Are there any mistakes in the parameter settings of the master station and NZ2FT-MT?	Review the parameters of the master station and NZ2FT-MT. ■When the master station is the RJ71EN71 • IP Address • To Use or Not to Use Simple PLC Communication • Simple PLC Communication Setting • "Communication Destination Setting" window ■When the master station is the QJ71MT91 • QJ71MT91 automatic communication parameters 1 to 64 • NZ2FT-MT parameter "IP address" • NZ2FT-MT parameter "Subnet mask" • NZ2FT-MT parameter "Gateway" • NZ2FT-MT parameter "IP configuration"
Is the NZ2FT-MT responding abnormally to the request message from the master station?	Check the MODBUS abnormal response code, and take corrective action. (☞ Page 321 MODBUS abnormal response code)
Is the firmware version appropriate?	Check the firmware version of the master module and NZ2FT-MT. Update the firmware if necessary.
Is there a Watchdog timeout?	Review the parameters of the master station and NZ2FT-MT. ■When the master station is the RJ71EN71 • "Communication Setting: Execution Interval (ms)" (☞ Page 299 Simple CPU communication settings) ■When the master station is the QJ71MT91 • "Repeat interval timer value" (☞ Page 302 Automatic communication parameter) ■NZ2FT-MT • Parameter "Status Modbus watchdog" (☞ Page 304 Parameter list) Make the value set for the master station smaller than the value set for the NZ2FT-MT.
Has an error occurred in the master station?	Follow the manual of the master station and perform troubleshooting.

When the BF LED is flashing in red

Check the following items in order from the top.

Item	Action
Is the parameter Check reference list before data exchange Enabled?	Make the same I/O module configuration. Match the reference list (2800H and later) with the current module list (2A00H and later).
Are the NZ2FT-MT and I/O module connected with no clearance between them?	Connect the NZ2FT-MT and the I/O module with no clearance between them.
Is the electronic unit part detached?	Insert the electronic unit part.
Is a firmware update in progress?	Wait for the firmware update to end.

When the MT LED turns on in yellow

Check the following item.

Item	Action
Is the I/O module mounted?	Mount the I/O module again by pressing it to the NZ2FT-MT until it clicks.

When the L/A P1 LED and L/A P2 LED turn off

Check the following items in order from the top.

Item	Action
Is the Ethernet cable connected correctly?	Push in the Ethernet cable of each connection section until it clicks.
Has the Ethernet cable been disconnected?	Replace the Ethernet cable.
Is there any noise affecting the system?	If the effect from noise is suspected, take the following actions. • Install a noise filter between the external power supply and the NZ2FT-MT. • Attach a ferrite core to the Ethernet cable. When the master station is the QJ71MT91, if a send/receive processing interruption (error code: 73D5H), an open failure (error code: 73D8H), or a timeout error of response monitoring timer (error code: 7378H) occurs, the master module in use may be being affected by noise.

When the following LEDs turn on in red

- Power supply LED
- Input power supply LED 3.2
- Output power supply LED 4.2
- Input power supply internal protection circuit LED 3.4
- Output power supply internal protection circuit LED 4.4

Check the following item.

Item	Action
Is the voltage of the external power supply (24VDC) within the specified range?	The power supply voltage is less than 18VDC. Set the voltage value within the range of performance specifications. If the problem persists, the possible cause is an internal fuse failure. Replace the NZ2FT-MT.

Confirmation by status information (Coupler status)

This section describes troubleshooting with status information (Coupler status) of the NZ2FT-MT.

For details on how to read devices from the master station, refer to the following.

- When the master station is the RJ71EN71: Simple CPU communication function (📖 MELSEC iQ-R Ethernet User's Manual (Application))
- When the master station is the QJ71MT91: Automatic communication function (📖 MODBUS/TCP Interface Module User's Manual (Details))

Data structure

The status information is stored in the NZ2FT-MT register.

Register address	Item	Description	Reference
100CH	Coupler status	Indicates the status of the NZ2FT-MT.	Page 361 Coupler status
101CH to 101FH	Collective process alarm message for I/O modules	Indicates that Process alarm has occurred from the I/O module.	
B000H to B7FFH	Process alarms	Process alarm data for each I/O module is stored in order of mounting position proximity to the NZ2FT-MT.	

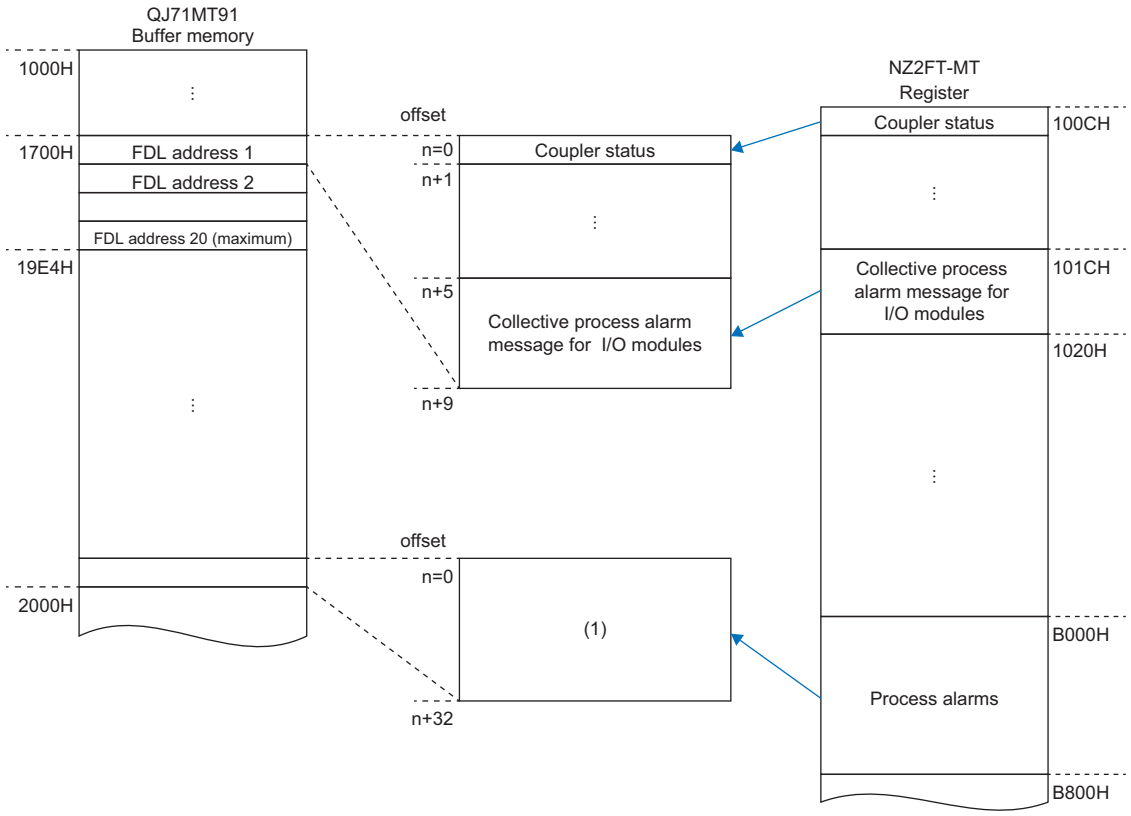
Assignment of the master module to the buffer memory

Status information can be read into any address in the buffer memory read area.

Item	Buffer memory address	Description
Read area	1000H to 1FFFH	Area for reading register address values of the NZ2FT-MT

Ex.

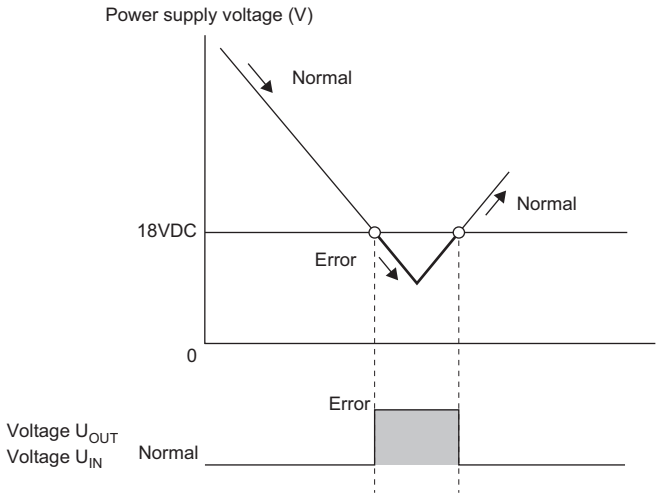
When data is assigned from 1700H in the buffer memory



(1) Process alarm data is assigned to a read area in 32 words for each I/O module.

Data configuration

■Coupler status

Bit	Item	Description
0	Error bit 0	System area
1	Module sequence not clear	0: Normal (A disconnected I/O module has been reconnected.) 1: Two or more I/O modules are disconnected during operation.
2	Error bit 2	System area
3	System bus error	System bus status 0: Normal 1: Error
4 to 5	Error bit 4 to 5	System area
6	I/O-Configuration error	Configuration error of the slave station 0: Normal 1: Error This bit is set to 1 when the configuration information saved in the slave station does not match with the current configuration information. During I/O module replacement, this bit is set to 1 when the module is disconnected and is set to 0 when a new module is mounted.
7	Error bit 7	System area
8	Register access error	0: Normal 1: Access to invalid register address
9	Error bit 9	System area
10	Force mode active	0: Unexecuted 1: In the Force mode Channels in the Force mode do not output the output value (Process data) from the master station. They output the value instructed for the Force mode.
11 to 12	Error bit 11 to 12	System area
13	Voltage U_{OUT} error	Detection of an error in the external power supply voltage for output/input 0: Normal 1: Error  The threshold is less than the power supply voltage 18VDC.
14	Voltage U_{IN} error	
15	Error bit 15	System area

How to check Coupler status

■GX Works3/GX Works2

Check the buffer memory address of "Coupler status" on the monitor. (☞ Page 360 Assignment of the master module to the buffer memory).

■Web server

It is displayed in decimal in "Coupler status" of "General information" of the NZ2FT-MT. (☞ Page 71 "Component view")

Troubleshooting by symptom

Cannot communicate with the master station

Check the following items.

Item	Action
Are the L/A P1 LED and L/A P2 LED of the NZ2FT-MT on or flashing?	If they are off, check them using LEDs. Also, check other LEDs. (☞ Page 357 Checking with LEDs)
Is the BF LED on the NZ2FT-MT off?	If it is not turned off, check it using LEDs. Also, check other LEDs. (☞ Page 357 Checking with LEDs)
Is the voltage of the power supply (24VDC) of the NZ2FT-MT within the specified range?	Set the voltage value within the range of performance specifications.
Is the wiring between the master station and NZ2FT-MT appropriate?	Review the wiring between the master station and NZ2FT-MT. (☞ Page 46 Wiring of network cable).
Are the parameters correct?	Check the parameters. (☞ Page 304 Parameter list).
Are the IP address and subnet mask set correctly?	Review the IP address and subnet mask. If the settings have been changed, turn off and on the NZ2FT-MT.

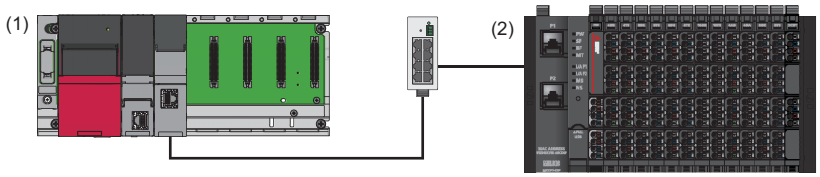
If communication is not established with the master station even after checking all of the above and checking with the LEDs of the I/O module and Web server, there is a risk of hardware failure in the NZ2FT-MT.
Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

12 NZ2FT-EIP

This chapter describes the details of the EtherNet/IP coupler.

12.1 EtherNet/IP Configuration

An EtherNet/IP system consists of a scanner (master station) with the RJ71EIP91 as the master module (1) and an adapter (slave station) for the EtherNet/IP device (2).
The NZ2FT system using the NZ2FT-EIP operates as an adapter.



Corresponding master module and software package

The master module corresponding to the NZ2FT-EIP and the software package corresponding to the master module are shown.

Master module			Software package	
Name	**Model**	**Version**	**Product name**	**Version**
EtherNet/IP network interface module	RJ71EIP91	Firmware version "01" or later	GX Works3	1.045X or later
			EtherNet/IP Configuration Tool for RJ71EIP91	1.00A or later

For how to check the version, refer to the manual for each master module and software package.

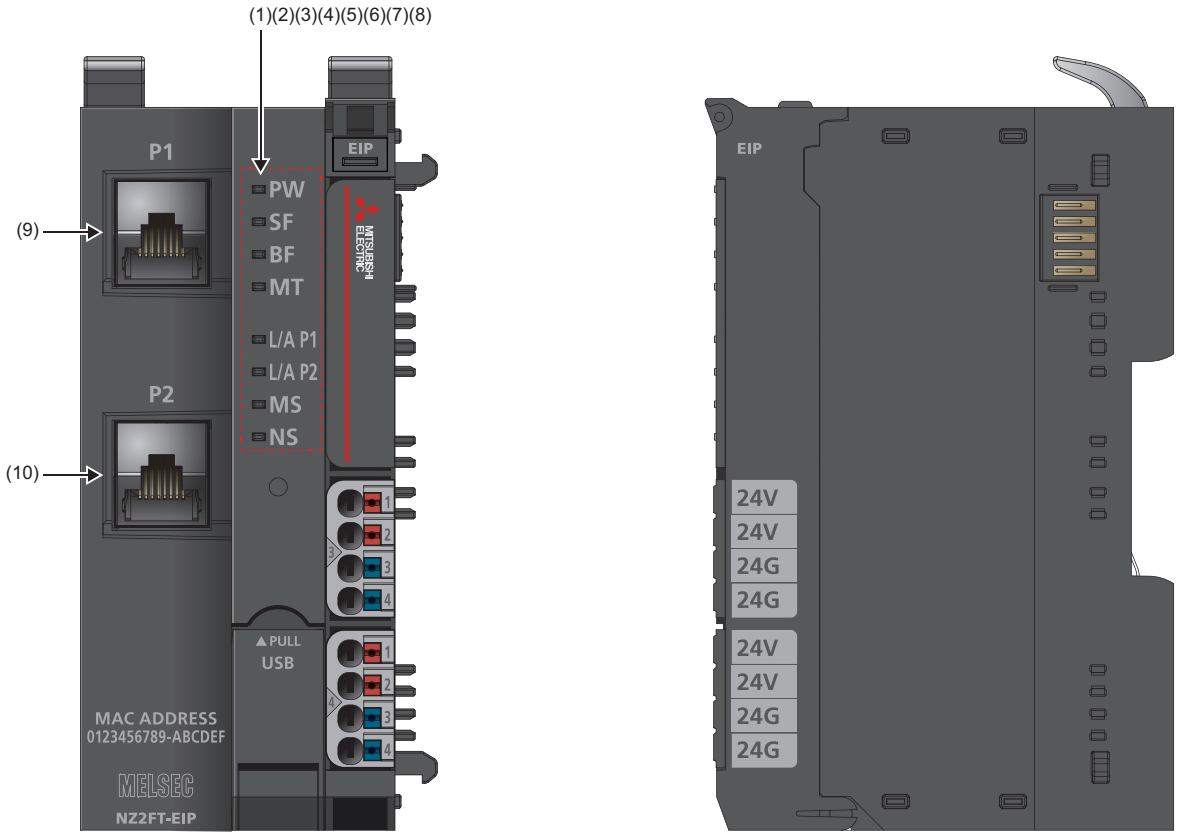
EDS file

The EDS file for setting the NZ2FT-EIP and I/O modules must be registered in the software package.
The EDS file is included with the EtherNet/IP Configuration Tool for RJ71EIP91.

Registration destination software package	Name	Release file name	Version
EtherNet/IP Configuration Tool for RJ71EIP91	EtherNet/IP EDS file	NZ2FT-EIP_v[Major version]_[Minor version].eds.zip ([Major version]: 1 to 99, [Minor version]: 0 to 99)	1.1 or later

12.2 Part Names

This section describes the LEDs of the NZ2FT-EIP. (☞ Page 94 Coupler Common Part Names)



No.	Name	Description
(1)	PW LED	Indicates the status of the module power supply. On in green: Power-on Off: Power-off
(2)	SF LED	Indicates the module status. On in red: Error (☞ Page 407 When the SF LED turns on in red) Flashing in red: Force mode Off: No error
(3)	BF LED	Indicates a communication error. On in red: Fieldbus error (☞ Page 407 When the BF LED turns on in red) Flashing in red: Error (☞ Page 408 When the BF LED is flashing in red) Off: No error
(4)	MT LED	Shows the status of the NZ2FT-EIP and modules. On in yellow: Error (☞ Page 408 When the MT LED turns on in yellow) Off: No error
(5)	L/A P1 LED	Indicates the fieldbus status. On: Connection is established between P1 of the NZ2FT-EIP and other field devices. Flashing: Data is being exchanged at P1 of the NZ2FT-EIP. When it is on/flashing in green, the data communication speed is 100Mbps, and when it is on/flashing in yellow, the data communication speed is 10Mbps. Off: Connection is not established between P1 of the NZ2FT-EIP and other field devices. (☞ Page 408 When the L/A P1 LED and L/A P2 LED turn off).
(6)	L/A P2 LED	Same as L/A P1 LED.
(7)	MS LED	Indicates the module status. On in red: I/O module configuration error or fieldbus error (☞ Page 408 When the MS LED turns on in red) Flashing in red: I/O module configuration error (☞ Page 408 When the MS LED is flashing in red) On in green: Operation preparation completed Flashing in green: NZ2FT-EIP configuration not set Flashing in red/green: LED self-diagnostics Off: Power-off

No.	Name	Description
(8)	NS LED	Indicates the communication status. On in red: IP address duplicated (☞ Page 408 When the NS LED turns on in red) Flashing in red: Communication timed out (☞ Page 409 When the NS LED is flashing in red) On in green: At least one EtherNet/IP connection established Flashing in green: EtherNet/IP connection not established (☞ Page 409 When the NS LED is flashing in green). Flashing in red/green: LED self-diagnostics Off: Power-off
(9)	P1 (Ethernet port)	Connect an Ethernet cable. (☞ Page 41 Wiring products for coupler that use the Ethernet cable)
(10)	P2 (Ethernet port)	

12.3 Performance Specifications

This section describes the performance specifications of the NZ2FT-EIP. (☞ Page 30 General Specifications).

Item		Specifications
Connection		2×RJ45
Network		EtherNet/IP
Number of connectable stations per RJ71EIP91		20 stations maximum
Process data		2 × 494 bytes maximum
Parameter data		64 × 64 bytes maximum
Number of connectable I/O modules (excluding extension power supply modules)		64 modules maximum*1
Setting interface		Micro USB 2.0
Communication speed	Fieldbus	100Mbps
Transfer rate	System bus	48Mbps maximum
External power supply voltage	Input power supply	24VDC +20%/-15%
	Output power supply	24VDC +20%/-15%
Power supply rated current	Input power supply	10A
	Output power supply	10A
Module current consumption		105mA
Power cable connection method		Spring clamp terminal block
Applicable wire size		Solid wire, stranded wire 0.14 to 1.5mm² (26 to 16 AWG)
Weight		242g

*1 When the NZ2FTS-60RD4 module or the NZ2FT-C24 is included, the number of connectable I/O modules is 59 maximum.

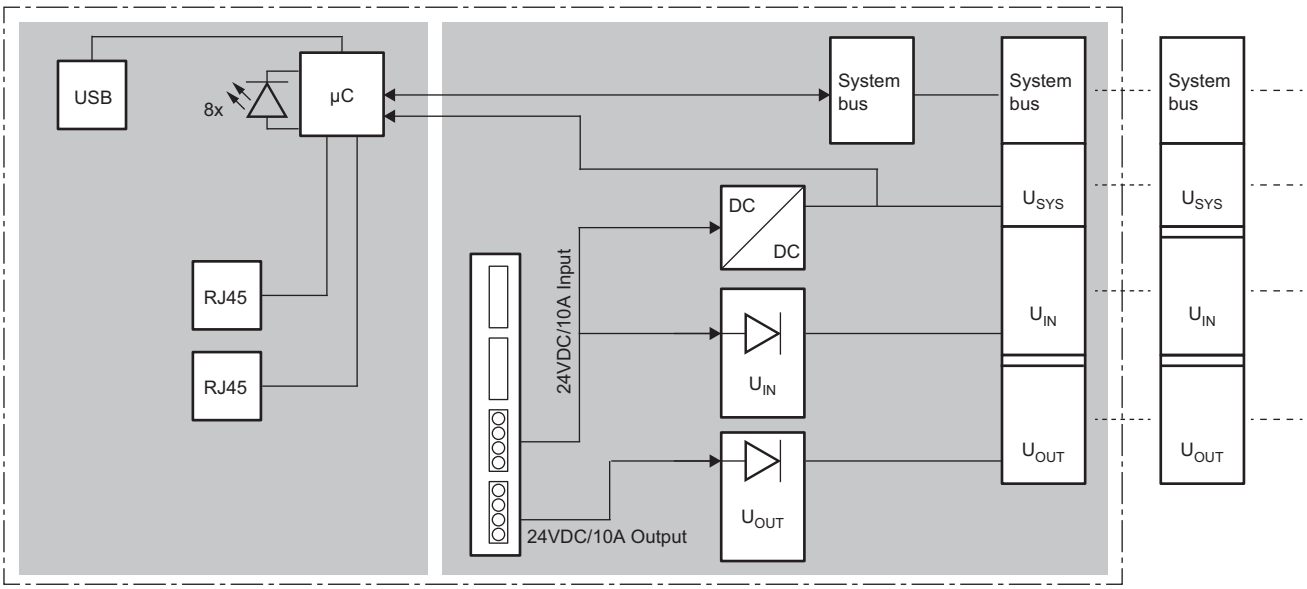
Precautions

The NZ2FT-EIP supports only the following master modules.

☞ Page 363 Corresponding master module and software package

Block diagram

The following figure shows the internal block diagram of the NZ2FT-EIP.



12.4 Functions

This section describes the functions of the NZ2FT-EIP.

Function list

Item	Description	Reference
Fieldbus communication	Communicates with the RJ71EIP91 using the EtherNet/IP protocol. Communication is performed with the RJ71EIP91 via the Class1 instance communications (constant periodic communications) or UCMM message communications (communications at arbitrary timing).	Page 363 EtherNet/IP Configuration
Parameter setting	Set the communication parameters of the NZ2FT-EIP from the setting window of the EtherNet/IP Configuration Tool for RJ71EIP91. Set the parameters of the NZ2FT-EIP and I/O module on the Web server.	Page 390 Parameter list
IP address acquisition method setting	Sets the method of acquiring an IP address.	Page 390 Parameter list
Data format switching	Sets the data format received/sent from/to the RJ71EIP91 to big-endian or little-endian.	Page 390 Parameter list
Module parameter function	Records the I/O module parameter settings in the non-volatile memory of the NZ2FT-EIP. Compatible with the NZ2FT-EIP firmware version 2.8.0 or later.	Page 75 Module parameter function
Save module parameters on coupler	Records the I/O module parameter settings in the non-volatile memory of the NZ2FT-EIP. Compatible with the NZ2FT-EIP firmware version 2.7.0 or earlier.	Page 390 Parameter list
Output value setting for fieldbus error	Sets the output value of the I/O module for each case, such as when the CPU module status of the RJ71EIP91 changes or a fieldbus error occurs.	Page 369 Output value setting for fieldbus error
I/O value setting for Hot swap	Set the I/O value of the I/O module of when replacing the I/O module while the power is on.	Page 79 I/O value setting for Hot swap
Checking warning output (Process alarm)	Checks whether Process alarm has occurred from the I/O module corresponding to the warning output, and reads Process alarm data of the content.	Page 370 Checking warning output (Process alarm)

Web server functions

Item	Description	Reference
Web server connection	Access the Web server via the USB port or the Ethernet port.	Page 60 Connection with a Personal Computer
Webserver via Ethernet	Set whether to enable or disable the access to the Web server via the Ethernet port.	Page 390 Parameter list
Login/Logout	Authenticate/clear access to the Web server. The functions will be limited if not logged in.	Page 64 Login/Logout
HTTPS setting	Encrypts the communications with the Web server.	Page 67 HTTPS setting
Help display	Displays Help of the Web server.	Page 69 Window Layout
Changing the language	Changes the display language of the Web server.	Page 73 Changing the language
Force mode	Inputs/outputs an arbitrary value forcibly from the Web server without being affected by the input from an external device or by the operation result (cyclic data) of the program.	Page 76 Force mode
Lock force mode	Enables or disables the ability to switch mode to the Force mode of the Web server.	Page 390 Parameter list
Tag name function	Set an arbitrary character string as the channel name of the I/O module.	Page 83 Tag name function
I&M data function	Records I&M data (Identification & Maintenance) such as the installation location of the system and the installation date.	Page 85 I&M data function
Reset	Restarts the NZ2FT-EIP from the Web server.	Page 85 Resetting the coupler
Saving/loading parameter files	Saves or loads the NZ2FT-EIP and I/O module parameter files. This function is used when the NZ2FT-EIP is replaced.	Page 80 Saving/loading parameter files
Initialization	Restores the NZ2FT-EIP to the factory default setting from the Web server.	Page 86 Initialization of the coupler
Firmware update	Updates the firmware of the NZ2FT-EIP and I/O module.	Page 87 Firmware update

Troubleshooting

Item	Description	Reference
LED indication	Displays the status of the NZ2FT-EIP with LED.	Page 364 Part Names
Status management	Manages the status of the NZ2FT-EIP.	Page 410 Confirmation by status information (Status word)
Acquisition of the service file	If troubleshooting does not solve the problem, analyzes the failure by obtaining the service file.	Page 88 Acquisition of the service file

Output value setting for fieldbus error

Set the output value of the I/O module for each case, such as when the CPU module status of the master station changes or a fieldbus error occurs.

The output value changes depending on the following two settings.

- NZ2FT-EIP parameter "Output behaviour on fieldbus error"
- Parameter "Substitute value" for each I/O module

However, the data sent from the NZ2FT-C24 to the external device is not affected by the setting of the NZ2FT-EIP parameter "Output behaviour on fieldbus error".

Ex.

For the digital output module

Status of master station (RJ71EIP91)		NZ2FT-EIP parameter "Output behaviour on fieldbus error" setting							
		0: All outputs off (All outputs are turned off.)		1: Enable substitute value (A substitute value is output.)				2: Hold last value (The last output value is held.)	
				The I/O module parameter "Substitute value" set to 1		The I/O module parameter "Substitute value" set to 0			
		Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on	Last output value is off	Last output value is on
Data link in operation	CPU module RUN state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	CPU module: RUN → STOP	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
	CPU module PAUSE state	OFF	ON	OFF	ON	OFF	ON	OFF	ON
	When the CPU module is reset	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
	When in CPU module stop error	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
Disconnected (fieldbus error occurred)		OFF	OFF	ON	ON	OFF	OFF	OFF	ON

Ex.

For the NZ2FTS-60DA4

Status of master station (RJ71EIP91)		NZ2FT-EIP parameter "Output behaviour on fieldbus error" setting		
		0: All outputs off (All outputs are turned off.)	1: Enable substitute value (A substitute value is output.)	2: Hold last value (The last output value is held.)
Data link in operation	CPU module RUN state	D/A conversion value		
	CPU module: RUN → STOP	0	A substitute value is output.	The last output value is held.
	CPU module PAUSE state	D/A conversion value		
	When the CPU module is reset	0	A substitute value is output.	The last output value is held.
	When in CPU module stop error	0	A substitute value is output.	The last output value is held.
Disconnected (fieldbus error occurred)		0	A substitute value is output.	The last output value is held.

Checking warning output (Process alarm)

Checks whether Process alarm has occurred from the I/O module corresponding to the warning output, and reads Process alarm data of the content.

The I/O modules that support the warning output and their details are as follows.

- NZ2FTS-60RD4: ☞ Page 504 Warning output (Process alarm)
- NZ2FTS-60TD4: ☞ Page 516 Warning output (Process alarm)
- NZ2FTS-D62P2: ☞ Page 535 Warning output (Process alarm)

Process alarm cannot be checked from the Web server.

Setting the NZ2FT-EIP parameter "Process alarm" to "Enabled" allows detection of Process alarm of I/O modules.

The following describes assignment to the buffer memory, data configuration, and referring method of Process alarm data of I/O modules.

Assignment to the buffer memory

Process alarm data is read in the same way as Diagnostic data. There is no assignment to the memory buffer.

How to check with the EtherNet/IP Configuration Tool for RJ71EIP91

Process alarm data of I/O modules can be checked by specifying the following items with the UCMM/Class3 communication command of EtherNet/IP Configuration Tool for RJ71EIP91. (📖 MELSEC iQ-R EtherNet/IP Network Interface Module User's Manual (Application))

- Class: 65H (101)
- Instance: I/O module mounting position value (the mounting position in order of proximity to the NZ2FT-EIP)
- Attribute: 75H (117)

How to check Process alarm

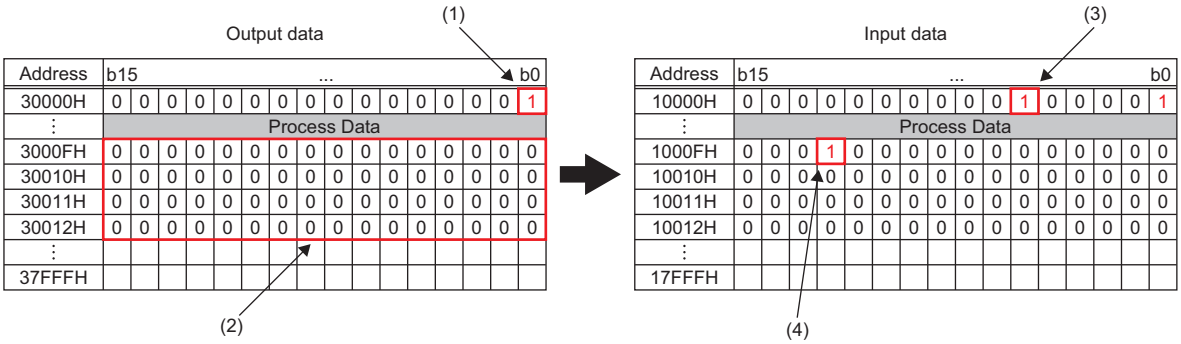
The following describes how to check Process alarm.

■Checking procedure

1. Check that Unacknowledged process alarm (b5) of Status word (☞ Page 410 Status word) is set to 1.
2. Set the following of Output data.
   - Control word (b0) = 1 (Process alarm data)
   - Diagnostic data control word = 0
3. Check the I/O module that has detected Process alarm with Diagnostic data of Input data.
4. Set the value of the mounting position of the I/O module that has detected Process alarm to Diagnostic data control word of Output data.
5. Check Process alarm data (4 bytes) of the specified I/O module with Diagnostic data of Input data. For the data configuration of Process alarm data, refer to Process alarm data of each I/O module.
6. When Unacknowledged process alarm (b5) is 1, there is an unacknowledged Process alarm, so repeat the procedure from step 1.

Ex.

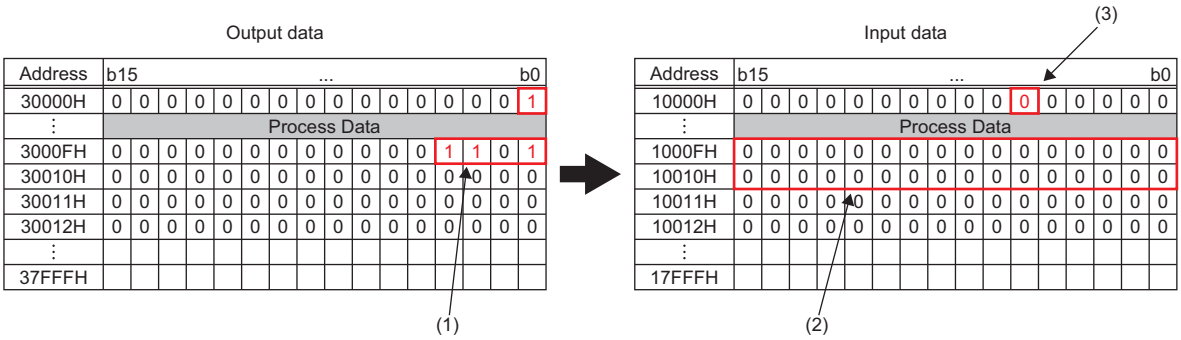
Check the I/O module that has detected Process alarm



(1) Set b0 of Control word to 1.
(2) Set Diagnostic data control word to 0.
(3) There is an unacknowledged Process alarm.
(4) The 13th I/O module has detected Process alarm.

Ex.

Checking Process alarm data of the 13th I/O module (NZ2FTS-D62P2)



(1) Set the mounting position 13.
(2) Process alarm data is stored. (4 bytes for the NZ2FTS-D62P2)
(3) When all detected Process alarm is checked, it is set to 0.

Precautions

- If the mounting position value of an I/O module that is not mounted or a value greater than 64 is entered, Diagnostic data of Input data is all set to 0.
- The extension power supply modules are not included in the mounting position value count of Diagnostic data of Input data.

Point

If the second Process alarm is detected on the same channel of the same I/O module before reading Process alarm data, the second Process alarm data will not be stored correctly.
If Process alarm is detected, read Process alarm data.

CIP object list

The following table lists the object supported by the NZ2FT-EIP.

Object	Reference
Identity	Page 373 Identity
Message Router	Page 374 Message Router
Assembly	Page 375 Assembly
Connection Manager	Page 377 Connection Manager
SNMP	Page 378 SNMP
TCP/IP Interface	Page 379 TCP IP Interface
Ethernet Link	Page 381 Ethernet Link
Gateway	Page 383 Gateway
Slot	Page 384 Slot
Process Data	Page 385 Process Data
Module Parameter	Page 386 Module Parameter

Command explanations

■Access

This item indicates whether reading and writing using instance services are allowed.

- Get: Reading is possible with services such as Get_Attribute_Single.
- Set: Writing is possible with services such as Set_Attribute_Single.

■Data type

Item	Data size	Range
USINT	1 byte	0 to 255
UINT	2 bytes	0 to 65535
UDINT	4 bytes	0 to (2^{32} - 1)
BOOL	1 bit	—
BYTE	8 bits	—
WORD	16 bits	—
DWORD	32 bits	—
STRING	2 bytes for string length, 1 byte per character	—
SHORT_STRING	1 bytes for string length, 1 byte per character	—
STRING	Depends on the number of characters.	—
Padded EPATH	—	—
Packed EPATH	—	—

Identity

Object name	Class ID
Identity	01H (1)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	UINT	Revision	Object revision
02H	2	○	×	×	UINT	Max Instance	Maximum instance ID
03H	3	○	×	×	UINT	Number of Instances	Number of created instances
06H	6	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0
07H	7	○	×	×	UINT	Max Instance Attribute	Last attribute ID of this class in other instances

■Instance ID: 01H (1)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	○	UINT	Vendor ID	Vendor ID number
02H	2	○	×	○	UINT	DeviceType	Device type
03H	3	○	×	○	UINT	Product Code	Product ID number
04H	4	○	×	○	Struct {USINT, USINT}	Revision {Major, Minor}	Revision
05H	5	○	×	×	WORD	Device Status	Device status b0: Owned b2: Configured b4 to b7: Extended device status b8: Minor recoverable fault b9: Minor unrecoverable fault b10: Major recoverable fault b11: Major unrecoverable fault b12 to b15: Extended device status 2
06H	6	○	×	○	UDINT	Serial Number	Serial number
07H	7	○	×	○	SHORT_STRING	Product Name	Product name

Message Router

Object name	Class ID
Message Router	02H (2)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	UINT	Revision	Object revision
02H	2	○	×	×	UINT	Max Instance	Maximum instance ID
03H	3	○	×	×	UINT	Number of Instances	Number of created instances
04H	4	○	×	×	Struct {UINT, Array of UINT}	Optional Attributes	List of optional attributes
05H	5	○	×	×	Struct {UINT, Array of UINT}	Optional Services	Option service list
06H	6	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0
07H	7	○	×	×	UINT	Max Instance Attribute	Last attribute ID of this class in other instances

■Instance ID: 01H (1)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	Struct {UINT, Array of UINT}	List of supported objects	Number of objects (class code)
02H	2	○	×	×	UINT	Number of supported connections	Number of supported connections

Assembly

Object name	Class ID
Assembly	04H (4)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	UINT	Revision	Object revision
02H	2	○	×	×	UINT	Max Instance	Maximum instance ID
03H	3	○	×	×	UINT	Number of Instances	Number of created instances
04H	4	○	×	×	Struct {UINT, Array of UINT}	Optional Attributes	List of optional attributes implemented in this class
06H	6	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0
07H	7	○	×	×	UINT	Max Instance Attribute	Last attribute ID of this class in other instances

■Instance ID: 65H to 68H (101 to 104)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
03H	3	○	○	×	Array of BYTE	Data	Process data
04H	4	○	×	×	UINT	Size	Size of Process data

■Instance ID: 7AH (122)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
03H	3	○	×	×	Array of BYTE	Data	Configuration data
04H	4	○	×	×	UINT	Size	Size of Configuration data

■Instance ID: 7BH (123)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
03H	3	○	○	×	Array of BYTE	Data	Configuration data
04H	4	○	×	×	UINT	Size	Size of Configuration data (fixed to 400 bytes)

For the CLP setting, 7AH (122) and 7BH (123) of Configuration assembly are sent when a connection is established. The size of the 7AH (122) differs depending on the I/O module configuration. The size of 7BH (123) is fixed to 400 bytes. Two connections using 7BH (123) are defined in the EDS file.
After the connection is established, writing to Configuration assembly is not possible. To change parameters of the NZ2FT-EIP after the connection is established, use the attribute 73H of Gateway object or Slot object. After disconnection from a fieldbus, parameters can be changed from the Web server.
Configuration assembly includes an 8-byte mask (64 bits) followed by the parameters of all I/O modules. For I/O modules that include parameters, 1 is stored in the bit of the corresponding mask. Data is arranged according to the I/O module configuration, starting with byte 0 and b0 for the first I/O module. After that, the parameter of each I/O module with a 3-byte header will follow: 1-byte parameter data length and 2-byte for the upper 16 bits of Module ID.

Ex.

Structure of Configuration assembly

The values of byte 0 to byte 7 indicate the mounting order of I/O modules.

Byte	b7	b6	b5	b4	b3	b2	b1	b0
0	8	7	6	5	4	3	2	1
1	16	15	14	13	12	11	10	9
2	24	23	22	21	20	19	18	17
3	32	31	30	29	28	27	26	25
4	40	39	38	37	36	35	34	33
5	48	47	46	45	44	43	42	41
6	56	55	54	53	52	51	50	49
7	64	63	62	61	60	59	58	57
8	Parameter length of the first I/O module that includes parameters							
9	Module ID							
10	Module ID							
11	Parameter							
⋮	⋮							
⋮	Parameter length of the next I/O module that includes parameters							
⋮	Module ID							
⋮	Module ID							
⋮	Parameter							
⋮	⋮							

Connection Manager

Object name	Class ID
Connection Manager	06H (6)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	UINT	Revision	Object revision
02H	2	○	×	×	UINT	Max Instance	Maximum instance ID
03H	3	○	×	×	UINT	Number of Instances	Number of created instances
04H	4	○	×	×	Struct {UINT, Array of UINT}	Optional Attributes	List of optional attributes implemented in this class
06H	6	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0
07H	7	○	×	×	UINT	Max Instance Attribute	Last attribute ID of this class in other instances

■Instance ID: 01H (1)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	○	×	UINT	Open Requests	Number of Forward open requests
02H	2	○	○	×	UINT	Open Format Rejects	Number of Forward open services rejected due to format incompatibility
03H	3	○	○	×	UINT	Open Resource Rejects	Number of Forward open services rejected due to insufficient resources
04H	4	○	○	×	UINT	Open Other Rejects	Number of Forward open services rejected due to reasons other than format incompatibility and insufficient resources
05H	5	○	○	×	UINT	Close Requests	Number of Forward close requests
06H	6	○	○	×	UINT	Close Format Rejects	Number of Forward close services rejected due to format incompatibility
07H	7	○	○	×	UINT	Close Other Rejects	Number of Forward close services rejected due to reasons other than format incompatibility
08H	8	○	○	×	UINT	Connection Timeouts	Number of connection timeouts

SNMP

Object name	Class ID
SNMP	52H (82)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	UINT	Revision	Object revision
02H	2	○	×	×	UINT	Max Instance	Maximum instance ID
03H	3	○	×	×	UINT	Number of Instances	Number of created instances
04H	4	○	×	×	Struct {UINT, Array of UINT}	Optional Attributes	List of optional attributes implemented in this class
06H	6	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0
07H	7	○	×	×	UINT	Max Instance Attribute	Last attribute ID of this class in other instances

■Instance ID: 01H (1)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	(○)	○	USINT	SNMP enable	Enable or disable SNMP • 1 = Enabled • 0 = Disabled
02H	2	○	×	○	USINT	SNMP Version	SNMP version • 1 = SNMP v1 • 3 = SNMP v3 • 31 = SNMP v1 + v3
03H	3	○	(○)	○	Struct {USINT, STRING}	Trap 1	SNMP-trap destination Byte 1: • 0 = Not set • 1 = IP address String: IP address (Example: 123.123.123.123)
04H	4	○	(○)	○	Struct {USINT, STRING}	Trap 2	SNMP-trap destination Byte 1: • 0 = Not set • 1 = IP address String: IP address (Example: 123.123.123.123)
05H	5	○	(○)	○	BOOL	Trap enable	Enable or disable Trap • 1 = Enabled • 0 = Disabled
06H	6	○	×	○	USINT	Trap Type	Trap type • 1 = Trap V1PDU • 2 = Trap V2PDU (For SNMPv3 only)

TCP IP Interface

Object name	Class ID
TCP IP Interface	F5H (245)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	UINT	Revision	Object revision
02H	2	○	×	×	UINT	Max Instance	Maximum instance ID
03H	3	○	×	×	UINT	Number of Instances	Number of created instances
04H	4	○	×	×	Struct {UINT, Array of UINT}	Optional Attributes	List of optional attributes implemented in this class
06H	6	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0
07H	7	○	×	×	UINT	Max Instance Attribute	Last attribute ID of this class in other instances

■Instance ID: 01H (1)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	DWORD	Interface Status	Interface status b0 to 3: • 0 = Not set • 1 = Set by software • 2 = Set by hardware b4: Multicast pending b5: Interface setting pending b6: ACD duplication b7: ACD error
02H	2	○	×	○	DWORD	Capability Flags	Interface enable/disable flag b0: BootP b1: DNS b2: DHCP b4: Settable b5: Settable by hardware b6: Change requires reset b7: ACD possible
03H	3	○	○	○	DWORD	Control Flags	Interface control flag b0 to 3: • 0 = Static IP mode • 1 = BootP mode • 2 = DHCP mode When the mode is changed to Static IP mode, the assigned IP address is held. When the mode is changed to BootP mode or DHCP mode, the NZ2FT-EIP sends a request to the supported server automatically.
04H	4	○	×	○	Struct {UINT, Padded EPATH}	Physical Link Object	Path to internal Ethernet interface
05H	5	○	○	○	Struct {5*UDINT, STRING}	Interface Configuration	IP address, network mask, gateway address, primary name server, secondary name server, domain name Set a new IP address. In Static IP mode, the set IP address is saved. In the BootP mode or DHCP mode, the set IP address is used temporarily.
06H	6	○	○	○	STRING	Host Name	Host name (reference)
08H	8	○	○	○	USINT	TTL Value	TTL value for multicast packets

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
09H	9	○	○	○	Struct {USINT, USINT, UINT, UDINT}	Mcast Config	Multicast setting Byte 1: • 0 = Auto generation • 1 = Depends on this parameter setting • 2 = Not used Byte 2: Not used Byte 3 to 4: Number of multicast addresses Byte 5 to 7: First address
0AH	10	○	○	○	BOOL	ACD active	ACD status (Address Conflict Detection) • 0 = ACD invalid • 1 = ACD valid When an IP address is assigned to the NZ2FT-EIP, it will be checked whether the address is already used on the network. The address check is executed every two minutes. If the address is duplicated, the NZ2FT-EIP in the DHCP mode sends a request to the DHCP server again. When the NZ2FT-EIP is in the BootP mode or static IP mode, disconnect it from the network.
0BH	11	○	○	○	Struct {USINT, 6*USINT, 28*USINT}	Last ACD Conflict	Last conflict status Byte 1: • 0: No conflict • 1: Being checked • 2: In conflict • 3: Semi-Active 6 bytes or later: MAC address of the conflicting packet 28 bytes or later: Conflicting ARP packet

Ethernet Link

Object name	Class ID
Ethernet Link	F6H (246)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	UINT	Revision	Object revision
02H	2	○	×	×	UINT	Max Instance	Maximum instance ID
03H	3	○	×	×	UINT	Number of Instances	Number of created instances
04H	4	○	×	×	Struct {UINT, Array of UINT}	Optional Attributes	List of optional attributes implemented in this class
06H	6	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0
07H	7	○	×	×	UINT	Max Instance Attribute	Last attribute ID of this class in other instances

■Instance ID: 01H to 03H (1 to 3)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
01H	1	○	×	×	UDINT	Interface Speed	Communication speed • 0 = Not confirmed • 10 = 10 Mbps • 100 = 100 Mbps
02H	2	○	×	×	DWORD	Interface Flags	Interface status flag b0: Link-up b1: • 0 = Half-duplex • 1 = Full-duplex b2 to 4: • 0 = Auto-negotiation in progress • 1 = Auto-negotiation and speed detection failed • 2 = Speed detected but auto-negotiation failed • 3 = Auto-negotiation succeeded • 4 = Auto-negotiation disabled b5: Reset before change of settings is required b6: Hardware failure
03H	3	○	×	○	6*USINT	MAC address	MAC address
06H	6	○	○	○	Struct {WORD, UINT}	Interface Control	Interface control b0: • 1 = Auto-negotiation enabled • 0 = Auto-negotiation disabled b1: • 0 = Half-duplex • 1 = Full-duplex 3 to 4 bytes: • 10 = 10 Mbps • 100 = 100 Mbps
07H	7	○	×	○	USINT	Interface Type	Interface type • 0 = Unknown • 1 = Built-in • 2 = Twist pair • 3 = Optical fiber
08H	8	○	×	×	USINT	Interface State	Interface status • 0 = Unknown • 1 = Enabled • 2 = Disabled • 3 = During test

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
09H	9	○	○	○	USINT	Admin State	Administration status • 0 = Reserved • 1 = Enabled • 2 = Disabled
0AH	10	○	×	○	SHORT_STRING	Interface Label	Interface label (port 1/port 2/built-in)

Gateway

Object name	Class ID
Gateway	64H (100)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
64H	100	○	×	×	UINT	Revision	Object revision
65H	101	○	×	×	UINT	Max Instance	Maximum instance ID
66H	102	○	×	×	UINT	Number of Instances	Number of created instances
67H	103	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0

■Instance ID: 01H (1)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
64H	100	○	×	○	UINT	Max Attributes	Attribute ID of the last instance
65H	101	○	×	○	STRING	Hardware Version	Hardware version of the NZ2FT-EIP
66H	102	○	×	○	STRING	Software Version	Software version of the NZ2FT-EIP
67H	103	○	×	○	STRING	Serial Number	Serial number of the NZ2FT-EIP
68H	104	○	×	×	WORD	Status Word	Set of Status Word
69H	105	○	○	×	WORD	Control Word	Set of Control word
6AH	106	○	○	○	BYTE	Parameter Fieldbus error	Parameter "Output behaviour on fieldbus error" • All outputs off (0) • Enable substitute values (1) • Hold last value (2)
6BH	107	○	○	○	BOOL	Parameter Hot swap	Parameter "Module behaviour on hot swap" • Continue data exchange (0) • Behaviour like on fieldbus error (1)
6DH	109	○	○	○	BOOL	Parameter Data format	Parameter "Data format" • Motorola (0) • Intel (1)
6EH	110	○	○	×	Array of 4 BYTE	Save/Restore Module Parameter	Save/restore of the parameter • Write the string "SAVE": Save of the module parameter • Write the string "LOAD": Change of the module parameter to default
6FH	111	○	×	×	Array of 64 DWORD	Current Module List	List of the currently connected modules
70H	112	○	○	○	Array of 64 DWORD	Module Ref List	List of the expected modules
71H	113	○	○	○	BOOL	Diagnostic Alarm	Parameter "Diagnostic alarm" • Disabled (0) • Enabled (1)
72H	114	○	○	○	BOOL	Process Alarm	Parameter "Process alarm" • Disabled (0) • Enabled (1)
73H	115	○	○	×	Array of BYTE	Module Parameter	Array that stores all parameters of all modules
74H	116	○	○	○	BOOL	Force Lock	Force mode • Unlocked (0) • Locked (1)
75H	117	×	×	×	BYTE	Behaviour on Idle	Parameter "Output behaviour on IDLE state"

Slot

Object name	Class ID
Slot	65H (101)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
64H	100	○	×	×	UINT	Revision	Object revision
65H	101	○	×	×	UINT	Max Instance	Maximum instance ID
66H	102	○	×	×	UINT	Number of Instances	Number of created instances
67H	103	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0

■Instance ID: 01H to 40H (1 to 64)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
64H	100	○	×	○	USINT	Max Attributes	Attribute ID of the last instance
65H	101	○	×	×	STRING	Name	I/O module name
66H	102	○	×	×	STRING	Product Code	Order number of the I/O module
67H	103	○	×	×	STRING	Serial Number	Serial number of the I/O module
68H	104	○	×	×	UDINT	Module ID	Module ID
69H	105	○	×	×	STRING	Hardware Version	Hardware version of the I/O module
6AH	106	○	×	×	STRING	Software Version	Software version of the I/O module
6BH	107	○	×	×	STRING	MX Version	MX version of the I/O module
6CH	108	○	×	×	BYTE	Slot State	Status of the I/O module • 01H: No error • 80H: Empty slot • 81H: Different module • 82H: Diagnostics enabled
6DH	109	○	×	×	UINT	Input Bit Length	Bit length of Input data
6EH	110	○	×	×	UINT	Output Bit Length	Bit length of Output data
6FH	111	○	×	×	UINT	Parameter Byte Length	Byte length of parameter data
71H	113	○	×	×	Array of BYTE	Process Data In	Input data of the I/O module
72H	114	○	○	×	Array of BYTE	Process Data Out	Output data of the I/O module
73H	115	○	○	×	Array of BYTE	Parameter Data	Parameter data of the I/O module
75H	117	○	×	×	Array of BYTE	Process Alarm Data	Process alarm of the I/O module

Process Data

Object name	Class ID
Process Data	66H (102)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
64H	100	○	×	×	UINT	Revision	Object revision
65H	101	○	×	×	UINT	Max Instance	Maximum instance ID
66H	102	○	×	×	UINT	Number of Instances	Number of created instances
67H	103	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0

■Instance ID: 01H (1)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
64H	100	○	×	○	USINT	Max Attributes	Attribute ID of the last instance
65H	101	○	×	×	Array of BYTE	Process Data In	All Input data
66H	102	○	×	×	UINT	Length Process Data In	Total data length of Input data
67H	103	○	○	×	Array of BYTE	Process Data Out	All Output data
68H	104	○	×	×	UINT	Length Process Data Out	Total data length of Output data
69H	105	○	×	×	Array of 8 BYTE	Diag Status	Set of Diagnosis messages
6AH	106	○	×	×	Array of 8 BYTE	Diag Control	Set of Diagnosis control

Module Parameter

Object name	Class ID
Module Parameter	67H (103)

■Instance ID: 00H (0)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
64H	100	○	×	×	UINT	Revision	Object revision
65H	101	○	×	×	UINT	Max Instance	Maximum instance ID
66H	102	○	×	×	UINT	Number of Instances	Number of created instances
67H	103	○	×	×	UINT	Max Class Attribute	Last attribute ID of this class in instance 0

■Instance ID: 01H (1)

○: Available, ×: Not available

Attribute ID		Access		Data held	Data type	Name	Description
Hexadecimal	Decimal	Get	Set				
64H	100	○	×	○	UINT	Max Attributes	Attribute ID of the last instance
65H	101	○	○	×	UINT	Parameter	Parameter of the module

Each module parameter corresponds to the attribute starting from the attribute 65H. The number of attributes depends on the module type. The attribute ID of the last module parameter is checked with the attribute 64H. The attribute data type (USINT, UINT, or UDINT) depends on the parameter to be set.

The class 67H supports the services Get_Attributes_All and Set_Attributes_All. Therefore, all parameters of each module can be read and written in one message. All attributes of each module are included in the message beginning with the attribute 65H. Therefore, the data size depends on the number of attributes and the data type.

12.5 Procedures Before Operation

1. Installation

Attach the NZ2FT system to the DIN rail and install it in a suitable environment. (☞ Page 36 Installation Environment and Installation Position of Module, Page 38 Installation)

2. Wiring

Connect the power cable and Ethernet cable to the NZ2FT-EIP. (☞ Page 45 Wiring of power cable and I/O cable, ☞ Page 46 Ethernet cable)

Connect the I/O cables to the I/O module. (☞ Page 45 Wiring of power cable and I/O cable)

3. DHCP/BootP server setting

To use DHCP or BootP, set the DHCP server or BootP server in advance.

Use the static IP address. For the server setting, refer to the manual of the server used.

4. Scanner (master station) setting

Register the EtherNet/IP EDS file and set communication parameters. (☞ Page 388 Parameter Setting)

5. Connection between the Web server and personal computer

Access the NZ2FT-EIP Web server via the USB port or the Ethernet port. (☞ Page 60 Connection with a Personal Computer)

6. EtherNet/IP device (adapter) setting

Set the parameters of the NZ2FT-EIP and I/O module on the Web server. (☞ Page 390 Parameter list)

7. Start operation

Turn on EtherNet/IP communication start request (Y10).

12.6 Parameter Setting

EtherNet/IP network interface module

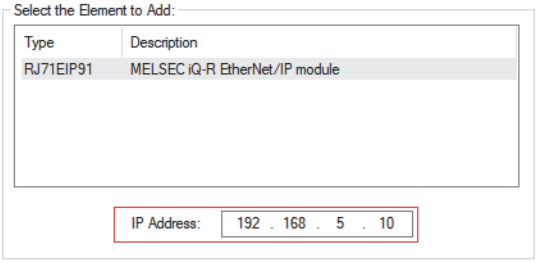
When performing EtherNet/IP communication with RJ71EIP91, start EtherNet/IP Configuration Tool for RJ71EIP91 and configure the EtherNet/IP communication settings. (Parameter setting procedure 📖 MELSEC iQ-R EtherNet/IP Network Interface Module User's Manual (Application))

Setting item

■IP address of the RJ71EIP91

Set on the "Element Properties" window.

Match the IP address with the one set in "Basic Settings" of the RJ71EIP91.

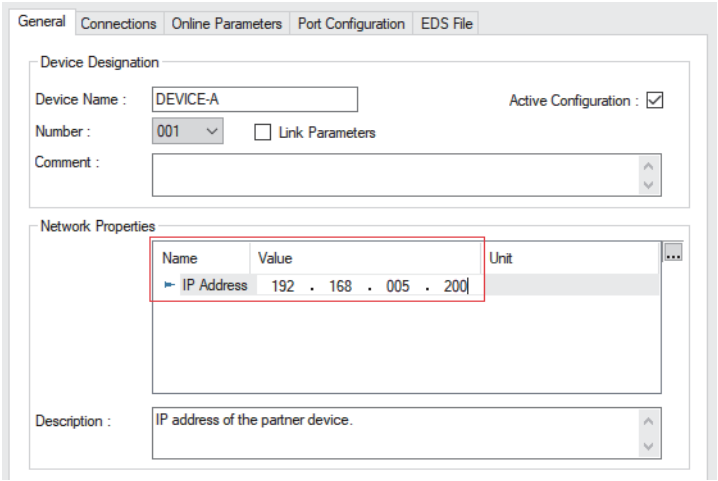


■Adding the EDS file

Add the EDS file of the NZ2FT-EIP on the "EDS Management" window. (☞ Page 363 EDS file).

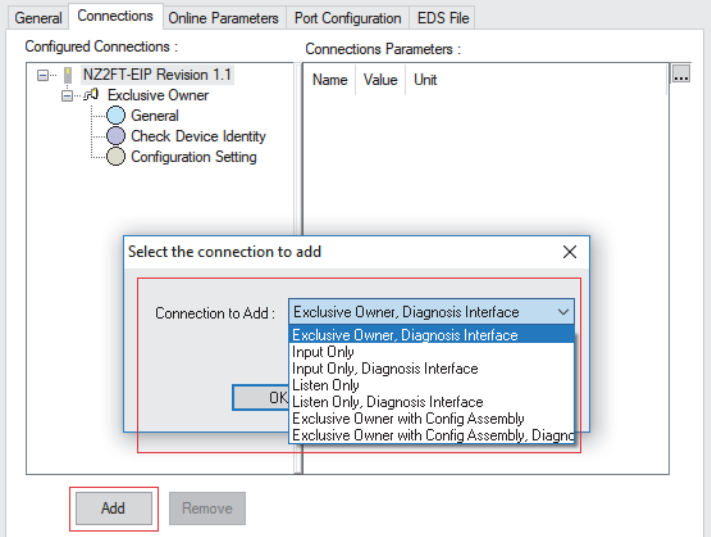
■IP address of the NZ2FT-EIP

Set the IP address of the NZ2FT-EIP on the [General] tab in the EtherNet/IP device setting window.



■Connection type at establishment of the connection

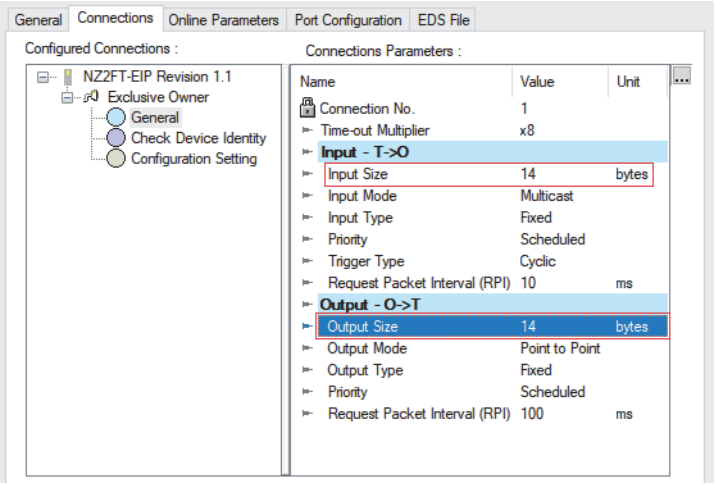
On the [Connections] tab in the EtherNet/IP device setting window, set the connection type at establishment of the connection.



Select [Add] ⇨ [Connection to Add] and select the connection type of the NZ2FT-EIP.

■Input Size and Output Size

On the [Connections] tab in the EtherNet/IP device setting window, set "Input Size" and "Output Size" at establishment of the connection.



"Input Size" is the sum of the following data sizes. (☞ Page 394 Input data)

Item	Data size
Status word	2 bytes
Process data of the modules	Total size of Process data of the I/O module mounted to the NZ2FT-EIP
Diagnostic data	8 bytes When the connection type includes "Diagnosis Interface", the number of bytes of diagnosis data is added.

"Output Size" is the sum of the following data sizes. (☞ Page 394 Output data)

Item	Data size
Control word	2 bytes
Process data of the modules	Total size of Process data of the I/O module mounted to the NZ2FT-EIP
Diagnostic data control word	8 bytes When the connection type includes "Diagnosis Interface", the number of bytes of diagnosis data is added.

The length of Process data of the modules depends on the I/O module configuration. The size is always set to an even number of bytes. (☞ Page 392 Data width used by the I/O module)

Ex.

When a single NZ2FTS-60AD4 is connected to the NZ2FT-EIP

Item	Data size
Input Size	Input Size is 18 bytes because Process data in Input of the NZ2FTS-60AD4 is 4 words (8 bytes). 2 bytes + 8 bytes + 8 bytes = 18 bytes
Output Size	Output Size is 10 bytes because there is no Process data in Output of the NZ2FTS-60AD4. 2 bytes + 0 bytes + 8 bytes = 10 bytes.

Slave station setting

Set the parameters of the NZ2FT-EIP and each I/O module on the Web server. (☞ Page 390 Parameter list)

Parameter list

These parameters can be set in the NZ2FT-EIP from the Web server. (☞ Page 74 Parameter setting)

Set the parameters while communications are not being performed with the RJ71EIP91. Use any of the following methods to stop communications.

- Change the CPU module of the RJ71EIP91 from RUN to STOP.
- Turn off the RJ71EIP91.
- Turn off EtherNet/IP communication start request [Y10].

Item	Description	Setting range*1	Default
IP configuration	Set the specification method of the IP address. • Static: The value set for the IP address of the NZ2FT-EIP is used. • DHCP: The IP address is acquired from the DHCP server. • BootP: The IP address is acquired from the BootP server. When using the DHCP or BootP server, add the static IP address.	• Static • DHCP • BootP	DHCP
IP address	Set the IP address of the NZ2FT-EIP.	0.0.0.1 to 223.255.255.254 *2	0.0.0.0
Subnet mask	Set the subnet mask of the NZ2FT-EIP.	128.0.0.0 to 255.255.255.248 *2	255.255.255.0
Gateway	Set the gateway of the NZ2FT-EIP.	0.0.0.1 to 223.255.255.254 *2	0.0.0.0
IP address USB port	Set the IP address of the USB port. The NZ2FT-EIP must be reset after the setting.	• 192.168.1.202 • 192.168.2.202 • 192.168.3.202 • 192.168.4.202 • 192.168.5.202	192.168.5.202
Webserver via Ethernet	Set whether to enable or disable the access to the Web server via the Ethernet port. The NZ2FT-EIP must be reset after the setting.	• Disabled • Enabled	Enabled
Save module parameters on coupler	Records the I/O module parameter settings in the non-volatile memory of the NZ2FT-EIP. When reset, the recorded parameter settings are loaded into the I/O module before operation. • No: The parameter settings of the I/O module are not recorded. • Yes: The parameter settings of the I/O module are recorded. • Default: The I/O module parameters are set to their default values. "Yes" and "Default" return to "No" when the Web server window is switched.	• No • Yes • Default	No
HTTPS setting	Set this parameter when encrypting the communications with the Web server. (☞ Page 67 HTTPS setting) • HTTP & HTTPS concurrent operation: HTTP and HTTPS communications are possible. • only HTTPS; no HTTP: Only HTTPS communications are possible.	• HTTP & HTTPS concurrent operation • only HTTPS; no HTTP	HTTP & HTTPS concurrent operation
Process alarm	Set whether to detect the Process alarm in the I/O module.	• Disabled (0)*3 • Enabled (1)*3	Disabled
Diagnostic alarm	Set it to "Disabled".	• Disabled (0)*3 • Enabled (1)*3	Disabled

Item	Description	Setting range[*1]	Default
Output behaviour on fieldbus error	Set the output operation when a fieldbus error occurs. • All outputs off: All outputs are turned off. • Enable substitute value: Output is produced according to the substitute value of the output module. • Hold last value: The output status is maintained.	• All outputs off (0) • Enable substitute values (1) • Hold last value (2)	All outputs off
Output behaviour on IDLE state	Setting is not required.		
Module behaviour on hot swap	Set the I/O module operation during Hot swap. • Continue data exchange: The operation of the output module is maintained. • Behaviour like on fieldbus error: The output module is operated according to the setting of Output behaviour on fieldbus error.	• Continue data exchange (0)[*3] • Behaviour like on fieldbus error (1)[*3]	Continue data exchange
Data format	Set how to send communication data. • Motorola: Communication data is sent in big-endian format. • Intel: Communication data is sent in little-endian format.	• Motorola (0)[*3] • Intel (1)[*3]	Intel
Lock force mode	Set whether to enable or disable the ability to switch to the Force mode in the Web server. • Force mode unlocked: Switch to the Force mode is enabled. • Force mode locked: Switch to the Force mode is disabled.	• Force mode unlocked • Force mode locked	Force mode unlocked

*1 Values in brackets for the parameter setting in non-cyclic transmission
*2 Do not set the values out of the setting range.
*3 (0), (1), and (2) are the values set in the register when the digital I/O module is connected to the NZ2FT-EIP.

Precautions

"IP address" and "IP address USB port" cannot be set to the same value. Also, do not set the same value for the network part of the IP address (1st to 3rd octets when the subnet mask is set to 255.255.255.0).

12.7 Access to Process Data

I/O data of the I/O module is stored in Process data, and data communication with the buffer memory of the RJ71EIP91 is performed.

Data configuration

Process data consists of Input data and Output data.

In NZ2FT-EIP, Process data is included in each of Input data and Output data.

Item	Data size	Description
Input data	Variable length (byte)	Input data of the I/O modules connected to the NZ2FT-EIP. The data size varies depending on the connected I/O modules and the number of them. (☞ Page 392 Data width used by the I/O module) A Status word that indicates the status information of the NZ2FT-EIP and Diagnostic data stored by Process alarm data of the I/O modules are assigned before and after Process data. (☞ Page 394 Input data)
Output data	Variable length (byte)	Output data of the I/O modules connected to the NZ2FT-EIP. The data size varies depending on the connected I/O modules and the number of them. (☞ Page 392 Data width used by the I/O module) Control word and Diagnostic data control word used when Process alarm data of the I/O modules is read from the NZ2FT-EIP are assigned before and after Process data. (☞ Page 394 Output data)

Point

- Process data can also be checked from the Web server. (☞ Page 72 "Process data").
- The communication data format can be changed to little-endian or big-endian by setting the parameter. (☞ Page 390 Parameter list)

Data width used by the I/O module

The following table lists the data widths used by each I/O module in the NZ2FT-EIP during Class1 instance communications (constant periodic communications).

I/O module	Process data	
	Input data	Output data
NZ2FTS4-4DE	4 bits	—
NZ2FTS3-8DE	8 bits	—
NZ2FTS1-16DE	16 bits	—
NZ2FTS4-4D	4 bits	—
NZ2FTS3-8D	8 bits	—
NZ2FTS1-16D	16 bits	—
NZ2FTS2-4A	4 bits	—
NZ2FTS4-4TE	—	4 bits
NZ2FTS2-8TE	—	8 bits
NZ2FTS1-16TE	—	16 bits
NZ2FTS4-4T	—	4 bits
NZ2FTS2-8T	—	8 bits
NZ2FTS1-16T	—	16 bits
NZ2FTS3-4R	—	4 bits
NZ2FTS-60AD4	4 words	—
NZ2FTS-60DA4	—	4 words
NZ2FTS-60RD4	4 words	—
NZ2FTS-60TD4	4 words	—
NZ2FTS-D62P2	6 words	6 words
NZ2FTS-D66D1	3 words	—
NZ2FT-C24	8 words	8 words

Assignment to the RJ71EIP91 buffer memory

Process data of the NZ2FT-EIP is stored in the following addresses of the RJ71EIP91 buffer memory by data communication.

Item	Buffer memory address	Description
Class1 input data area	10000H to 17FFFH	The area that stores input data received from each NZ2FT-EIP
Class1 output data area	30000H to 37FFFH	The area that stores output data sent to each NZ2FT-EIP

Each NZ2FT-EIP station is assigned next to the previous NZ2FT-EIP station in the buffer memory, so the data of station n is followed immediately by the allocation of station n+1.

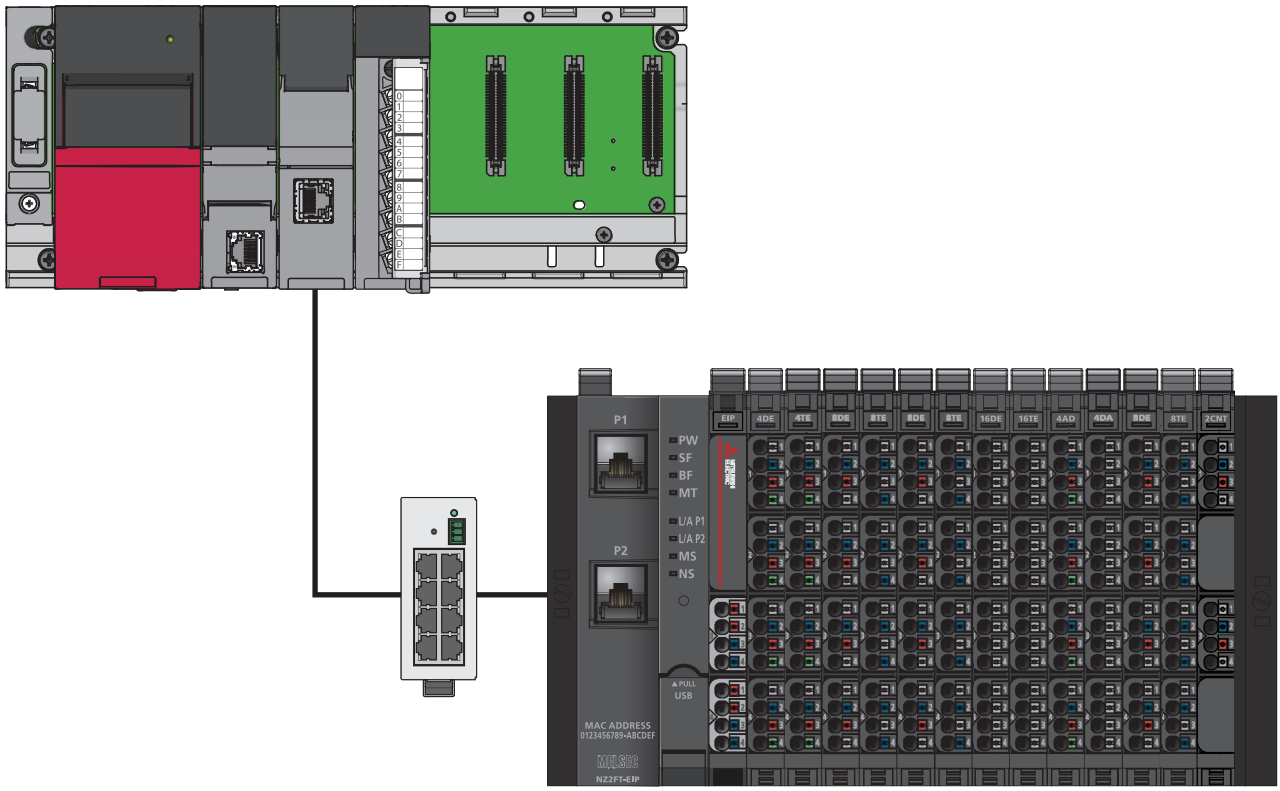
The data length of each NZ2FT-EIP station depends on the system configuration of the station. Therefore, the start address of the second and subsequent NZ2FT-EIP stations is not fixed.

For details on the RJ71EIP91 buffer memory, refer to the following.

MELSEC iQ-R EtherNet/IP Network Interface Module User's Manual (Application)

Ex.

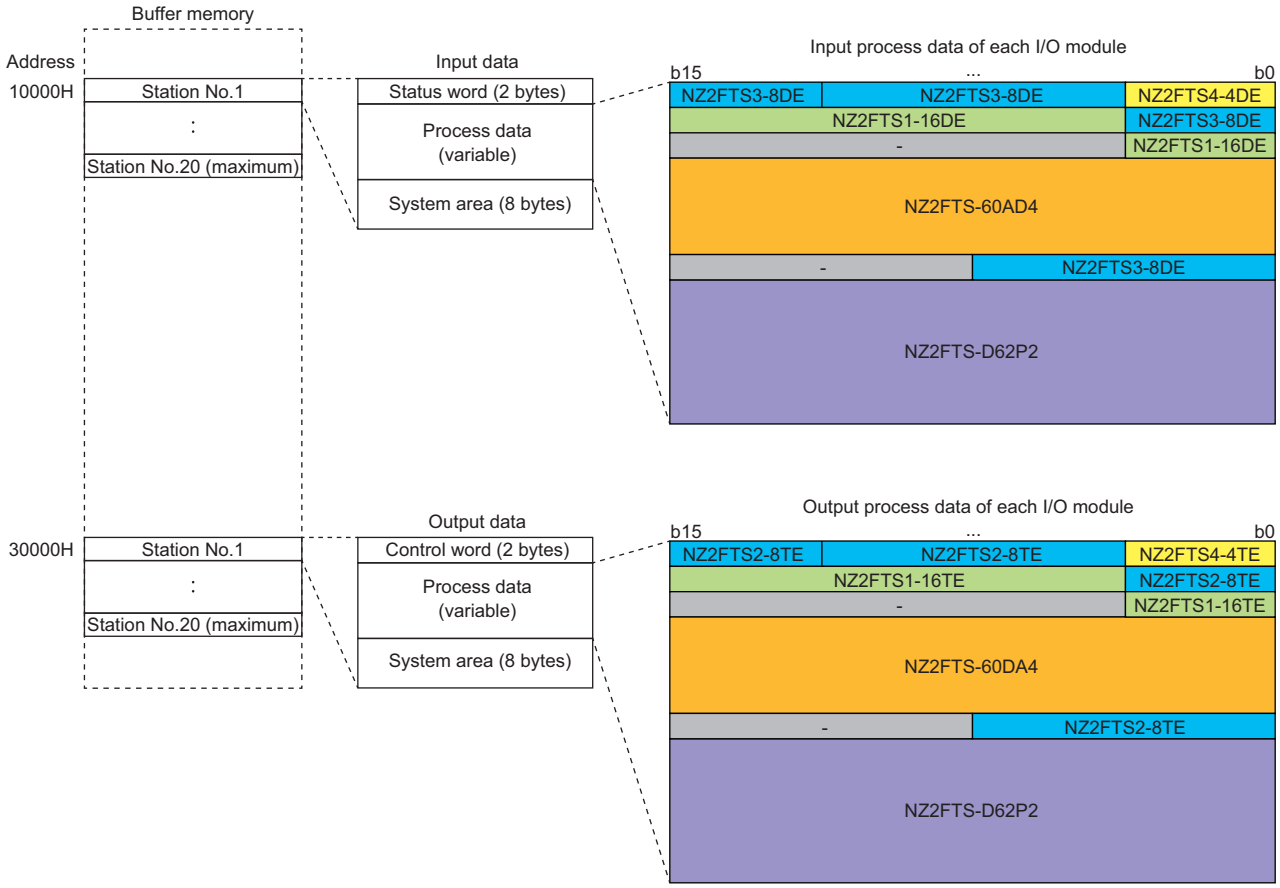
The following system configuration describes the assignment of the RJ71EIP91 buffer memory and the data structure of Process data of NZ2FT-EIP.



(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)

(1) NZ2FTS4-4DE
(2) NZ2FTS4-4TE
(3) NZ2FTS3-8DE
(4) NZ2FTS2-8TE
(5) NZ2FTS3-8DE
(6) NZ2FTS2-8TE
(7) NZ2FTS1-16DE
(8) NZ2FTS1-16TE
(9) NZ2FTS-60AD4
(10) NZ2FTS-60DA4
(11) NZ2FTS3-8DE
(12) NZ2FTS2-8TE
(13) NZ2FTS-D62P2

Input data and Output data of the buffer memory of the RJ71EIP91 are stored for each NZ2FT-EIP station as shown in the following data configuration.



■Input data

- Process data of each I/O module is arranged in order from the mounting position closest to the NZ2FT-EIP.
- The size of Process data of each I/O module depends on the I/O module. (☞ Page 392 Data width used by the I/O module)
- Process data of the NZ2FTS4-4DE uses only 4 bits of b0 to b3. 4 bits of b4 to b7 are deleted and Process data of the next I/O module is assigned next to the previous I/O module.
- Process data of the digital input module and the serial communication module are assigned without blanks in between.
- Process data of the analog module, high-speed counter module, and absolute encoder module with Input data is not assigned in left-aligned increments of a byte or 4 bits, but is arranged from the start of next word.

■Output data

- Process data of each I/O module is arranged in order from the mounting position closest to the NZ2FT-EIP.
- The size of Process data of each I/O module depends on the I/O module. (☞ Page 392 Data width used by the I/O module)
- Process data of the NZ2FTS4-4TE uses only 4 bits of b0 to b3. 4 bits of b4 to b7 are deleted and Process data of the next I/O module is assigned next to the previous I/O module.
- Process data of the digital output module and the serial communication module are assigned without blanks in between.
- Process data of the analog module and high-speed counter module with Output data is not assigned in left-aligned increments of a byte or 4 bits, but is arranged from the start of the next word.

12.8 Program Example of NZ2FT-EIP

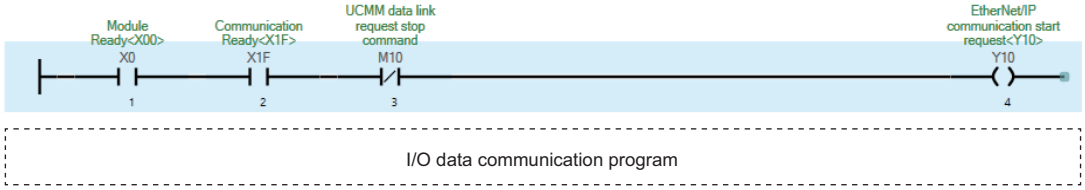
Precautions for programming

In EtherNet/IP transmission programs, interlock is provided with the following device.

• UCMM communication stop command (M10)

The following shows an example of interlock being provided in a communication program through the use of UCMM communication request stop command (M10) of the RJ71EIP91.

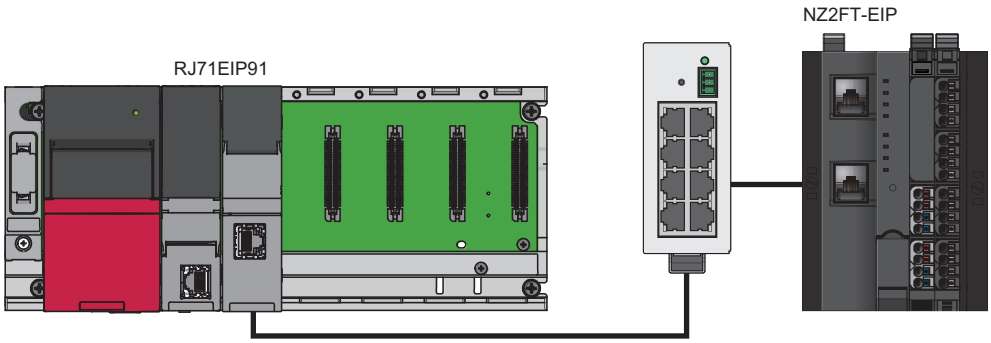
Turning off UCMM communication stop command (M10) executes the UCMM message program.



Example using the NZ2FTS-60AD4

The following example is for a program to read AI values that are obtained from A/D conversion performed on AI 0 (Channel 0) to AI 3 (Channel 3) of the analog input module.

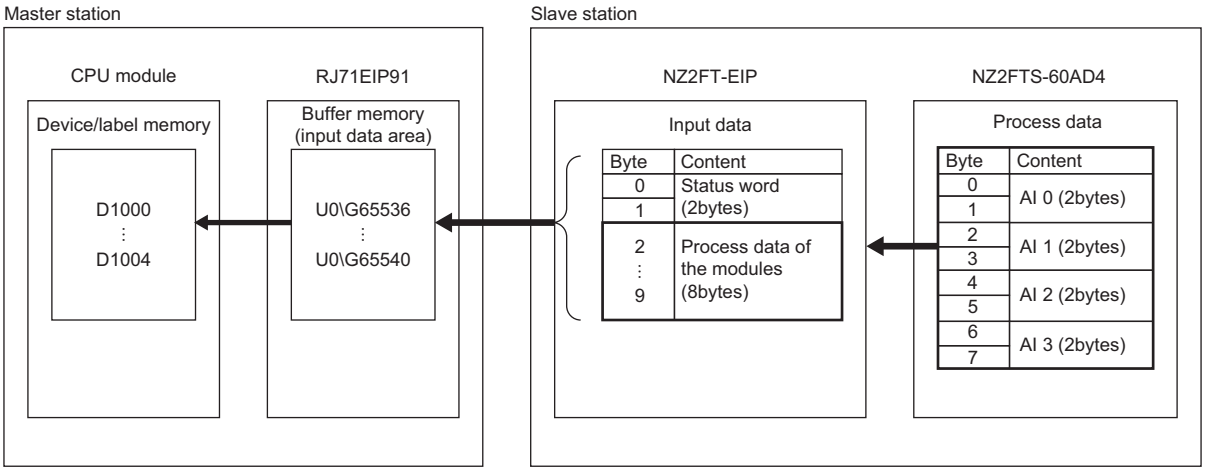
System configuration



Item		Model
Scanner (master station) IP address: 192.168.5.10	CPU module	R04CPU
	Power supply module	R61P
	EtherNet/IP network interface module	RJ71EIP91
Adapter (slave station) IP address: 192.168.5.200	EtherNet/IP coupler	NZ2FT-EIP
	4ch analog input module	NZ2FTS-60AD4

Device assignment

The following figure shows the device assignment in Class1 instance communications. (☞ Page 393 Assignment to the RJ71EIP91 buffer memory)



Scanner (master station) setting

For the setting method of parameters, refer to the following.

☞ Page 388 EtherNet/IP network interface module

Adapter (slave station) settings

Set the parameters of the NZ2FTS-60AD4 as follows. (☞ Page 484 Parameter settings)

Item	Description			
	AI 0 (Channel 0)	**AI 1 (Channel 1)**	**AI 2 (Channel 2)**	**AI 3 (Channel 3)**
Frequency suppression	Disabled			
Data format	High resolution format			
Measurement range	0...20mA	-10...10V	0...20mA	-10...10V

Device used

Device	Description	
X0	Module ready signal	
X10	EtherNet/IP communication start request	
X1F	Communication ready signal	
Y10	EtherNet/IP communication start request signal	
D1001	Class1 instance communications	AI 0
D1002		AI 1
D1003		AI 2
D1004		AI 3
M20		I/O module configuration error
U0\G65536		Status word

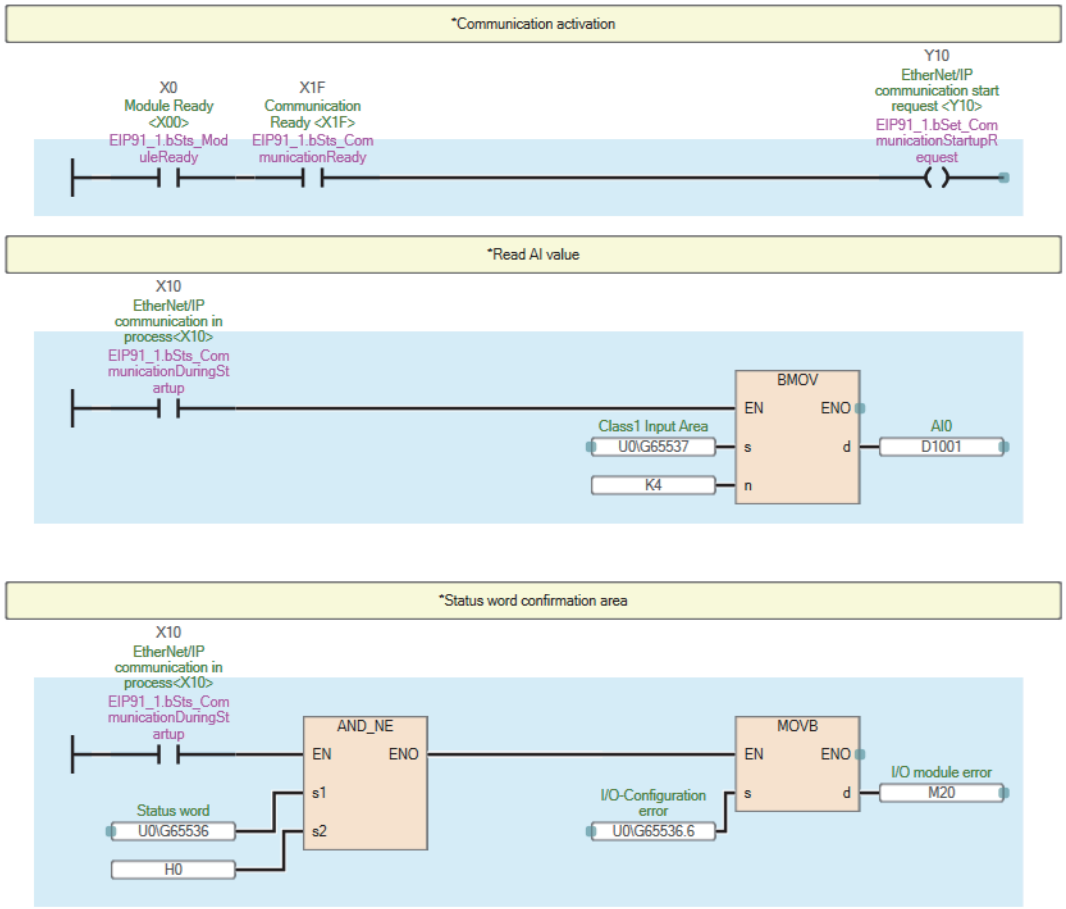
Device	Description	
D3000	UCMM message communications	AI 0
D3001		AI 1
D3002		AI 2
D3003		AI 3
M10		UCMM communication stop command
M100		UCMM command send request
U0\G393281		UCMM communication request command Target IP address (lower order)
U0\G393282		UCMM communication request command Target IP address (higher order)
U0\G393283		UCMM communication request command Service
U0\G393286		UCMM communication request command Class
U0\G393287		UCMM communication request command Instance
U0\G393288		UCMM communication request command Attribute
U0\G393216.0		UCMM communication execution request
U0\G393232.0		UCMM communication execution request acceptance
U0\G393248.0		UCMM communication execution completion

Program example

■Program example of Class1 instance communications

Changing the CPU module status STOP to RUN executes Class1 instance communications.

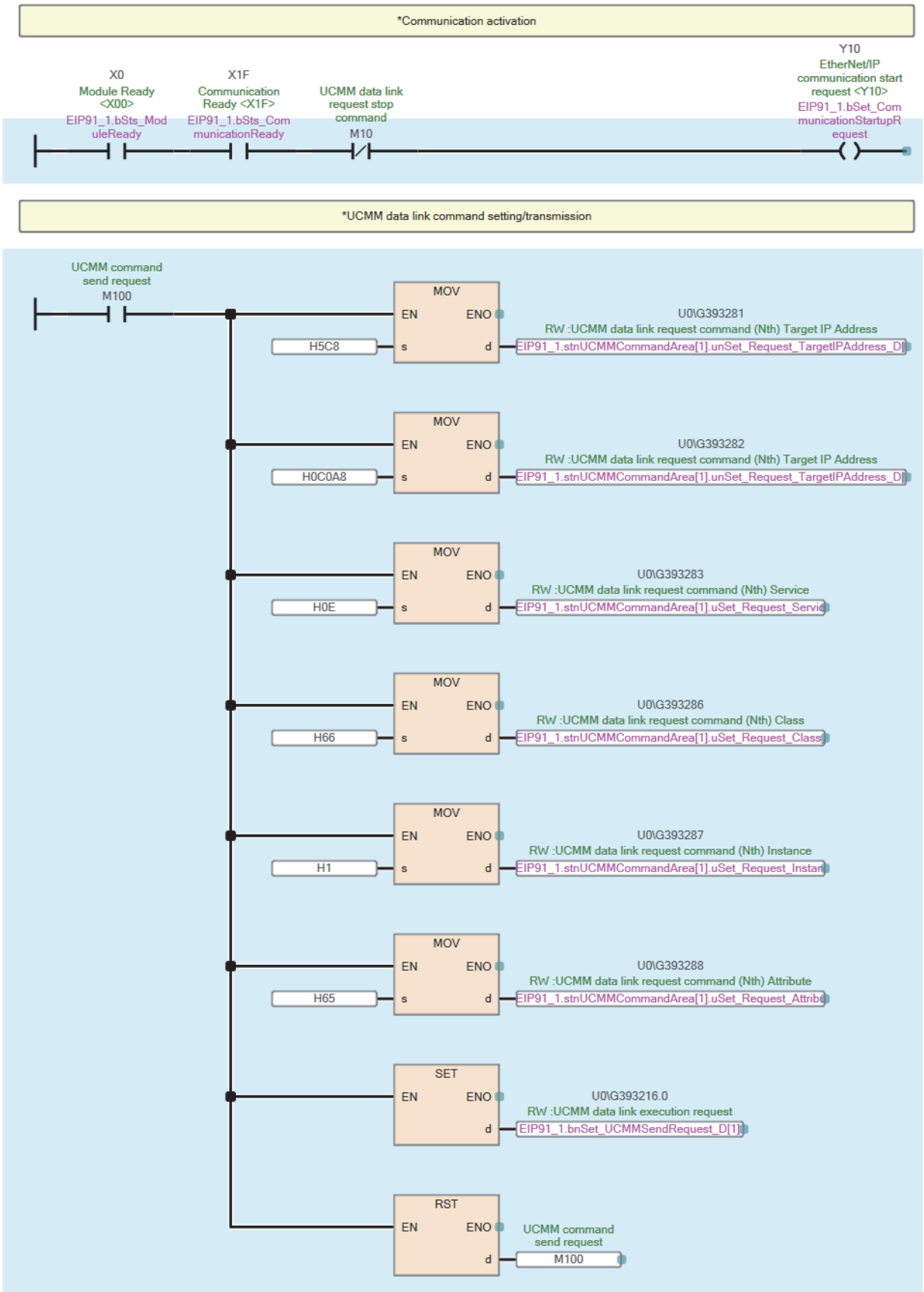
The values of AI 0 to AI 3 are stored in D1001 to D1004.

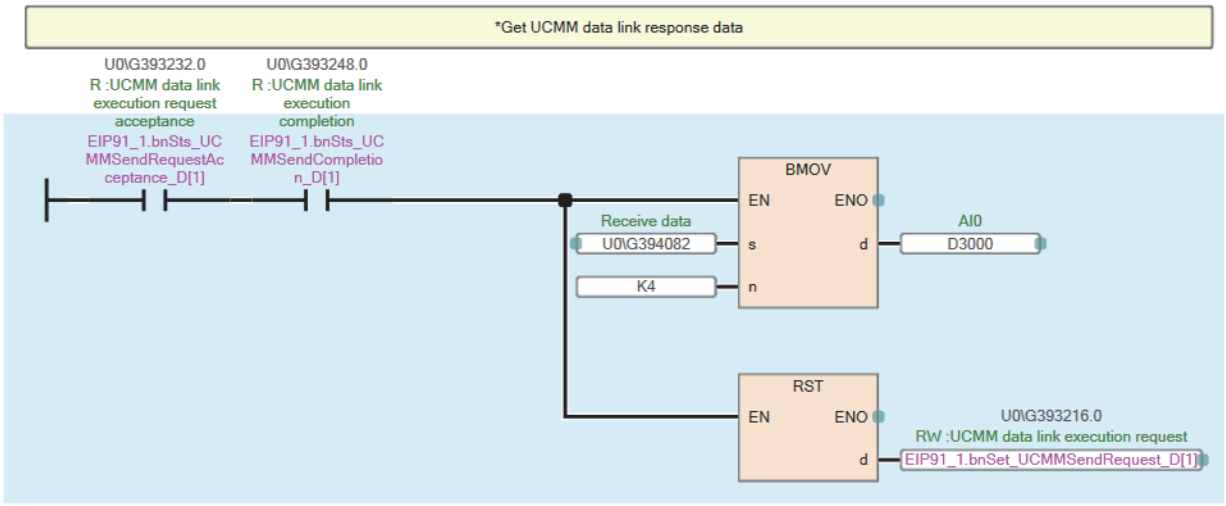


■Program example of UCMM message communications

Turning on UCMM command send request executes UCMM message communications.

The values of AI 0 to AI 3 are stored in D3000 to D3003.

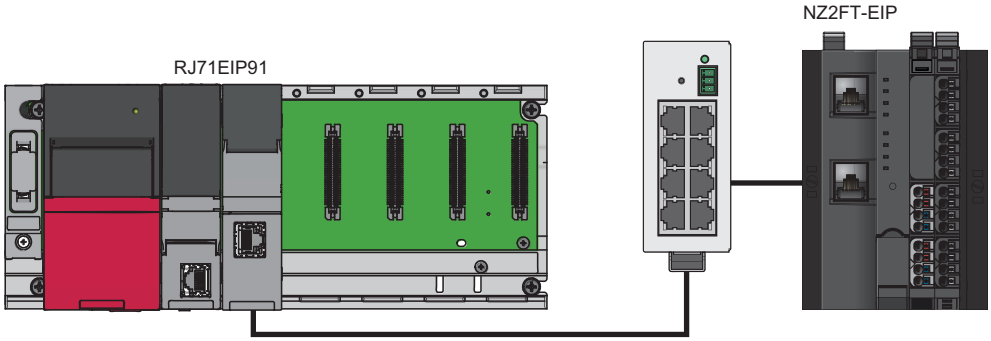



*Get UCMM data link response data
U0\G393232.0
R :UCMM data link execution request acceptance
EIP91_1.bnSts_UCMMSendRequestAcceptance_D[1]
U0\G393248.0
R :UCMM data link execution completion
EIP91_1.bnSts_UCMMSendCompletion_D[1]
BMOV
EN
ENO
Receive data
U0\G394082
s
d
AI0
D3000
K4
n
RST
EN
ENO
U0\G393216.0
RW :UCMM data link execution request
d
EIP91_1.bnSet_UCMMSendRequest_D[1]

Example using the NZ2FTS-60RD4

This program reads Process alarm data when Process alarm occurs in RTD 0 (Channel 0) to RTD 3 (Channel 3) of the temperature input module (Resistance Temperature Detector).

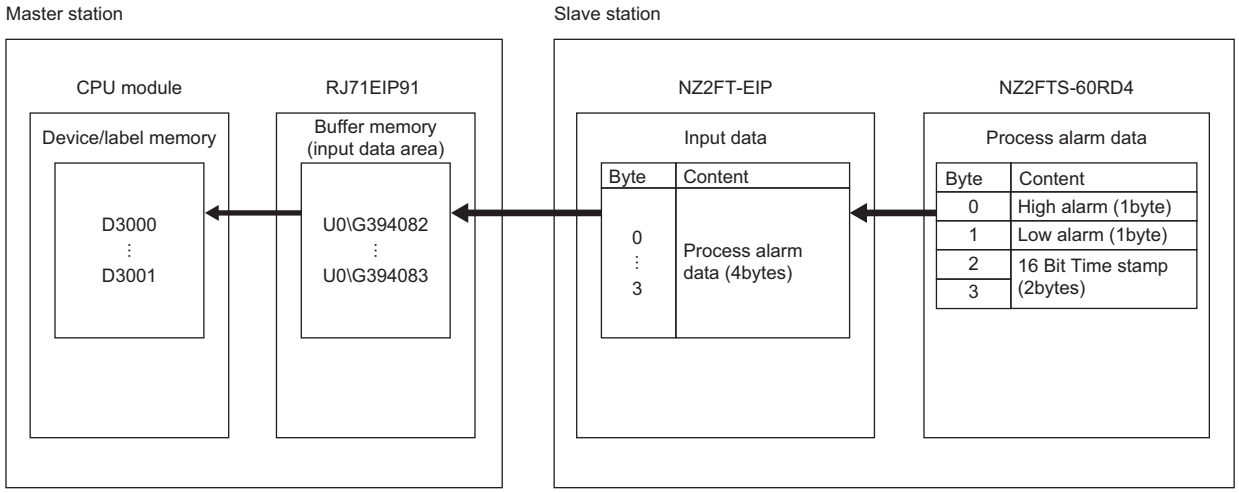
System configuration



Item		Model
Scanner (master station) IP address: 192.168.5.10	CPU module	R04CPU
	Power supply module	R61P
	EtherNet/IP network interface module	RJ71EIP91
Adapter (slave station) IP address: 192.168.5.200	EtherNet/IP coupler	NZ2FT-EIP
	4ch analog temperature input module (RTD)	NZ2FTS-60RD4

Device assignment

The following figure shows the device assignment in UCMM communications. ☞ Page 370 Checking warning output (Process alarm)



Scanner (master station) setting

To refer to Process alarm data, set the connection type at establishment of the EtherNet/IP connection to "Exclusive Owner, Diagnosis Interface".

For the setting method of parameters, refer to the following.

☞ Page 388 EtherNet/IP network interface module

Adapter (slave station) settings

■NZ2FT-EIP

Set the parameters as follows. (☞ Page 390 Parameter list)

Item	Description
IP configuration	Static
IP address	192.168.5.200
Subnet mask	255.255.255.0
Gateway	0.0.0.0
Webserver via Ethernet	Enabled
Save module parameters on coupler	No
Output behaviour on idle state	Setting is not required.
Process alarm	Enabled
Diagnostic alarm	Disabled
Output behaviour on fieldbus error	All outputs off
Module behaviour on hot swap	Continue data exchange
Data format	Intel
Lock force mode	Force mode unlocked

■NZ2FTS-60RD4

Set the parameters as follows. (☞ Page 505 Parameter settings)

Item	Description			
	RTD 0 (Channel 0)	RTD 1 (Channel 1)	RTD 2 (Channel 2)	RTD 3 (Channel 3)
Temperature unit	Degree Celsius			
Measurement range	PT100 -200 ... 850 Degree Celsius	NI100 -60 ... 250 Degree Celsius	Cu10 -100 ... 260 Degree Celsius	Resistance 40 Ohm
Connection type	2-wire	2-wire	2-wire	2-wire
Conversion time	80ms	80ms	80ms	80ms
Channel diagnostics	Disabled	Disabled	Disabled	Disabled
Limit value monitoring	Enabled	Enabled	Enabled	Enabled
High limit value	200.000℃	200.000℃	200.000℃	20.000 Ohm
Low limit value	-200.000℃	-200.000℃	-200.000℃	-20.000 Ohm

Device used

Device	Description	
X0	Module ready signal	
X10	EtherNet/IP communication start request	
X1F	Communication ready signal	
Y10	EtherNet/IP communication start request signal	
D1100 to D1103	UCMM message communications	I/O module mounting position check
D1004		I/O module mounting position setting
D1105		UCMM communication request command Instance setting
D3000		CH0 to 3 High alarm, Low alarm
D3001		16 Bit Time stamp
M10		UCMM communication stop command
M30		Process alarm occurrence area detection request
M31		I/O module mounting position setting
M32		UCMM communication off check
M33		Process alarm data read request
M34		Process alarm data read
M100		UCMM command send request
U0\G393281		UCMM communication request command Target IP address (lower order)
U0\G393282		UCMM communication request command Target IP address (higher order)
U0\G393283		UCMM communication request command Service
U0\G393286		UCMM communication request command Class
U0\G393287		UCMM communication request command Instance
U0\G393288		UCMM communication request command Attribute
U0\G393216.0		UCMM communication execution request
U0\G393232.0		UCMM communication execution request acceptance
U0\G393248.0		UCMM communication execution completion

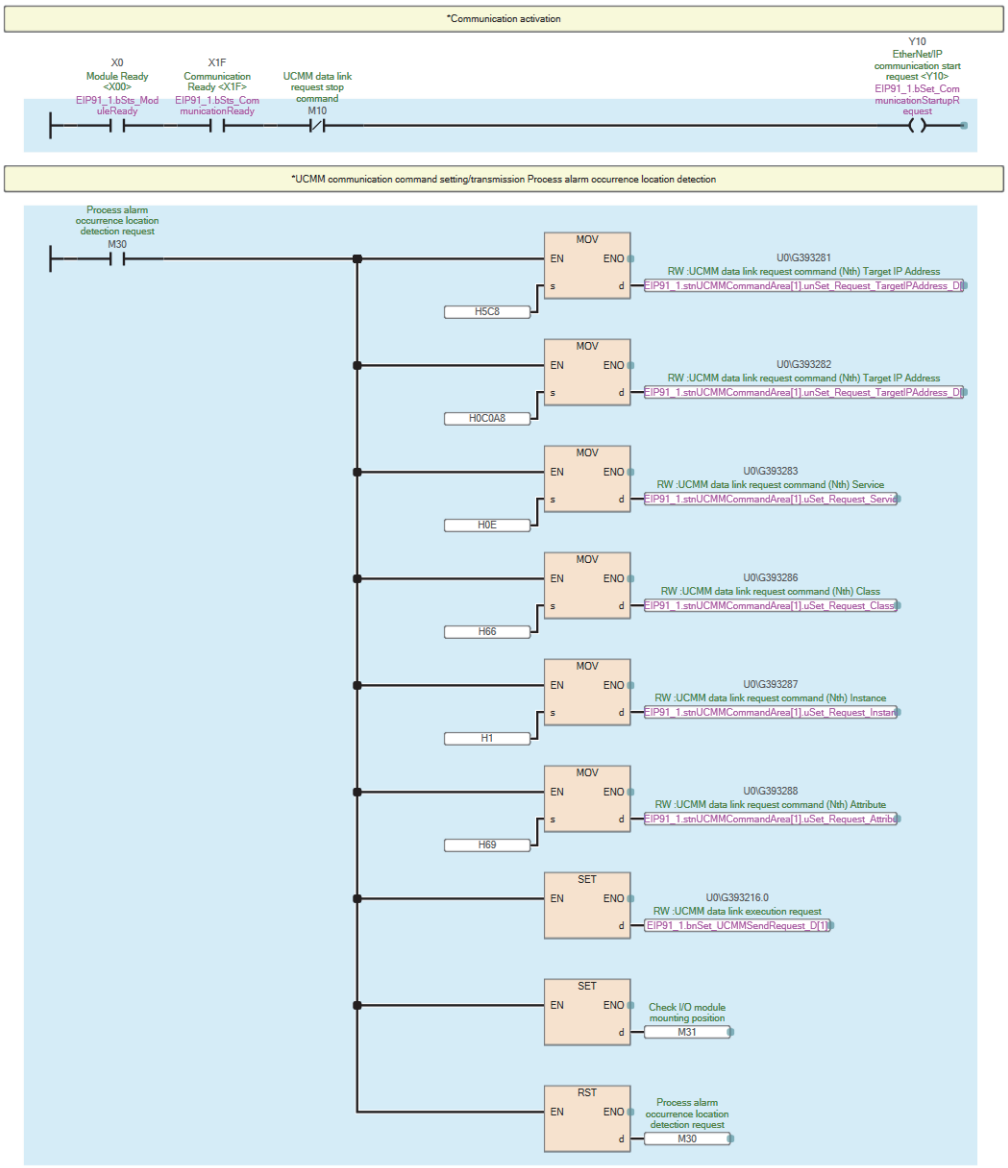
Program example

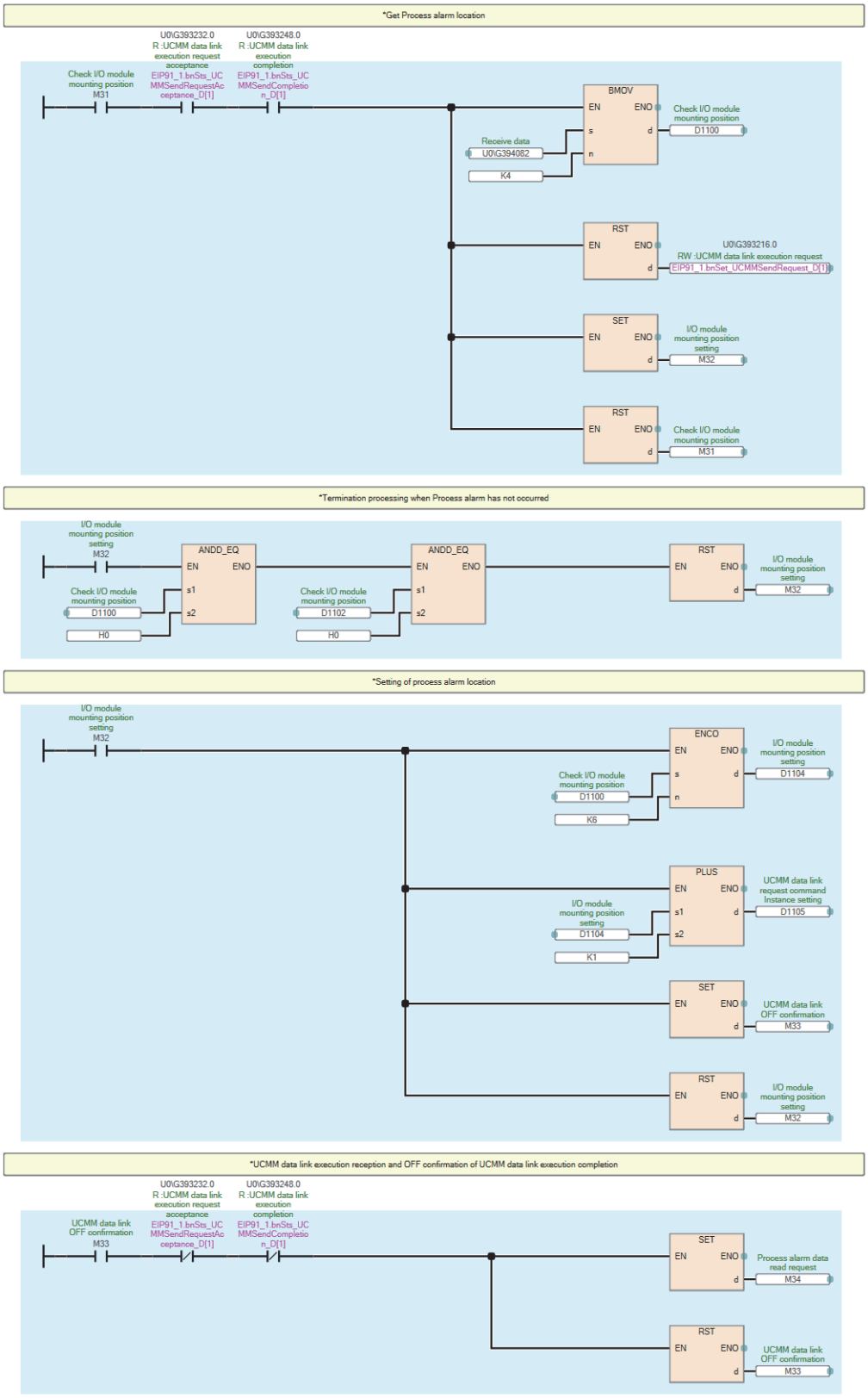
■Program example of UCMM communications

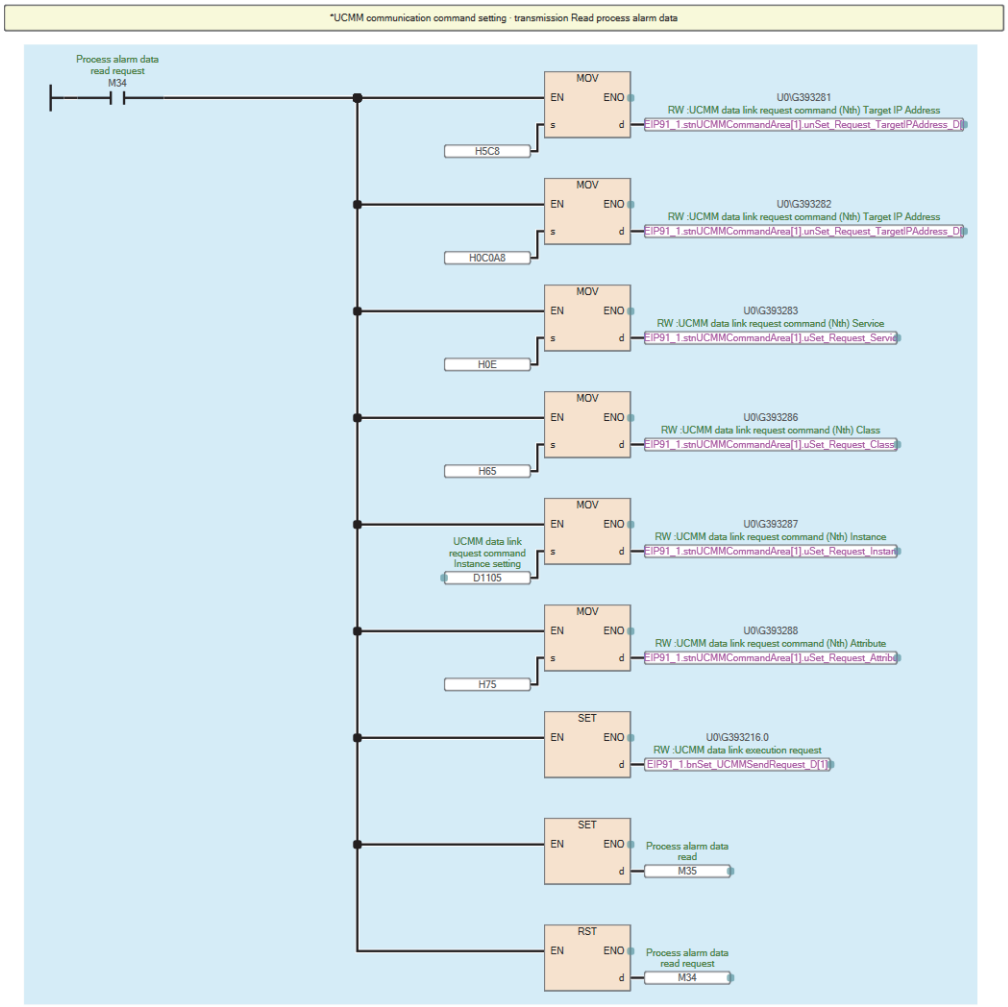
The following example shows a program to execute UCMM message communications by turning on the Process alarm occurrence area detection request.

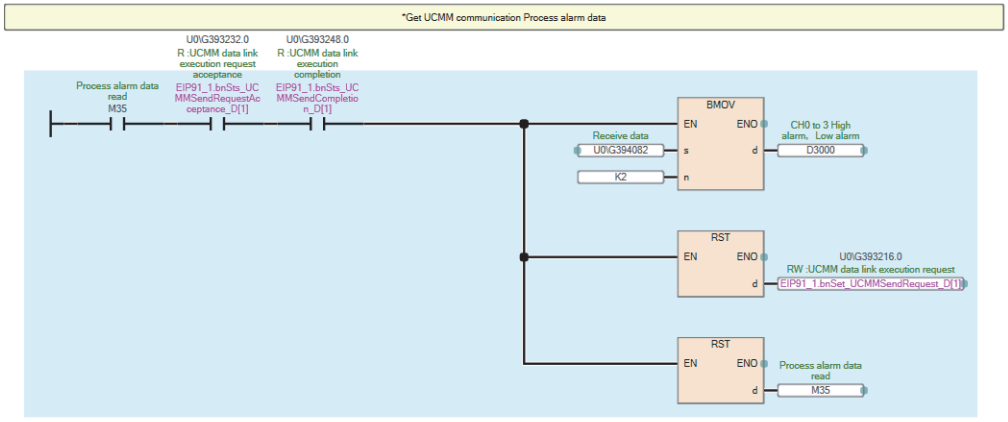
High alarm and Low alarm of RTD 0 to RTD 3 are stored in D3000, and 16 Bit Time stamp is stored in D3001.

To read Process alarm, set b0 in "Control word" of Output data to 1 in advance. (☞ Page 370 How to check Process alarm)




*Get Process alarm location
U0\G393232.0
R :UCMM data link execution request acceptance
EIP91_1.bnSts_UCMMSendRequestAceptance_D[1]
U0\G393248.0
R :UCMM data link execution completion
EIP91_1.bnSts_UCMMSendCompletion_D[1]
Check I/O module mounting position
M31
BMOV
EN
ENO
s
d
n
Receive data
U0\G394082
K4
Check I/O module mounting position
D1100
RST
U0\G393216.0
RW :UCMM data link execution request
EIP91_1.bnSet_UCMMSendRequest_D[1]
SET
I/O module mounting position setting
M32
RST
Check I/O module mounting position
M31
*Termination processing when Process alarm has not occurred
I/O module mounting position setting
M32
ANDD_EQ
s1
s2
Check I/O module mounting position
D1100
H0
Check I/O module mounting position
D1102
H0
RST
I/O module mounting position setting
M32
*Setting of process alarm location
I/O module mounting position setting
M32
ENCO
Check I/O module mounting position
D1100
K6
I/O module mounting position setting
D1104
PLUS
I/O module mounting position setting
D1104
K1
UCMM data link request command Instance setting
D1105
SET
UCMM data link OFF confirmation
M33
RST
I/O module mountng position setting
M32
*UCMM data link execution reception and OFF confirmation of UCMM data link execution completion
U0\G393232.0
R :UCMM data link execution request acceptance
EIP91_1.bnSts_UCMMSendRequestAceptance_D[1]
U0\G393248.0
R :UCMM data link execution completion
EIP91_1.bnSts_UCMMSendCompletion_D[1]
UCMM data link OFF confirmation
M33
SET
Process alarm data read request
M34
RST
UCMM data link OFF confirmation
M33


*UCMM communication command setting · transmission Read process alarm data
Process alarm data read request M34
MOV
EN
ENO
s
d
H5C8
U0\G393281
RW :UCMM data link request command (Nth) Target IP Address
EIP91_1.stnUCMMCommandArea[1].unSet_Request_TargetIPAddress_D[1]
H0C0A8
U0\G393282
RW :UCMM data link request command (Nth) Target IP Address
EIP91_1.stnUCMMCommandArea[1].unSet_Request_TargetIPAddress_D[1]
H0E
U0\G393283
RW :UCMM data link request command (Nth) Service
EIP91_1.stnUCMMCommandArea[1].uSet_Request_Service
H65
U0\G393286
RW :UCMM data link request command (Nth) Class
EIP91_1.stnUCMMCommandArea[1].uSet_Request_Class
UCMM data link request command Instance setting
D1105
U0\G393287
RW :UCMM data link request command (Nth) Instance
EIP91_1.stnUCMMCommandArea[1].uSet_Request_Instance
H75
U0\G393288
RW :UCMM data link request command (Nth) Attribute
EIP91_1.stnUCMMCommandArea[1].uSet_Request_Attribute
SET
U0\G393216.0
RW :UCMM data link execution request
EIP91_1.bnSet_UCMMSendRequest_D[1]
Process alarm data read
M35
RST
Process alarm data read request
M34


*Get UCMM communication Process alarm data
Process alarm data read
M35
U0\G393232.0
R :UCMM data link execution request acceptance
EIP91_1.bnSts_UCMMSendRequestAcceptance_D[1]
U0\G393248.0
R :UCMM data link execution completion
EIP91_1.bnSts_UCMMSendCompletion_D[1]
BMOV
EN
ENO
s
d
n
Receive data
U0\G394082
K2
CH0 to 3 High alarm, Low alarm
D3000
RST
U0\G393216.0
RW :UCMM data link execution request
EIP91_1.bnSet_UCMMSendRequest_D[1]
Process alarm data read
M35

12.9 Troubleshooting

This section describes troubleshooting of the NZ2FT-EIP.

Point

If troubleshooting does not solve the problem, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Checking with LEDs

When the PW LED turns off

Check the following items in order from the top.

Item	Action
Is the module status LED of the I/O module on in green?	Repair or replace the NZ2FT-EIP. The possible cause is an internal fuse failure.
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 of the external power supply within the range of performance specifications.

When the SF LED turns on in red

Check the following items in order from the top.

Item	Action
Is the latest EDS file in use?	Use the latest EDS file.
Are the station settings matched with the actual settings?	Match the station settings with the actual settings.
Is the electronic unit part detached?	Insert the electronic unit part.
Are the NZ2FT-EIP and I/O module connected with no clearance between them?	Connect the NZ2FT-EIP and the I/O module with no clearance between them.

When the SF LED is flashing in red

Check the following item.

Item	Action
Has the Force mode been selected?	The NZ2FT-EIP is in Force mode. Clear the Force mode.

When the BF LED turns on in red

Check the following items in order from the top.

Item	Action
Are the Ethernet cables between the RJ71EIP91, the hub, and the NZ2FT-EIP inserted as far as they will go?	Push in the Ethernet cable of each connection section until it clicks.
Has the Ethernet cable been disconnected?	Replace the Ethernet cable.
Are there any mistakes in the parameter settings of RJ71EIP91 and NZ2FT-EIP?	Review the IP address setting of the RJ71EIP91 and the following parameters for the NZ2FT-EIP. • Parameter "IP address" • Parameter "Subnet mask" • Parameter "Gateway" • Parameter "IP configuration"
Is the firmware version appropriate?	Check the firmware version of the master module and NZ2FT-EIP. Update the firmware if necessary.
Is the EtherNet/IP communication start request signal of RJ71EIP91 operating?	Check the EtherNet/IP communication start request signal.
Has an error occurred in the RJ71EIP91?	Follow the manual of the RJ71EIP91 and perform troubleshooting.

When the BF LED is flashing in red

Check the following items in order from the top.

Item	Action
Is the latest EDS file in use?	Use the latest EDS file.
Are the station settings matched with the actual settings?	Match the station settings with the actual settings.
Is the electronic unit part detached?	Insert the electronic unit part.
Are the NZ2FT-EIP and I/O module connected with no clearance between them?	Connect the NZ2FT-EIP and the I/O module with no clearance between them.
Is a firmware update in progress?	Wait for the firmware update to end.

When the MT LED turns on in yellow

Check the following items in order from the top.

Item	Action
Is the I/O module mounted?	Mount the I/O module again by pressing it to the NZ2FT-EIP until it clicks.

When the L/A P1 LED and L/A P2 LED turn off

Check the following items in order from the top.

Item	Action
Is the Ethernet cable connected correctly?	Push in the Ethernet cable of each connection section until it clicks.
Has the Ethernet cable been disconnected?	Replace the Ethernet cable.

When the MS LED turns on in red

Check the following item.

Item	Action
Does the I/O module configuration set in the NZ2FT-EIP match the actual configuration?	An I/O module configuration error has occurred. Match the setting to the actual configuration.

When the MS LED is flashing in red

Check the following items in order from the top.

Item	Action
Is there a duplicate IP address?	Solve the duplicate IP address.
Is new Diagnostic data displayed?	Check the error status with the Web server, and take corrective action.

When the NS LED turns on in red

Check the following item.

Item	Action
Is there a duplicate IP address?	Solve the duplicate IP address.

When the NS LED is flashing in red

The possible cause is a timeout of the Exclusive Owner connection[*1].

Check the following items in order from the top.

Item	Action
Is the Ethernet cable of the RJ71EIP91 inserted as far as it will go?	Push in the Ethernet cable of the RJ71EIP91 until it clicks.
Is heavy load applied to the network?	Divide the network.
Is the EtherNet/IP connection timeout set appropriately?	Check the connection setting for the connection destination.

*1 The Exclusive Owner connection is a connection that allows sending data from the NZ2FT-EIP to the RJ71EIP91 and receiving data from the RJ71EIP91 to the NZ2FT-EIP to be set simultaneously.

When the NS LED is flashing in green

Check the following items in order from the top.

Item	Action
Is the Ethernet cable of the NZ2FT-EIP inserted as far as it will go?	The EtherNet/IP connection has not been established. Push in the Ethernet cable of the NZ2FT-EIP until it clicks.
Check for errors in the line status.	The EtherNet/IP connection has not been established. The line may be busy, so retry at a later time.

When the following LEDs turn on in red

- Power supply LED
- Input power supply LED 3.2
- Output power supply LED 4.2
- Input power supply internal protection circuit LED 3.4
- Output power supply internal protection circuit LED 4.4

Check the following item.

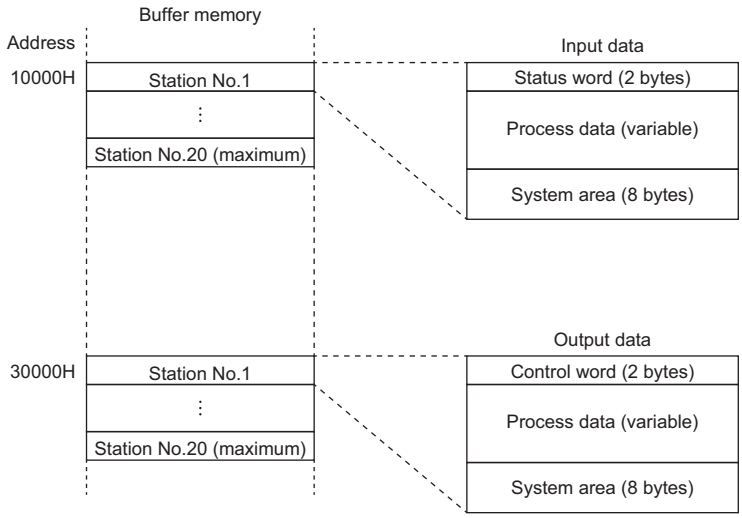
Item	Action
Is the voltage of the external power supply (24VDC) within the specified range?	The power supply voltage is less than 18VDC. Set the voltage value within the range of performance specifications. If the problem persists, the possible cause is an internal fuse failure. Replace the NZ2FT-EIP.

Confirmation by status information (Status word)

The following describes assignment to the buffer memory, data configuration, and referring method of Status word of the NZ2FT-EIP.

Assignment of the master module to the buffer memory

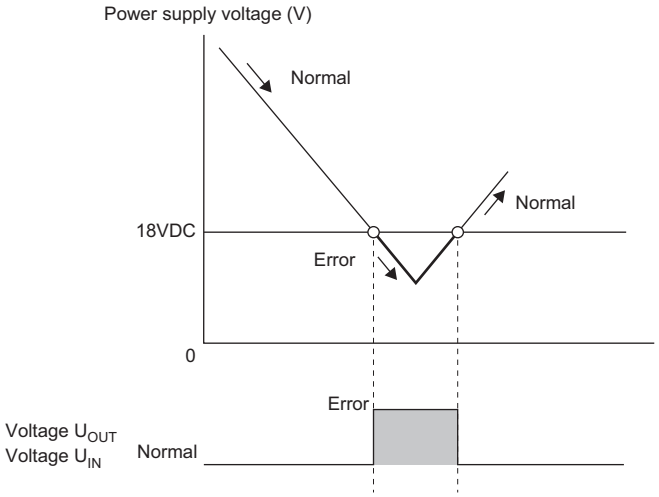
Status word is stored in the start of Input data.



Data configuration

■Status word

Bit	Item	Description
0	Error bit 0	System area
1	Module sequence not clear	0: Normal (A disconnected I/O module has been reconnected.) 1: Two or more I/O modules are disconnected during operation.
2	Error bit 2	System area
3	System bus error	Indicates the System bus status. 0: Normal 1: Error
4	Errorbit 4	System area
5	Unacknowledged process alarm	Indicates whether the status of "Process alarm" of the I/O module has changed. ■When Process alarm is Disabled 0: Process alarm is not monitored. ■When Process alarm is Enabled 0: All I/O modules are normal, Process alarm data of all I/O modules has been checked, or Process alarm of all I/O modules whose status had changed has been read. 1: There is an I/O module whose status change is not checked.
6	I/O-Configuration error	NZ2FT-EIP configuration error 0: Normal 1: Error This bit is set to 1 when the configuration information saved in the NZ2FT-EIP does not match with the current configuration information. During I/O module replacement, this bit is set to 1 when the module is disconnected and is set to 0 when a new module is mounted.
7 to 9	Error bit 7 to 9	System area
10	Force mode active	0: Unexecuted 1: In the Force mode
11 to 12	Error bit 11 to 12	System area

Bit	Item	Description
13	Voltage U_{OUT} error	Detection of an error in the external power supply voltage for output/input 0: Normal 1: Error  The threshold is less than the power supply voltage 18VDC.
14	Voltage U_{IN} error	
15	Error bit 15	System area

How to check Status word

■GX Works3

Check the buffer memory address of "Status word" on the monitor. (☞ Page 410 Assignment of the master module to the buffer memory).

■Web server

It is displayed in decimal in "Coupler status" of "General information" of the NZ2FT-EIP. (☞ Page 71 "Component view")

Troubleshooting by symptom

Cannot communicate with RJ71EIP91

Check the following item.

Item	Action
Are the L/A P1 LED and L/A P2 LED of the NZ2FT-EIP on or flashing?	If they are off, perform troubleshooting by checking the LEDs. Also, check other LEDs. (☞ Page 407 Checking with LEDs)
Is the BF LED on the NZ2FT-EIP off?	If it is not off, perform troubleshooting by checking the LEDs. Also, check other LEDs. (☞ Page 407 Checking with LEDs)
Is the voltage of the power supply (24VDC) of the NZ2FT-EIP within the specified range?	Set the voltage value within the range of performance specifications.
Is the wiring between the RJ71EIP91 and NZ2FT-EIP appropriate?	Review the wiring between the RJ71EIP91 and NZ2FT-EIP. (☞ Page 46 Wiring of network cable).
Are the parameters correct?	Check the parameters. (☞ Page 388 Parameter Setting).
Are the IP address and subnet mask set correctly?	Review the IP address and subnet mask. If the settings have been changed, turn off and on the NZ2FT-EIP.

If communication is not established with the RJ71EIP91 even after checking all of the above and checking with the LEDs of the I/O module and Web server, there is a risk of hardware failure in the NZ2FT-EIP.

Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

PART 3 I/O MODULE

This part consists of the following chapters.

13 OVERVIEW OF I/O MODULES

14 DIGITAL INPUT MODULE

15 DIGITAL OUTPUT MODULE

16 ANALOG INPUT MODULE

17 ANALOG OUTPUT MODULE

18 TEMPERATURE INPUT MODULE

19 HIGH-SPEED COUNTER MODULE

20 ABSOLUTE ENCODER MODULE

21 SERIAL COMMUNICATION MODULE

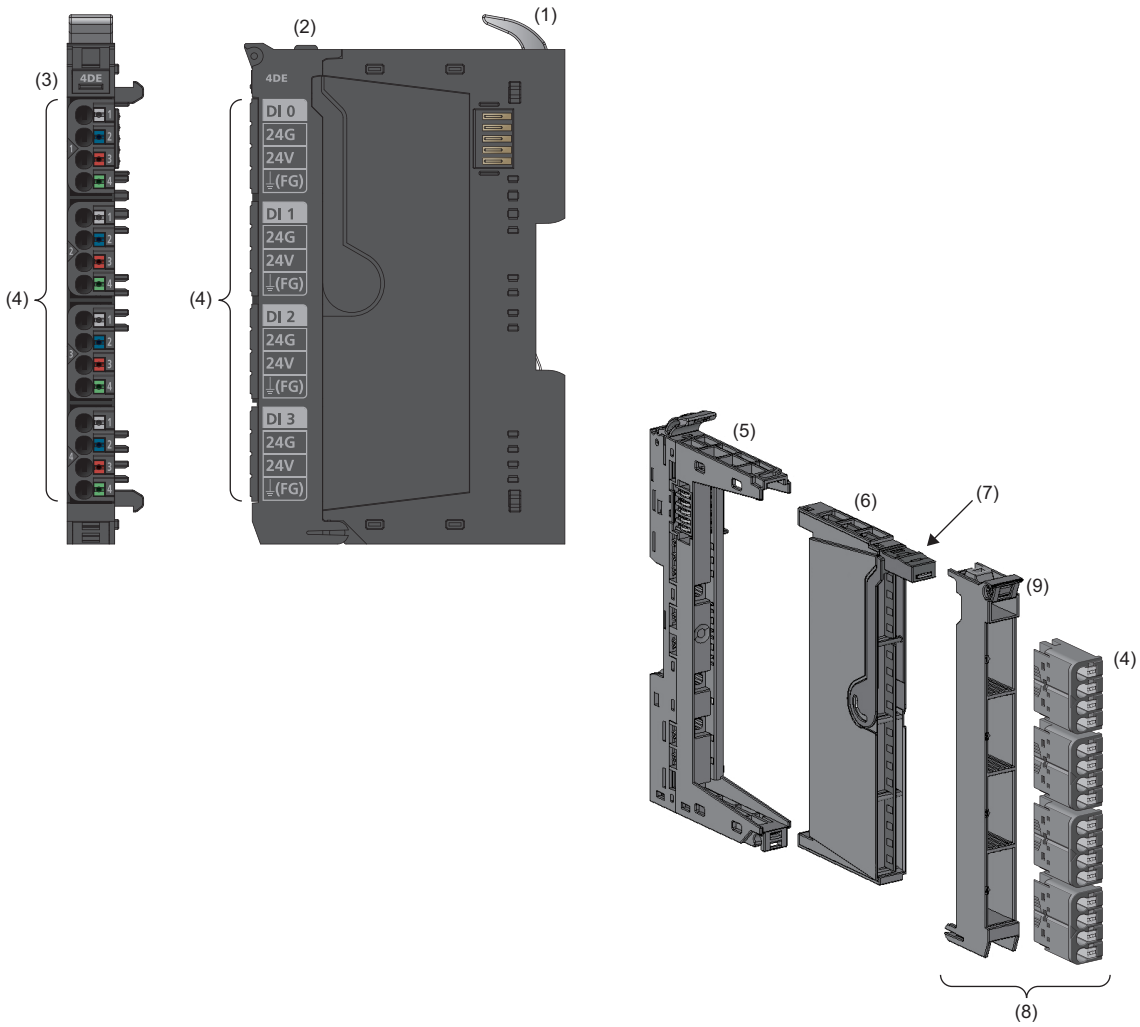
22 EXTENSION POWER SUPPLY MODULE

13 OVERVIEW OF I/O MODULES

13.1 I/O Module Common Part Names

This section describes the names of the parts common to each I/O module.

Ex.
For the NZ2FTS4-4DE



No.	Name	Description
(1)	DIN rail fixing lever	Removes/attaches the module from/to a DIN rail. (☞ Page 38 Installation procedure of modules)
(2)	Connector frame open button	Opens the connector frame. (☞ Page 52 Connector replacement)
(3)	Module status LED	Indicates the communication and operating status of the module.
(4)	Connector part	Connects external devices. (☞ Page 44 Connector part)
(5)	Base unit	Fixes the electronic unit part and plug-in unit part in place.
(6)	Electronic unit part	Performs I/O data operation.
(7)	Electronic unit part removal lever	Is used to remove the electronic unit part. (☞ Page 55 Procedure for Hot swap)
(8)	Plug-in unit part	Connector and connector frame.
(9)	Connector frame	Fixes the connector in place.

For the module status LED and LEDs on each connector, refer to the description of each I/O module.

MEMO

14 DIGITAL INPUT MODULE

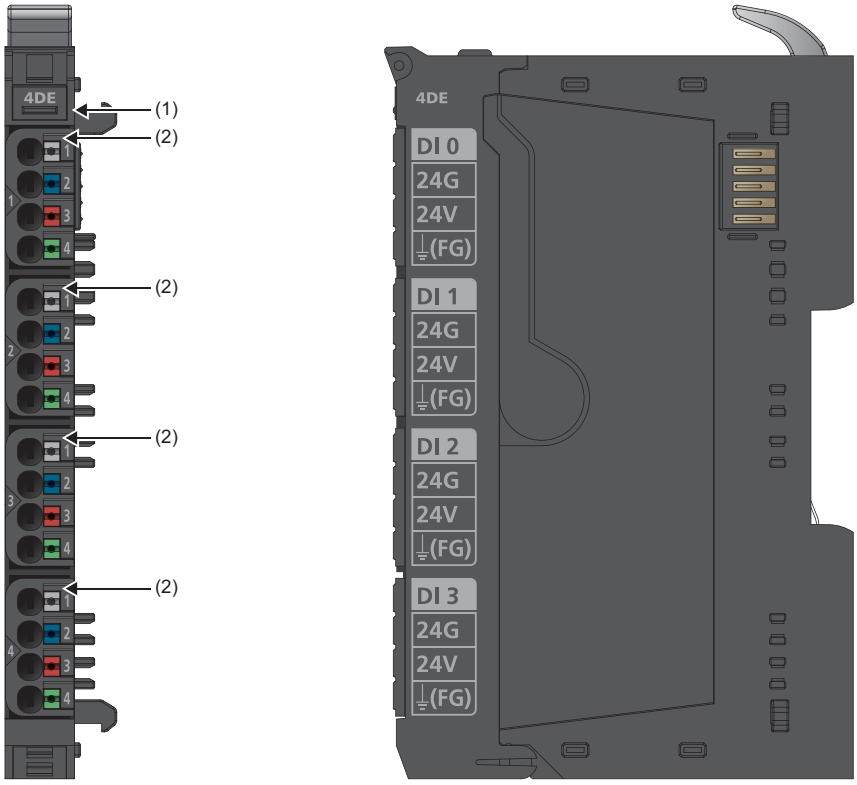
This chapter describes the details of each digital input module.

14.1 NZ2FTS4-4DE

This is a 4-wire digital input module with 24VDC negative common input at four input points.

Part names

This section describes the name of each LED of the NZ2FTS4-4DE. (☞ Page 414 I/O Module Common Part Names)

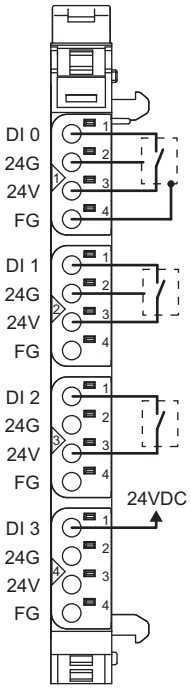


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 445 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the input ON/OFF state of each channel. On in yellow: Input is on. Off: Input is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS4-4DE and external devices.

Ex.



To supply 24V from an external power supply, connect 24G of the external power supply to 24G of a coupler.

Performance specifications

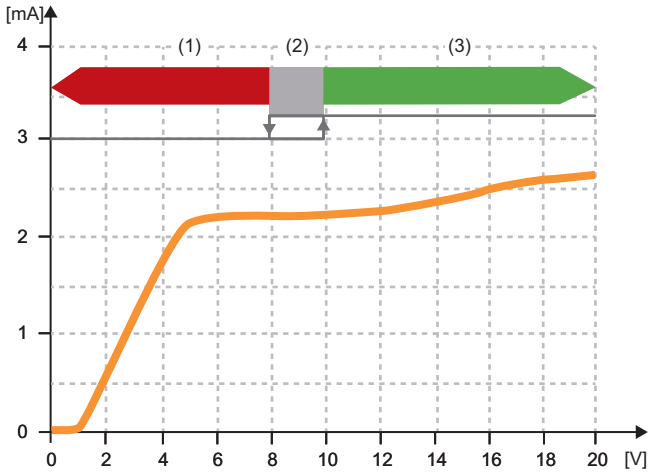
This section describes the performance specifications of the NZ2FTS4-4DE. (☞ Page 30 General Specifications)

Item	NZ2FTS4-4DE
System bus transfer speed	48Mbps
Number of points	4
Input type	Negative common type, compliant with IEC 61131-2 Type 1 and Type 3
Input filter	Input delay time: Adjustable between 0ms and 40ms*1 (☞ Page 419 Input delay function and parameter setting) (A pulse width shorter than 10ms cannot be taken in as an input.)
L level input voltage	Less than +5V compared to input power supply voltage U_{IN} 0V
H level input voltage	More than +11V compared to input power supply voltage U_{IN} 0V
Supply to external device	2A maximum per circuit, 8A in total
External device connection method	2-wire, 3-wire, 3-wire + FG
Reverse polarity protection	Provided
Module diagnostics	Provided
External power supply voltage	24VDC +20%/-15%
Module current consumption	30mA
Weight	94g

*1 For PROFIBUS-DP, up to 20ms

Current-voltage characteristic

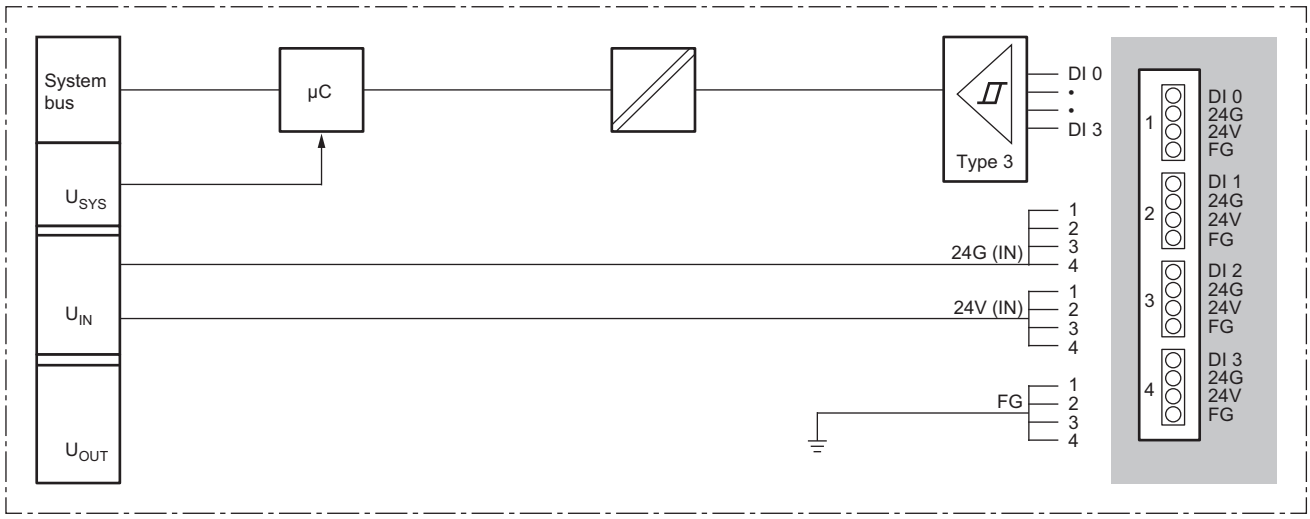
The following figure shows the current-voltage characteristic of the NZ2FTS4-4DE.



(1) The input signal turns off.
(2) 7.9 to 9.9V is the hysteresis width.
(3) The input signal turns on.

Block diagram

The following figure shows the internal block diagram of the NZ2FTS4-4DE.



Input delay function and parameter setting

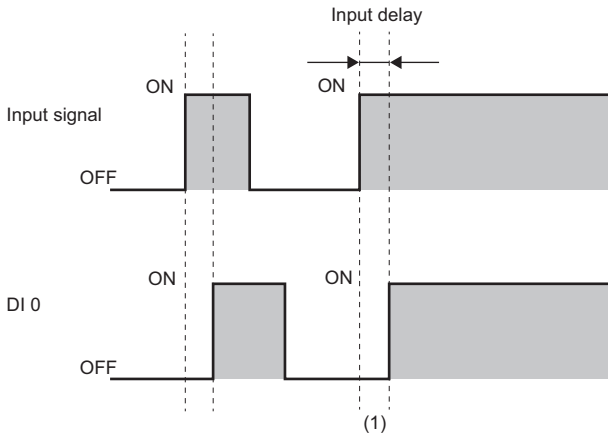
The input module may take in noise as an input depending on the pulse width of the signal. To avoid taking in such noise, set the Input delay time in the parameter setting of the NZ2FTS4-4DE.

Item		Description	Setting range*1
DI 0 (Channel 0)	Input delay	Delays input by the specified length of time.	• No(0) • 0.3ms (1)*2 • 3ms (2) • 10ms (3) • 20ms (4) • 40ms (5)*2 (Default: 3ms)
DI 1 (Channel 1)			
DI 2 (Channel 2)			
DI 3 (Channel 3)			

*1 (0) to (5) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

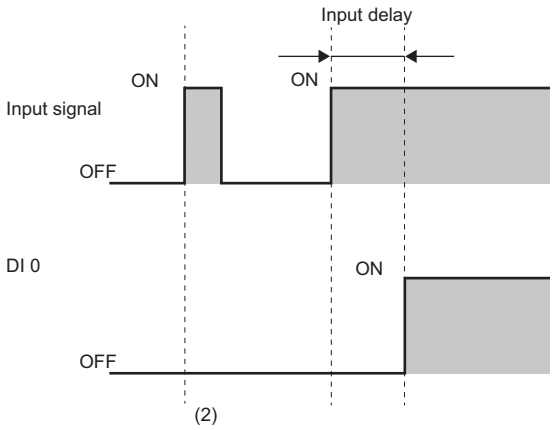
*2 These cannot be set with the NZ2FT-PBV.

• When a short Input delay time is set



(1) Change of the input signal is quickly followed.

• When a long Input delay time is set



(2) Change of the input signal that persists for a short time period (less than Input delay time) is not loaded.

Point

The input module may take in noise as an input depending on the pulse width of the signal. The pulse width that can be taken in as an input varies depending on the setting of the parameter "Input delay". Consider the following when setting the Input delay time.

- Pulse widths shorter than 10ms cannot be taken in as inputs.
- The boundary of the pulse width that can be taken in is about 110% of the Input delay time, so set a pulse width sufficiently longer than that.
- Fully consider the operating environment when setting the Input delay time.

Process data

The following table lists the Process data of the NZ2FTS4-4DE.

Input/ Output	Address (byte)	Bit	Description
Input	0	b0	DI 0 (Channel 0)
		b1	DI 1 (Channel 1)
		b2	DI 2 (Channel 2)
		b3	DI 3 (Channel 3)
		b4	System area
		b5	System area
		b6	System area
		b7	System area

Troubleshooting

For troubleshooting the NZ2FTS4-4DE, refer to the following.

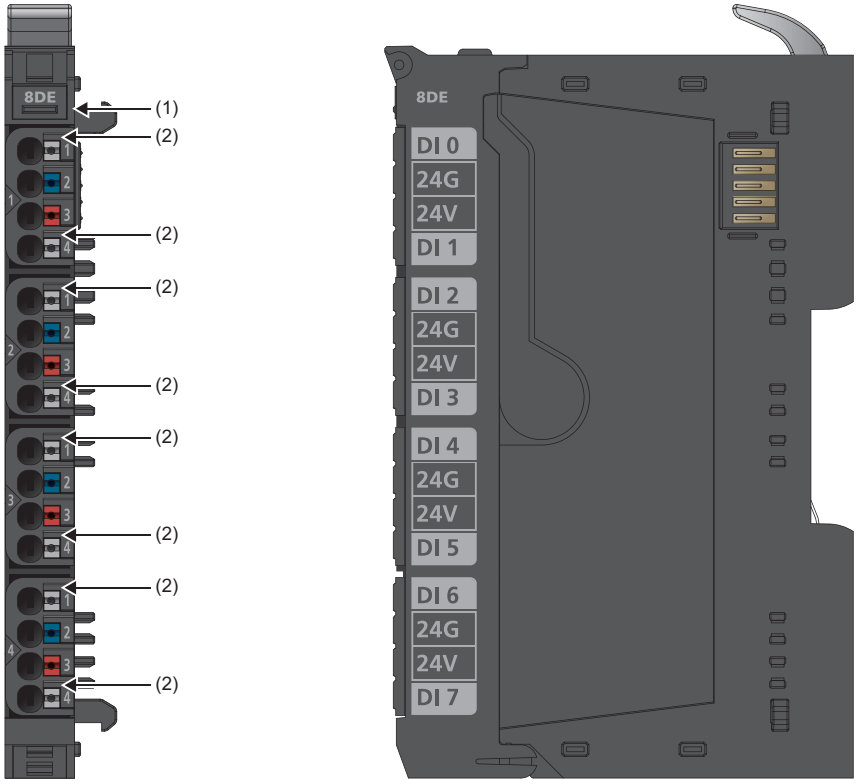
☞ Page 445 Troubleshooting for Digital Input Modules

14.2 NZ2FTS3-8DE

This is a 3-wire digital input module with 24VDC negative common input at eight input points.

Part names

This section describes the name of each LED of the NZ2FTS3-8DE. (☞ Page 414 I/O Module Common Part Names)

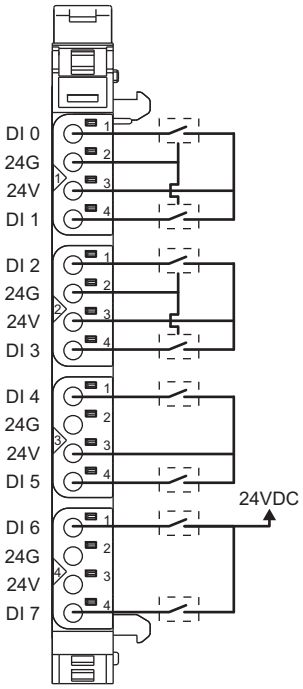


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 445 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the input ON/OFF state of each channel. On in yellow: Input is on. Off: Input is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS3-8DE and external devices.

Ex.



To supply 24V from an external power supply, connect 24G of the external power supply to 24G of a coupler.

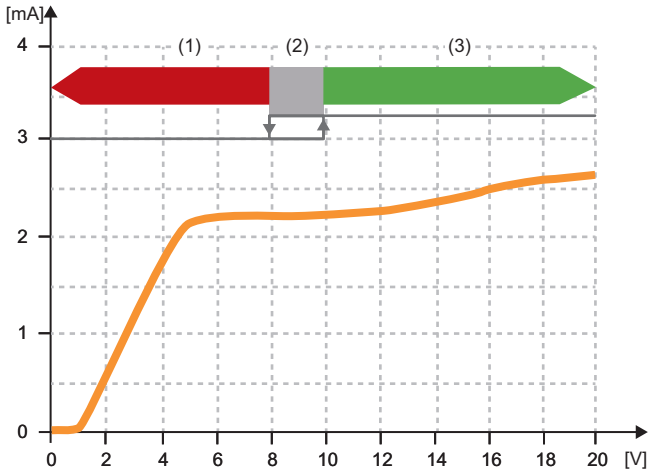
Performance specifications

This section describes the performance specifications of the NZ2FTS3-8DE. (☞ Page 30 General Specifications)

Item	NZ2FTS3-8DE
System bus transfer speed	48Mbps
Number of points	8
Input type	Negative common type, compliant with IEC 61131-2 Type 1 and Type 3
Input filter	Input delay time: Adjustable between 0ms and 40ms (☞ Page 424 Input delay function and parameter setting) (A pulse width shorter than 10ms cannot be taken in as an input.)
L level input voltage	Less than +5V compared to input power supply voltage U_{IN} 0V
H level input voltage	More than +11V compared to input power supply voltage U_{IN} 0V
Supply to external device	2A maximum per circuit, 8A in total
External device connection method	2-wire, 3-wire
Reverse polarity protection	Provided
Module diagnostics	Provided
External power supply voltage	24VDC +20%/-15%
Module current consumption	40mA
Weight	94g

Current-voltage characteristic

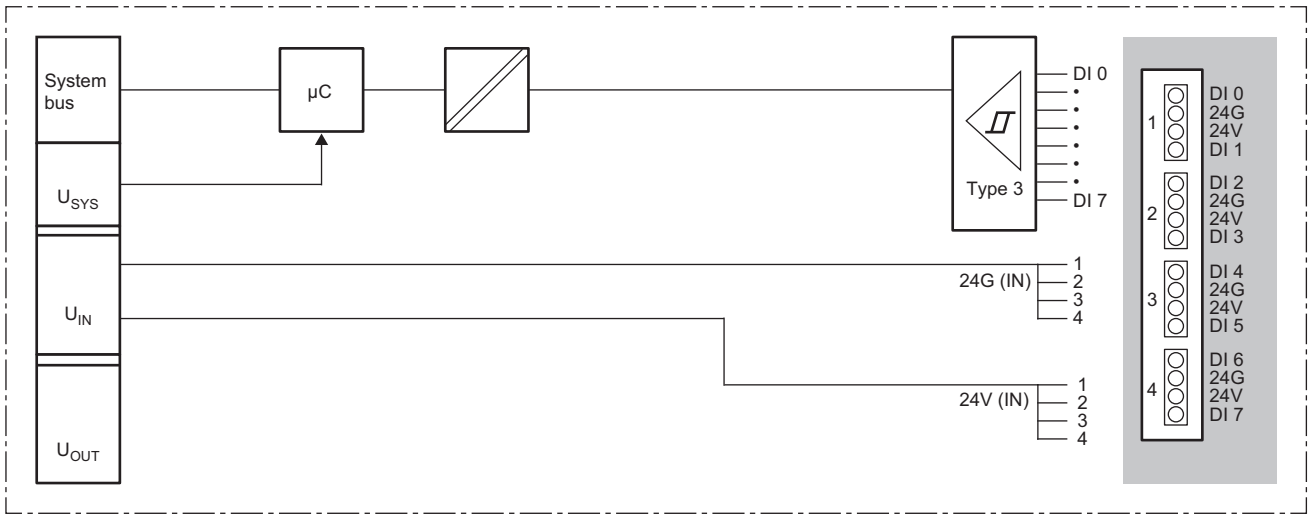
The following figure shows the current-voltage characteristic of the NZ2FTS3-8DE.



(1) The input signal turns off.
(2) 7.9 to 9.9V is the hysteresis width.
(3) The input signal turns on.

Block diagram

The following figure shows the internal block diagram of the NZ2FTS3-8DE.



Input delay function and parameter setting

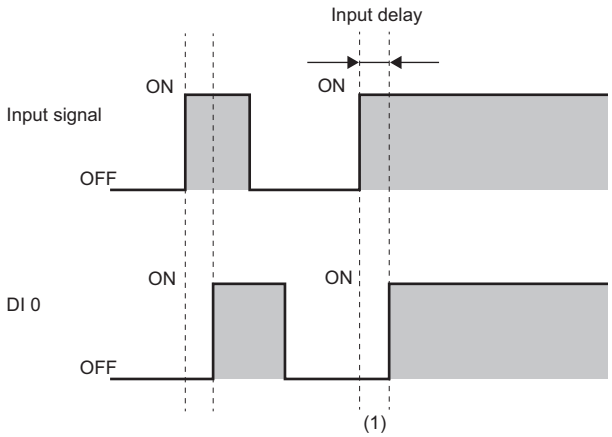
The input module may take in noise as an input depending on the pulse width of the signal. To avoid taking in such noise, set the Input delay time in the parameter setting of the NZ2FTS3-8DE.

Item		Description	Setting range*1
DI 0 (Channel 0)	Input delay	Delays input by the specified length of time.	• No(0) • 0.3ms (1)*2 • 3ms (2) • 10ms (3) • 20ms (4) • 40ms (5)*2 (Default: 3ms)
DI 1 (Channel 1)			
DI 2 (Channel 2)			
DI 3 (Channel 3)			
DI 4 (Channel 4)			
DI 5 (Channel 5)			
DI 6 (Channel 6)			
DI 7 (Channel 7)			

*1 (0) to (5) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

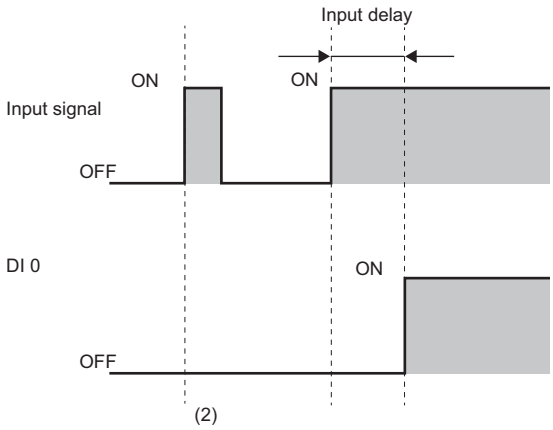
*2 These cannot be set with the NZ2FT-PBV.

• When a short Input delay time is set



(1) Change of the input signal is quickly followed.

• When a long Input delay time is set



(2) Change of the input signal that persists for a short time period (less than Input delay time) is not loaded.

Point

Fully consider the pulse width of noise that can be removed (pulse width to not take in as input) and the usage environment when setting the value of the Input delay time.

Process data

The following table lists the Process data of the NZ2FTS3-8DE.

Input/ Output	Address (byte)	Bit	Description
Input	0	b0	DI 0 (Channel 0)
		b1	DI 1 (Channel 1)
		b2	DI 2 (Channel 2)
		b3	DI 3 (Channel 3)
		b4	DI 4 (Channel 4)
		b5	DI 5 (Channel 5)
		b6	DI 6 (Channel 6)
		b7	DI 7 (Channel 7)

Troubleshooting

For troubleshooting the NZ2FTS3-8DE, refer to the following.

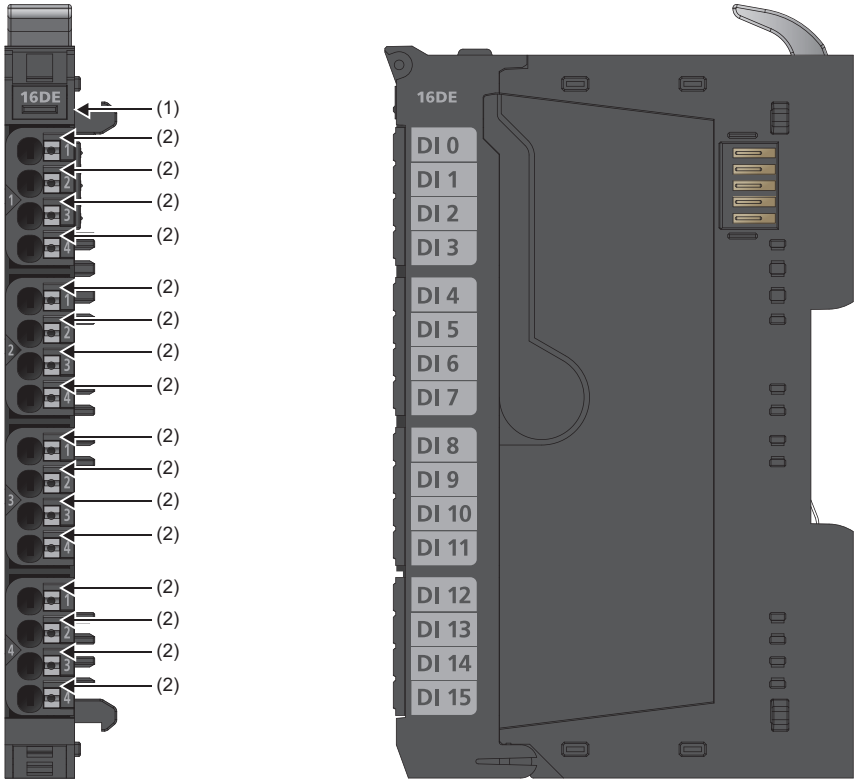
☞ Page 445 Troubleshooting for Digital Input Modules

14.3 NZ2FTS1-16DE

This is a 1-wire digital input module with 24VDC negative common input at 16 input points.

Part names

This section describes the name of each LED of the NZ2FTS1-16DE. (☞ Page 414 I/O Module Common Part Names)

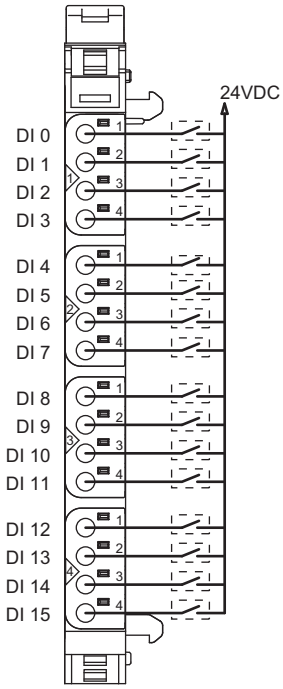


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 445 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the input ON/OFF state of each channel. On in yellow: Input is on. Off: Input is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS1-16DE and external devices.

Ex.



Connect 24G of the external power supply to 24G of the input power supply connector for the coupler.

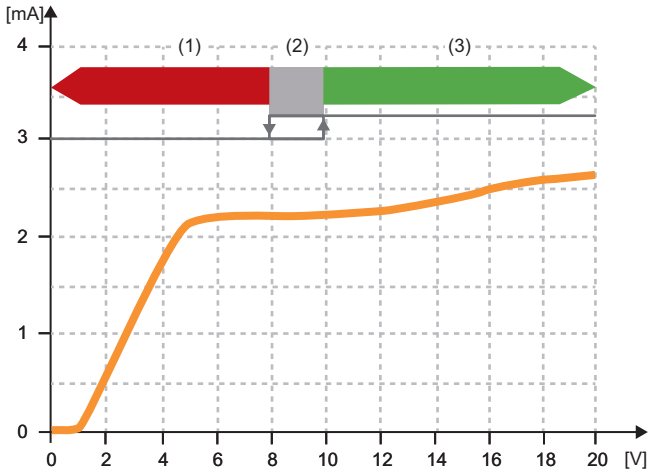
Performance specifications

This section describes the performance specifications of the NZ2FTS1-16DE. (☞ Page 30 General Specifications)

Item	NZ2FTS1-16DE
System bus transfer speed	48Mbps
Number of points	16
Input type	Negative common type, compliant with IEC 61131-2 Type 1 and Type 3
Input filter	Input delay time: 3ms (A pulse width shorter than 10ms cannot be taken in as an input.)
L level input voltage	Less than +5V compared to input power supply voltage U_{IN} 0V
H level input voltage	More than +11V compared to input power supply voltage U_{IN} 0V
Supply to external device	Not provided
External device connection method	1-wire
Reverse polarity protection	Provided
Module diagnostics	Provided
External power supply voltage	24VDC +20%/-15%
Module current consumption	70mA
Weight	95g

Current-voltage characteristic

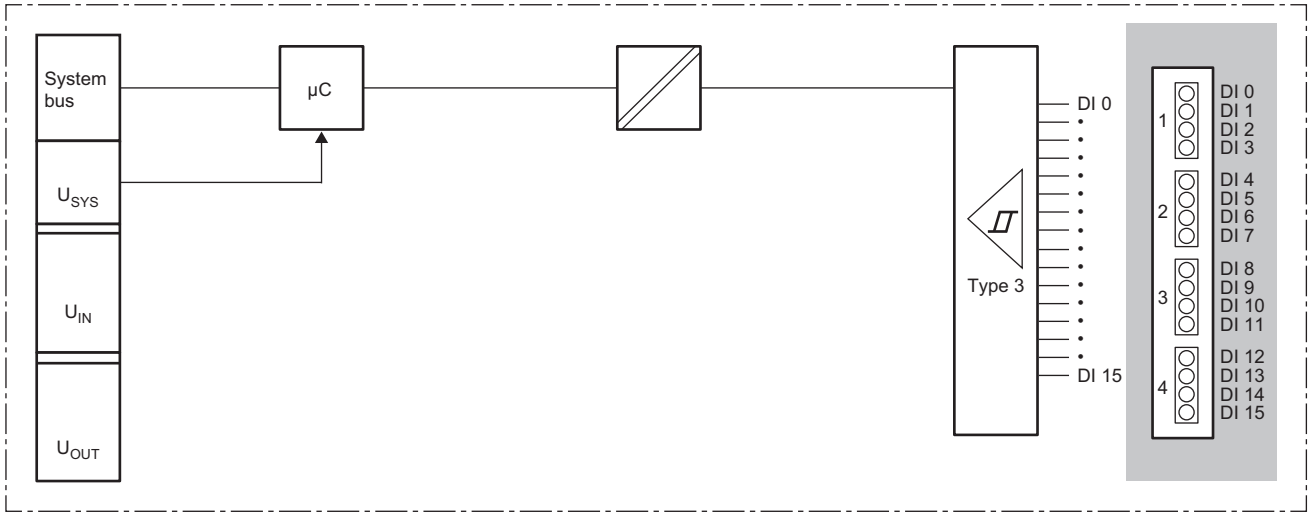
The following figure shows the current-voltage characteristic of the NZ2FTS1-16DE.



(1) The input signal turns off.
(2) 7.9 to 9.9V is the hysteresis width.
(3) The input signal turns on.

Block diagram

The following figure shows the internal block diagram of the NZ2FTS1-16DE.



Parameter setting

No parameters can be set for the NZ2FTS1-16DE.

Process data

The following table lists the Process data of the NZ2FTS1-16DE.

Input/ Output	Address (byte)	Bit	Description
Input	0	b0	DI 0 (Channel 0)
		b1	DI 1 (Channel 1)
		b2	DI 2 (Channel 2)
		b3	DI 3 (Channel 3)
		b4	DI 4 (Channel 4)
		b5	DI 5 (Channel 5)
		b6	DI 6 (Channel 6)
		b7	DI 7 (Channel 7)
	1	b8	DI 8 (Channel 8)
		b9	DI 9 (Channel 9)
		b10	DI 10 (Channel 10)
		b11	DI 11 (Channel 11)
		b12	DI 12 (Channel 12)
		b13	DI 13 (Channel 13)
		b14	DI 14 (Channel 14)
		b15	DI 15 (Channel 15)

Troubleshooting

For troubleshooting the NZ2FTS1-16DE, refer to the following.

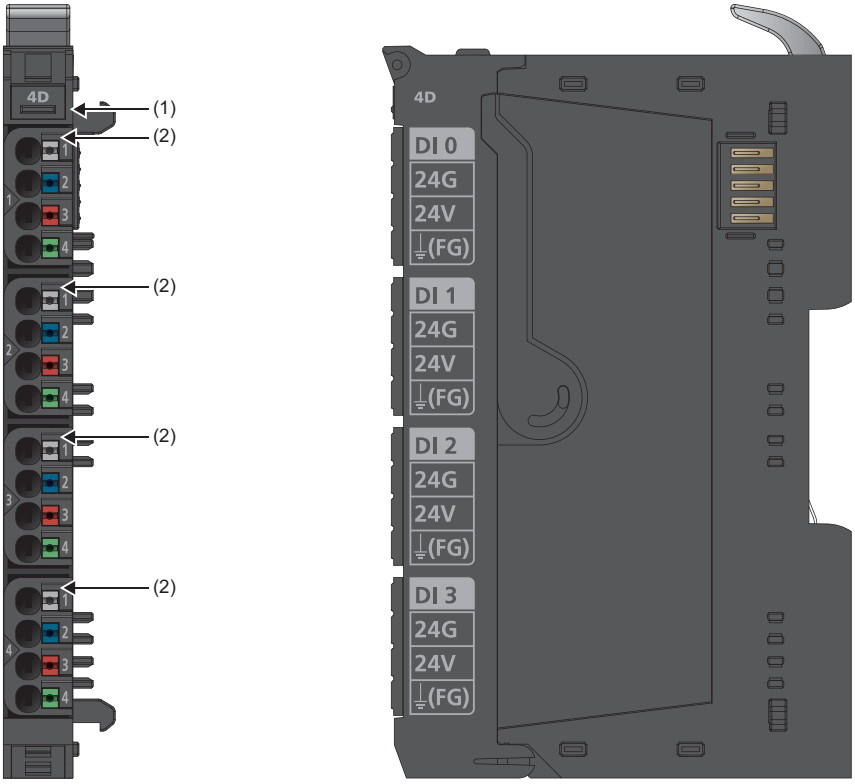
☞ Page 445 Troubleshooting for Digital Input Modules

14.4 NZ2FTS4-4D

This is a 4-wire digital input module with 24VDC positive common input at four input points.

Part names

This section describes the name of each LED of the NZ2FTS4-4D. (☞ Page 414 I/O Module Common Part Names)

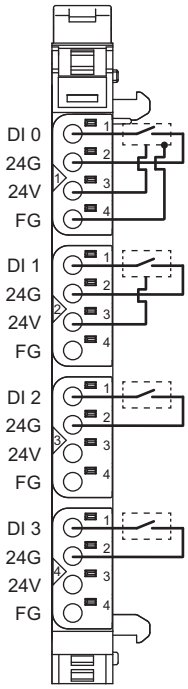


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 445 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the input ON/OFF state of each channel. On in yellow: Input is on. Off: Input is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS4-4D and external devices.

Ex.



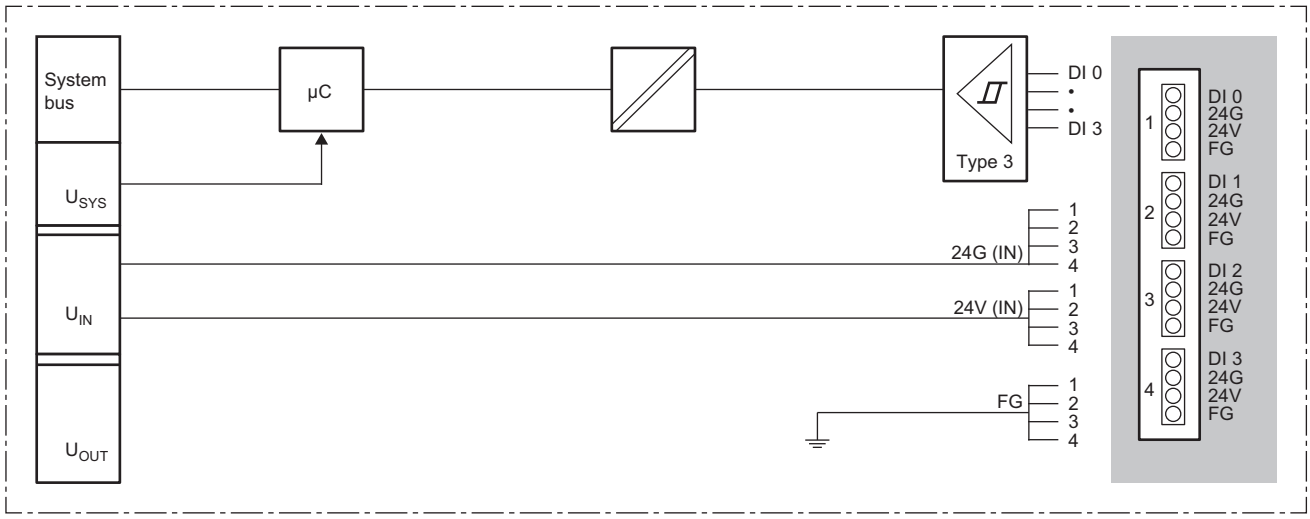
Performance specifications

This section describes the performance specifications of the NZ2FTS4-4D. (☞ Page 30 General Specifications)

Item	NZ2FTS4-4D
System bus transfer speed	48Mbps
Number of points	4
Input type	Positive common type, compliant with IEC 61131-2 Type1 and Type3
Input filter	Input delay time: Adjustable between 0ms and 40ms (☞ Page 432 Input delay function and parameter setting) (A pulse width shorter than 10ms cannot be taken in as an input.)
L level input voltage	More than -5V compared to input power supply voltage U_{IN} 24V
H level input voltage	Less than -11V compared to input power supply voltage U_{IN} 24V
Supply to external device	2A maximum per circuit, 8A in total
External device connection method	2-wire, 3-wire, 3-wire + FG
Reverse polarity protection	Available
Module diagnostics	Available
Supply voltage	24VDC +20%/-15%
Input power supply current consumption	30mA
Current consumption of external power supply for output part	Less than 10mA + supply to external device
Weight	93g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS4-4D.



Input delay function and parameter setting

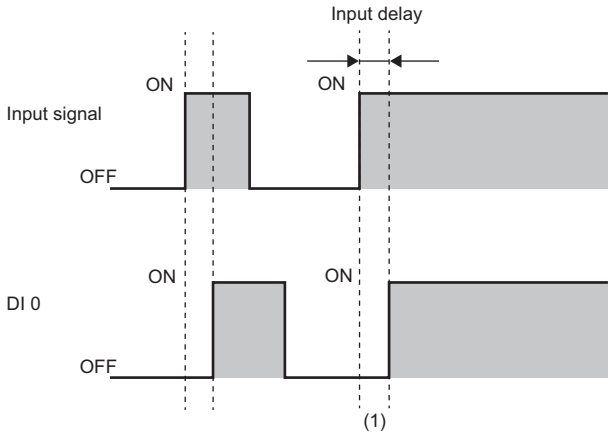
The input module may take in noise as an input depending on the pulse width of the signal. To avoid taking in such noise, set the Input delay time in the parameter setting of the NZ2FTS4-4D.

Item		Description	Setting range*1
DI 0 (Channel 0)	Input delay	Delays input by the specified length of time.	• No(0) • 0.3ms (1)*2 • 3ms (2) • 10ms (3) • 20ms (4) • 40ms (5)*2 (Default: 3ms)
DI 1 (Channel 1)			
DI 2 (Channel 2)			
DI 3 (Channel 3)			

*1 (0) to (5) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

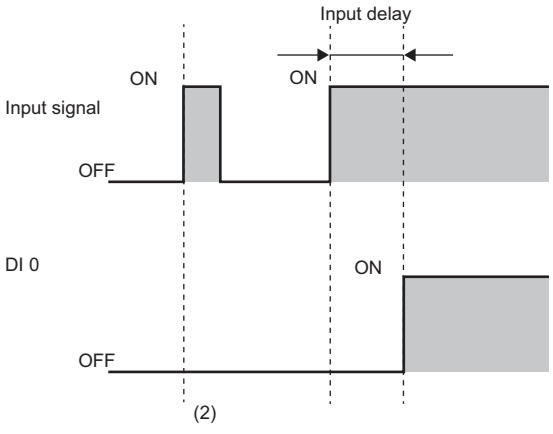
*2 These cannot be set with the NZ2FT-PBV.

• When a short Input delay time is set



(1) Change of the input signal is quickly followed.

• When a long Input delay time is set



(2) Change of the input signal that persists for a short time period (less than Input delay time) is not loaded.

Point

Fully consider the pulse width of noise that can be removed (pulse width to not take in as input) and the usage environment when setting the value of the Input delay time.

Process data

The following table lists the Process data of the NZ2FTS4-4D.

Input/Output	Address (byte)	Bit	Description
Input	0	b0	DI 0 (Channel 0)
		b1	DI 1 (Channel 1)
		b2	DI 2 (Channel 2)
		b3	DI 3 (Channel 3)
		b4 to b7	System area

Troubleshooting

For troubleshooting the NZ2FTS4-4D, refer to the following.

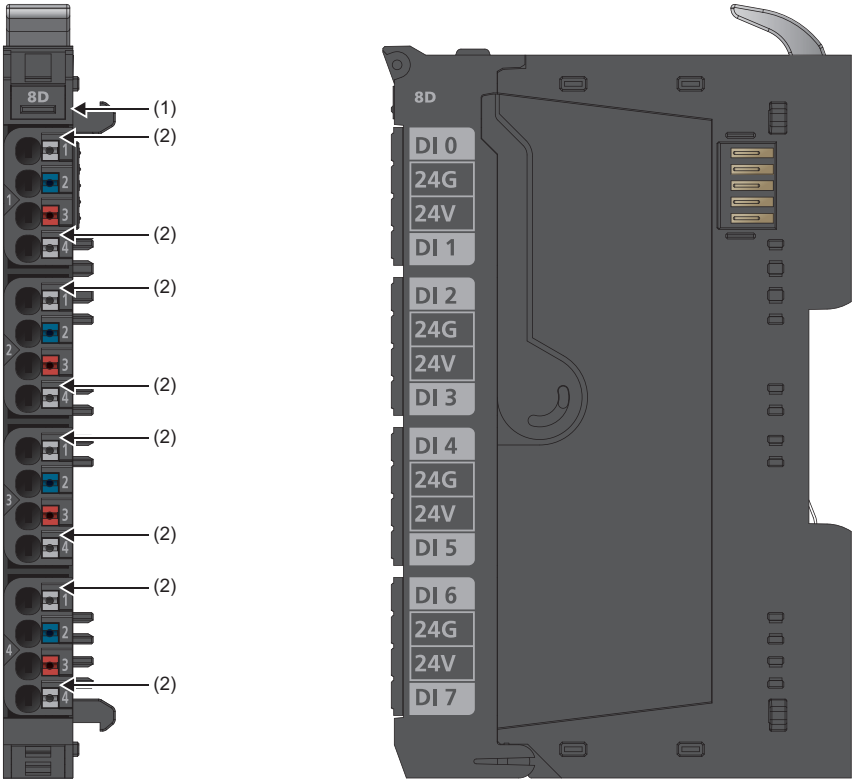
☞ Page 445 Troubleshooting for Digital Input Modules

14.5 NZ2FTS3-8D

This is a 3-wire digital input module with 24VDC positive common input at eight input points.

Part names

This section describes the name of each LED of the NZ2FTS3-8D. (☞ Page 414 I/O Module Common Part Names)

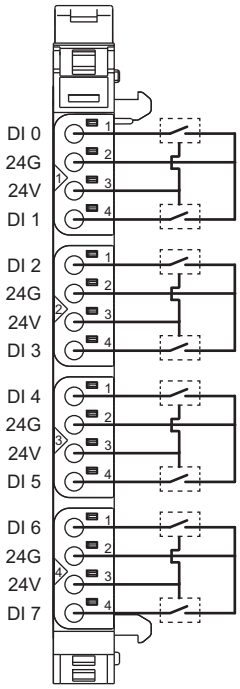


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 445 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the input ON/OFF state of each channel. On in yellow: Input is on. Off: Input is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS3-8D and external devices.

Ex.



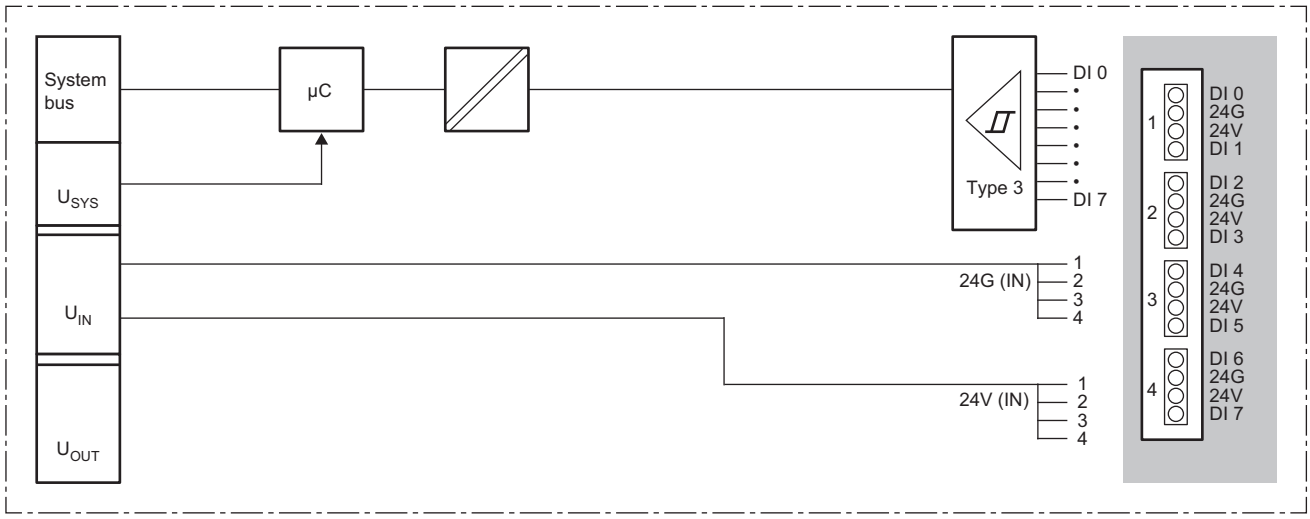
Performance specifications

This section describes the performance specifications of the NZ2FTS3-8D. (☞ Page 30 General Specifications)

Item	NZ2FTS3-8D
System bus transfer speed	48Mbps
Number of points	8
Input type	Positive common type, compliant with IEC 61131-2 Type1 and Type3
Input filter	Input delay time: Adjustable between 0ms and 40ms (☞ Page 436 Input delay function and parameter setting) (A pulse width shorter than 10ms cannot be taken in as an input.)
L level input voltage	More than -5V compared to input power supply voltage U_{IN} 24V
H level input voltage	Less than -11V compared to input power supply voltage U_{IN} 24V
Supply to external device	2A maximum per circuit, 8A in total
External device connection method	2-wire, 3-wire
Reverse polarity protection	Available
Module diagnostics	Available
Supply voltage	24VDC +20%/-15%
Input power supply current consumption	40mA
Current consumption of external power supply for output part	Less than 20mA + supply to external device
Weight	93g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS3-8D.



Input delay function and parameter setting

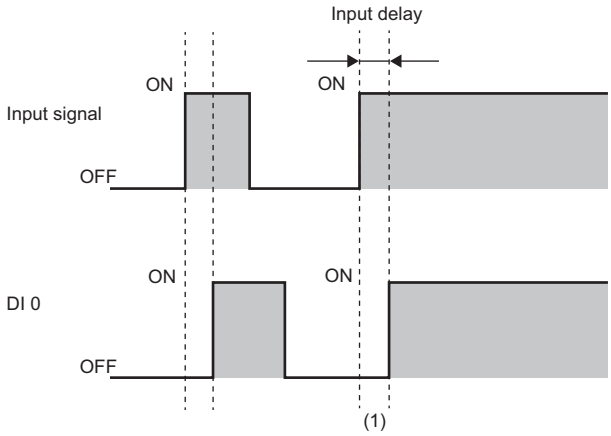
The input module may take in noise as an input depending on the pulse width of the signal. To avoid taking in such noise, set the Input delay time in the parameter setting of the NZ2FTS3-8D.

Item		Description	Setting range*1
DI 0 (Channel 0)	Input delay	Delays input by the specified length of time.	• No(0) • 0.3ms (1)*2 • 3ms (2) • 10ms (3) • 20ms (4) • 40ms (5)*2 (Default: 3ms)
DI 1 (Channel 1)			
DI 2 (Channel 2)			
DI 3 (Channel 3)			
DI 4 (Channel 4)			
DI 5 (Channel 5)			
DI 6 (Channel 6)			
DI 7 (Channel 7)			

*1 (0) to (5) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

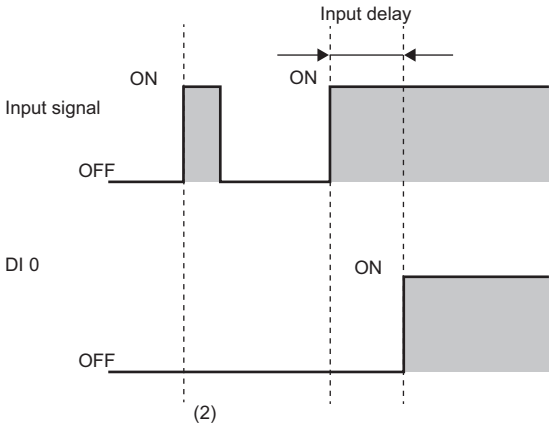
*2 These cannot be set with the NZ2FT-PBV.

• When a short Input delay time is set



(1) Change of the input signal is quickly followed.

• When a long Input delay time is set



(2) Change of the input signal that persists for a short time period (less than Input delay time) is not loaded.

Point

Fully consider the pulse width of noise that can be removed (pulse width to not take in as input) and the usage environment when setting the value of the Input delay time.

Process data

The following table lists the Process data of the NZ2FTS3-8D.

Input/Output	Address (byte)	Bit	Description
Input	0	b0	DI 0 (Channel 0)
		b1	DI 1 (Channel 1)
		b2	DI 2 (Channel 2)
		b3	DI 3 (Channel 3)
		b4	DI 4 (Channel 4)
		b5	DI 5 (Channel 5)
		b6	DI 6 (Channel 6)
		b7	DI 7 (Channel 7)

Troubleshooting

For troubleshooting the NZ2FTS3-8D, refer to the following.

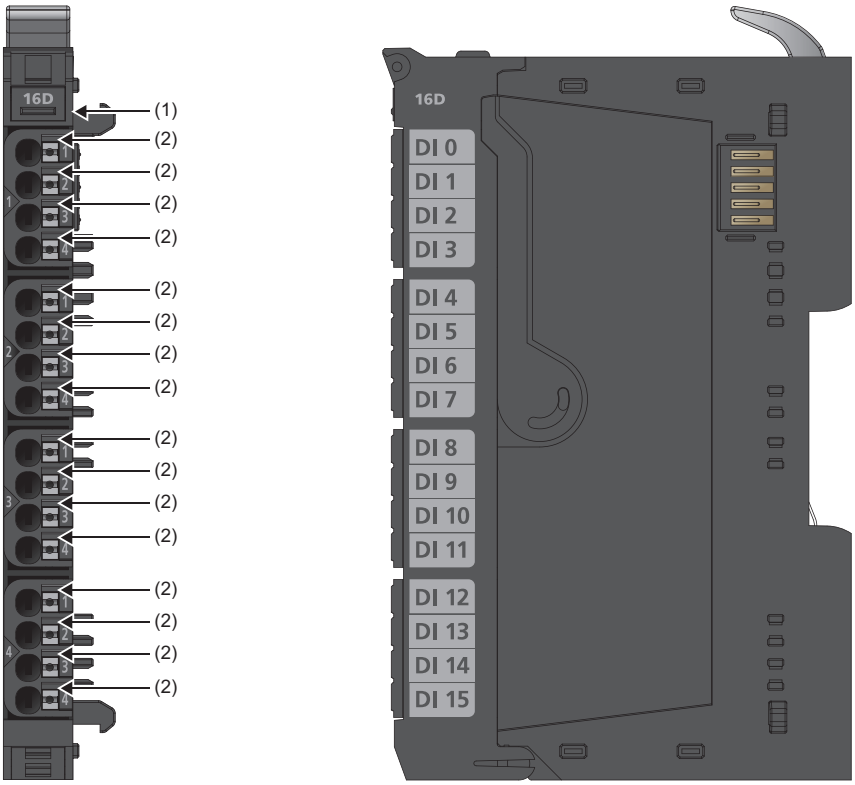
☞ Page 445 Troubleshooting for Digital Input Modules

14.6 NZ2FTS1-16D

This is a 1-wire digital input module with 24VDC positive common input at 16 input points.

Part names

This section describes the name of each LED of the NZ2FTS1-16D. (☞ Page 414 I/O Module Common Part Names)

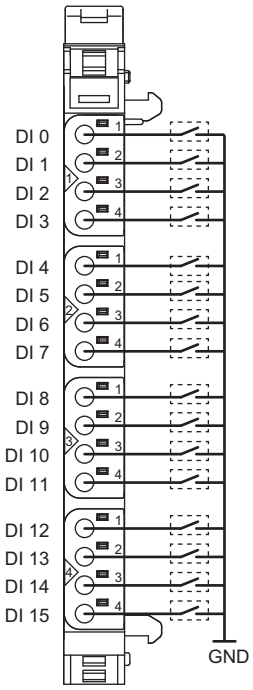


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 445 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the input ON/OFF state of each channel. On in yellow: Input is on. Off: Input is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS1-16D and external devices.

Ex.



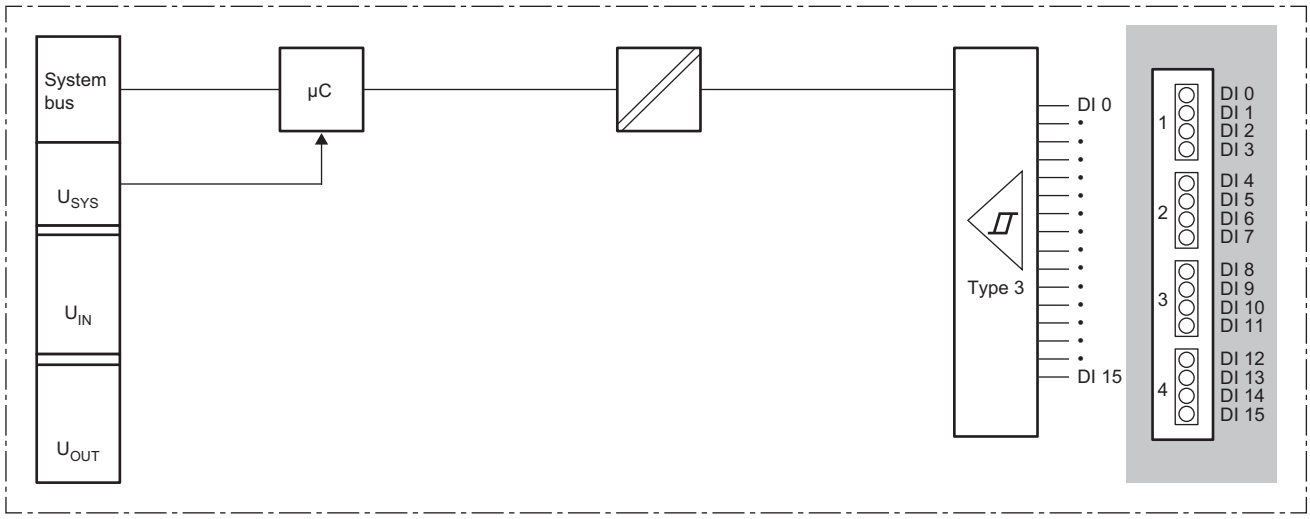
Performance specifications

This section describes the performance specifications of the NZ2FTS1-16D. (☞ Page 30 General Specifications)

Item	NZ2FTS1-16D
System bus transfer speed	48Mbps
Number of points	16
Input type	Positive common type, compliant with IEC 61131-2 Type1 and Type3
Input filter	Input delay time: 3ms (A pulse width shorter than 10ms cannot be taken in as an input.)
L level input voltage	More than -5V compared to input power supply voltage U_{IN} 24V
H level input voltage	Less than -11V compared to input power supply voltage U_{IN} 24V
Supply to external device	Not available
External device connection method	1-wire
Reverse polarity protection	Available
Module diagnostics	Available
Supply voltage	24VDC +20%/-15%
Input power supply current consumption	70mA
Current consumption of external power supply for output part	Less than 15mA
Weight	95g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS1-16D.



Parameter setting

No parameters can be set for the NZ2FTS1-16D.

Process data

The following table lists the Process data of the NZ2FTS1-16D.

Input/Output	Address (byte)	Bit	Description
Input	0	b0	DI 0 (Channel 0)
		b1	DI 1 (Channel 1)
		b2	DI 2 (Channel 2)
		b3	DI 3 (Channel 3)
		b4	DI 4 (Channel 4)
		b5	DI 5 (Channel 5)
		b6	DI 6 (Channel 6)
		b7	DI 7 (Channel 7)
	1	b8	DI 8 (Channel 8)
		b9	DI 9 (Channel 9)
		b10	DI 10 (Channel 10)
		b11	DI 11 (Channel 11)
		b12	DI 12 (Channel 12)
		b13	DI 13 (Channel 13)
		b14	DI 14 (Channel 14)
		b15	DI 15 (Channel 15)

Troubleshooting

For troubleshooting the NZ2FTS1-16D, refer to the following.

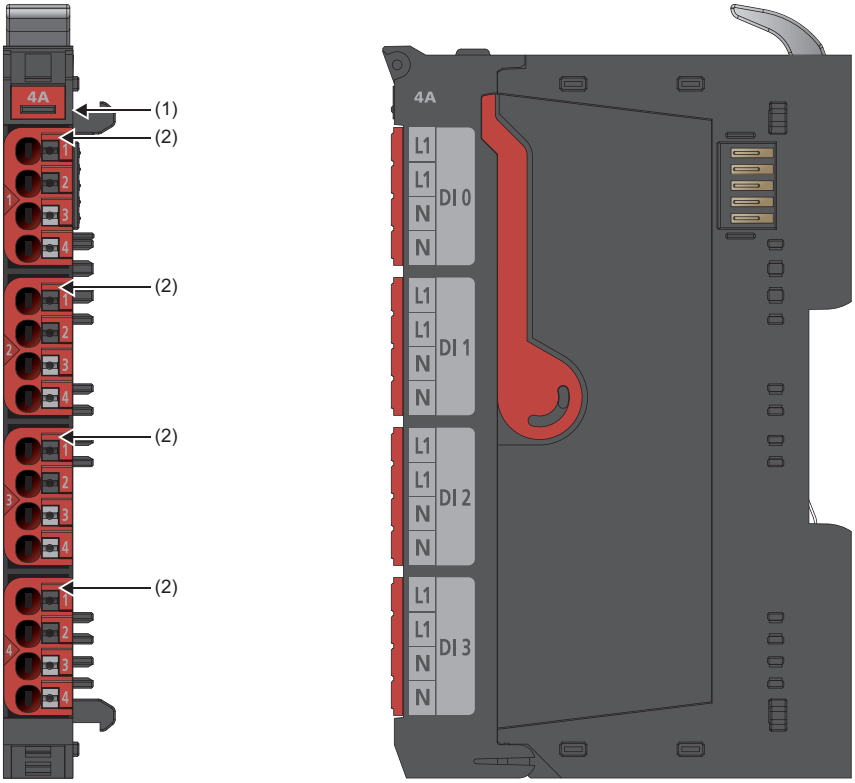
☞ Page 445 Troubleshooting for Digital Input Modules

14.7 NZ2FTS2-4A

This is a 2-wire digital input module for 110 to 230VAC with four input points.

Part names

This section describes the name of each LED of the NZ2FTS2-4A. (☞ Page 414 I/O Module Common Part Names)

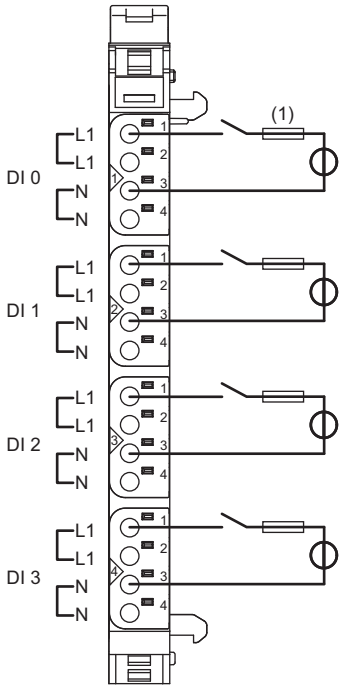


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 445 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the input ON/OFF state of each channel. On in yellow: Input is on. Off: Input is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS2-4A and external devices.

Ex.



A fuse (1) is required for wiring the NZ2FTS2-4A. Install a 4A slow fuse between the power supply on the L1 side and the switch. Each L1 and N are internally connected.

Precautions

- Be sure to supply all I/O cables from the same power source.
- Ensure that the input frequency does not exceed 65Hz and the switching frequency does not exceed 15Hz. If the frequency is too high, the module may fail.
- Be sure to install a slow fuse up to 4A at the input. If the input current is too large, the module may fail.
- When using the module in an environment where there is a risk of explosion, install it in an environment without condensation, corrosives or conductive dust. If the switching voltage or input voltage exceeds 63V, prepare a transient protection device that limits the peak voltage to 500V or less during transitions.

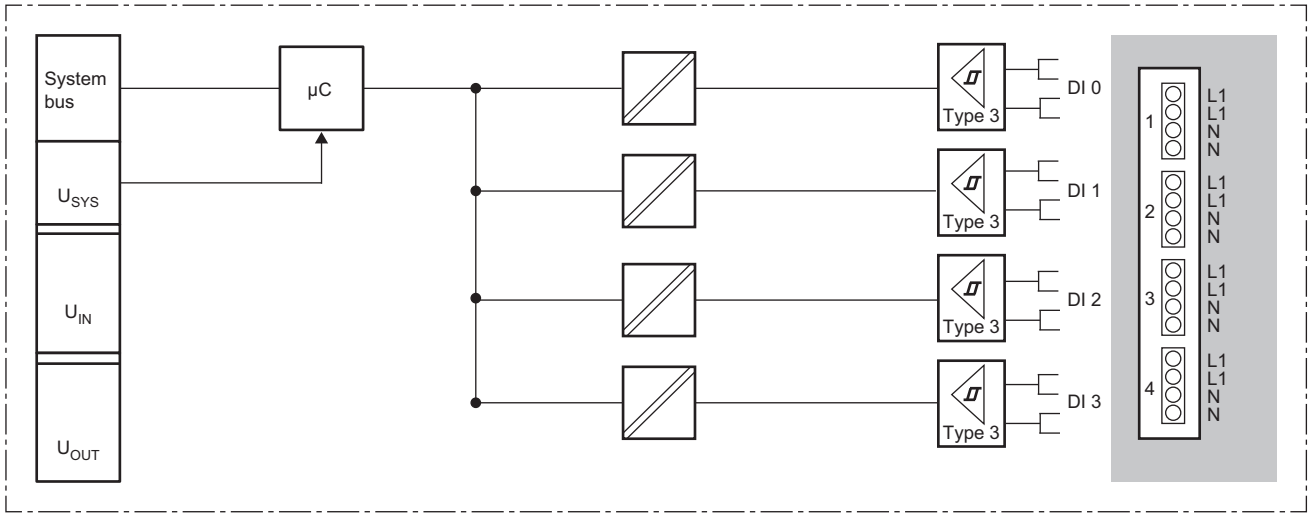
Performance specifications

This section describes the performance specifications of the NZ2FTS2-4A. (☞ Page 30 General Specifications)

Item	NZ2FTS2-4A
System bus transfer speed	48Mbps
Galvanic insulator	Channel-to-power supply and between channels: 4kV
Voltage between wires	400V
Number of points	4
Input type	Negative common type, compliant with IEC 61131-2 Type 3
Input filter	Input delay time: 10ms (A pulse width shorter than 10ms cannot be taken in as an input.)
L level input voltage	Less than 65V
H level input voltage	80V or more
Maximum input voltage	277VAC (UL) 265VAC (VDE)
Input frequency type	50/60Hz single-phase alternating current (Does not work below 40Hz. The module may be destroyed if it exceeds 65Hz.)
Supply to external device	Not available
External device connection method	2-wire
Module diagnostics	Available
Supply voltage	24VDC +20%/-15%
Input power supply current consumption	15mA
Current consumption of external power supply for output part	Not available
Weight	99g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS2-4A.



Parameter setting

No parameters can be set for the NZ2FTS2-4A.

Process data

The following table lists the Process data of the NZ2FTS2-4A.

Input/Output	Address (byte)	Bit	Description
Input	0	b0	DI 0 (Channel 0)
		b1	DI 1 (Channel 1)
		b2	DI 2 (Channel 2)
		b3	DI 3 (Channel 3)
		b4	System area
		b5	System area
		b6	System area
		b7	System area

Troubleshooting

For troubleshooting the NZ2FTS2-4A, refer to the following.

☞ Page 445 Troubleshooting for Digital Input Modules

14.8 Troubleshooting for Digital Input Modules

If problems occur on the digital input module, perform the following.

Checking with LEDs

When the module status LED turns on in red

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.
Is the I/O module mounted properly?	Mount the I/O module again by pressing it to the coupler until it clicks.

If the problem persists after checking the above, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

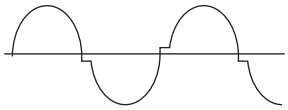
Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

Troubleshooting by symptom

ON/OFF status of an external input cannot be input

Check the following items in order from the top.

Item	Action
When the external input device turns on and off, does the corresponding LED of the input module turn on and off? Check the channel status LED of the actual digital input module, not the Web server. When the input power supply voltage is lowered, the indication of both channel status LEDs may not match.	If the input power supply LED 3.1 is off, there is a problem with the input wiring. Check that the input wiring is not disconnected or short-circuited and that the voltage of the input signal is correct. Then, change the wiring if necessary.
Is the parameter "Input delay" set correctly? (Except for the NZ2FTS1-16DE, NZ2FTS1-16D, and NZ2FTS2-4A)	When the parameter "Input delay" is set, the input signal changes after the Input delay time passes following a change on the external device. Disable Input delay or check the setting of Input delay.
■For the NZ2FT2-4A Do stepped distortions occur near the zero cross voltage of the input signal (AC)? 	If so, improve the waveform of the input signal by means such as by using an on-line type UPS.
■For the NZ2FT2-4A Is a 4A slow fuse being used?	Install a 4A slow fuse.
■For the NZ2FT2-4A Is the 4A slow fuse blown?	If so, replace the 4A slow fuse.
■For the NZ2FT2-4A Is the current value 4A or less?	Set the current value to 4A or less.
■For the NZ2FT2-4A Are high-frequency input signals (AC) above 65Hz being used?	Set the frequency of the input signal to 65Hz or less.

If the ON/OFF status of the external input still cannot be input after checking all of the above and checking the LED of the coupler, Web server, and so on, there is a risk of a hardware failure in the digital input module.
Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

15 DIGITAL OUTPUT MODULE

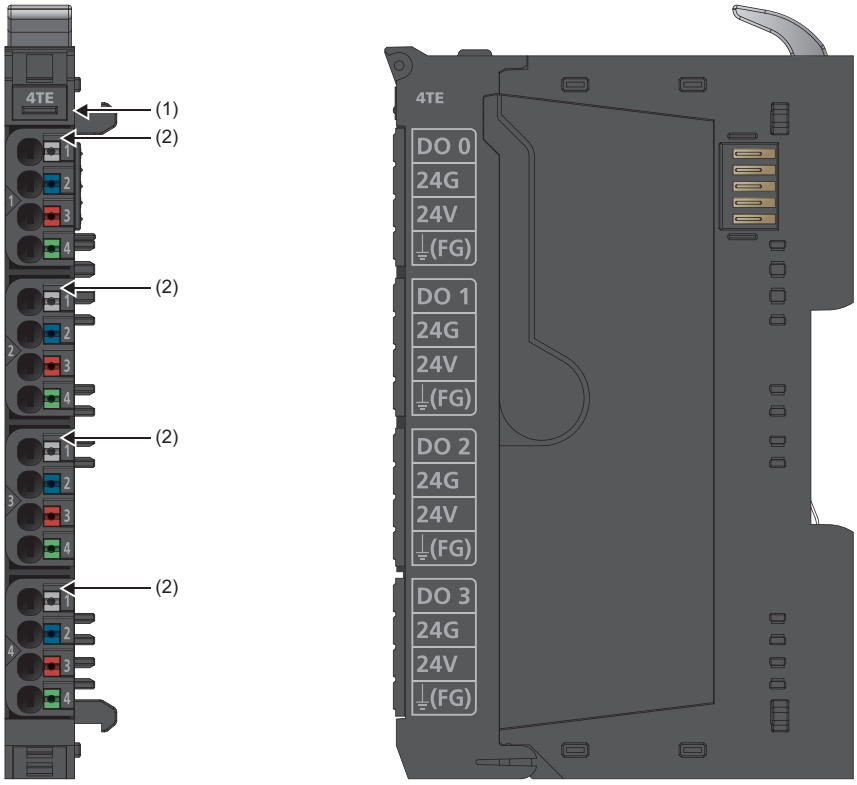
This chapter describes the details of each digital output module.

15.1 NZ2FTS4-4TE

This is a 4-wire digital output module with 24VDC (0.5A) transistor output (source type) at four output points.

Part names

This section describes the name of each LED of the NZ2FTS4-4TE. (☞ Page 414 I/O Module Common Part Names).

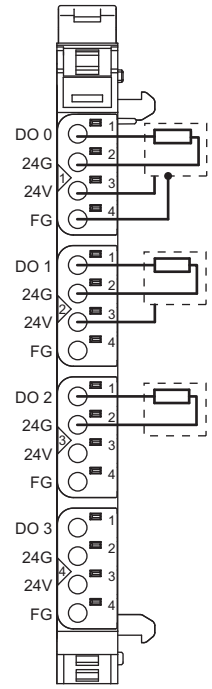


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 474 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the output ON/OFF states of each channel. On in yellow: Output is on. Off: Output is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS4-4TE and external devices.

Ex.



When using an inductive load, consider installing a flyback diode externally.

Power is fed back through the channels when the inductive loads are switched off. The output modules shut off the energy depending on the switching frequency, resulting in energy loss. If the permissible output power loss is exceeded, the module shuts down temporarily.

Feedback energy can be prevented by installing a flyback diode. With a flyback diode, the switching rate equivalent to a resistive load can be achieved with an inductive load.

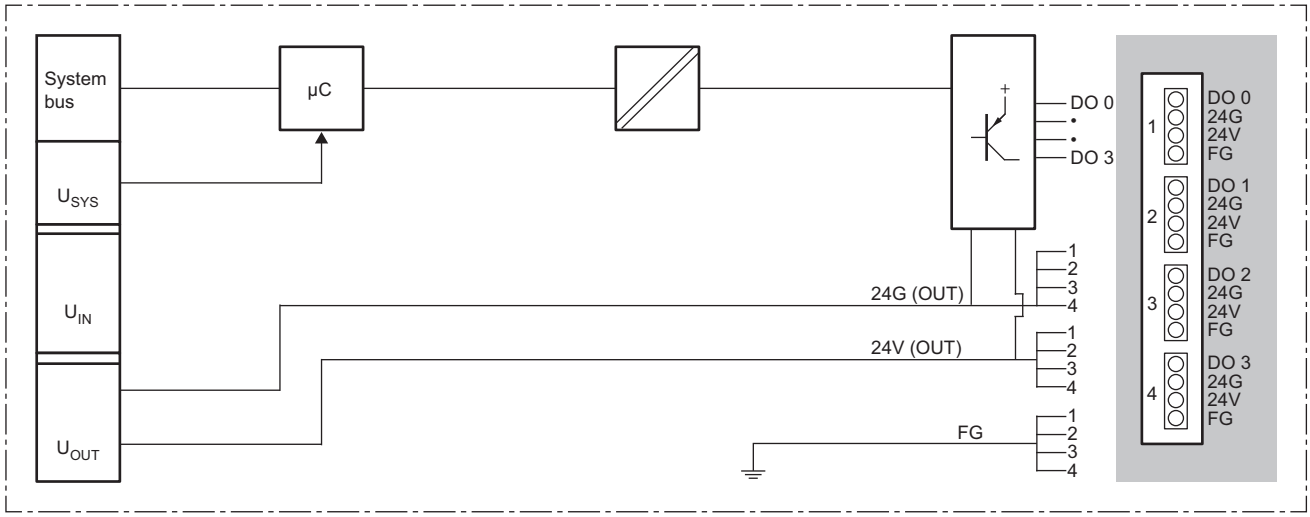
Performance specifications

This section describes the performance specifications of the NZ2FTS4-4TE. (☞ Page 30 General Specifications).

Item		NZ2FTS4-4TE
System bus transfer speed		48Mbps
Number of points		4
Output type		Source output type
Load type		Resistive load, inductive load, lamp load
Response time		L → H: 100μs H → L: 250μs
Maximum output current	Per channel	0.5A
	Per module	2A
Switching frequency	Resistive load (47Ω minimum)	1kHz
	Inductive load (DC13)	When no flyback diode is used: 0.2Hz When an appropriate flyback diode is used: 1kHz
	Lamp load (12W)	1kHz
External device connection method		2-wire, 3-wire, 3-wire + FG
Supply to external device		2A maximum per circuit 8A in total
Short circuit protection		Provided
Protection circuit		When the prescribed current flows, the temperature switch interrupts the circuit, and the module resets automatically.
Current control circuit response time		Less than 100μs
Module diagnostics		Provided
External power supply voltage		24VDC +20%/-15%
Module current consumption		35mA
Weight		94g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS4-4TE.



Substitute value setting function and parameter setting

The following table lists the parameters that can be set for the NZ2FTS4-4TE.

Item		Description	Setting range*1
DO 0 (Channel 0)	Substitute value	Sets the output ON/OFF state when a fieldbus error has occurred. It depends on the setting of the parameter "Output behaviour on fieldbus error" of the coupler.	• Off (0) • On (1) (Default: Off)
DO 1 (Channel 1)			
DO 2 (Channel 2)			
DO 3 (Channel 3)			

*1 (0) and (1) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

Process data

The following table lists the Process data of the NZ2FTS4-4TE.

Input/ Output	Address (byte)	Bit	Description
Output	0	b0	DO 0 (Channel 0)
		b1	DO 1 (Channel 1)
		b2	DO 2 (Channel 2)
		b3	DO 3 (Channel 3)
		b4	System area
		b5	System area
		b6	System area
		b7	System area

Troubleshooting

For troubleshooting the NZ2FTS4-4TE, refer to the following.

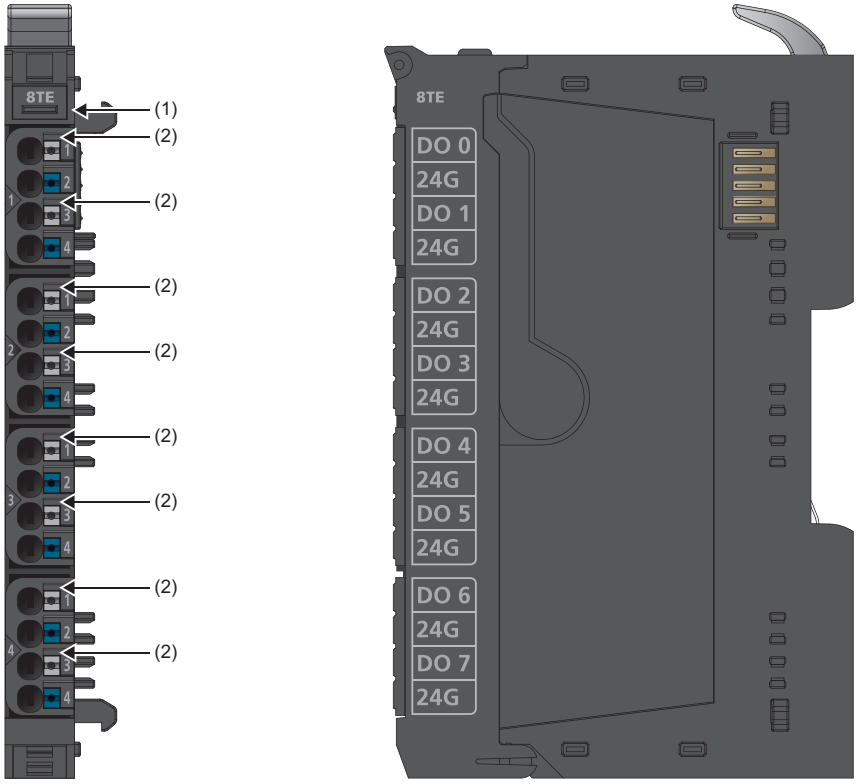
☞ Page 474 Troubleshooting for Digital Output Modules

15.2 NZ2FTS2-8TE

This is a 2-wire digital output module with 24VDC (0.5A) transistor output (source type) at eight output points.

Part names

This section describes the name of each LED of the NZ2FTS2-8TE. (☞ Page 414 I/O Module Common Part Names).

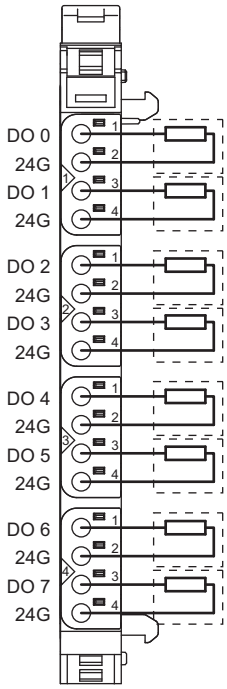


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 474 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the output ON/OFF states of each channel. On in yellow: Output is on. Off: Output is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS2-8TE and external devices.

Ex.



When using an inductive load, consider installing a flyback diode externally.

Power is fed back through the channels when the inductive loads are switched off. The output modules shut off the energy depending on the switching frequency, resulting in energy loss. If the permissible output power loss is exceeded, the module shuts down temporarily.

Feedback energy can be prevented by installing a flyback diode. With a flyback diode, the switching rate equivalent to a resistive load can be achieved with an inductive load.

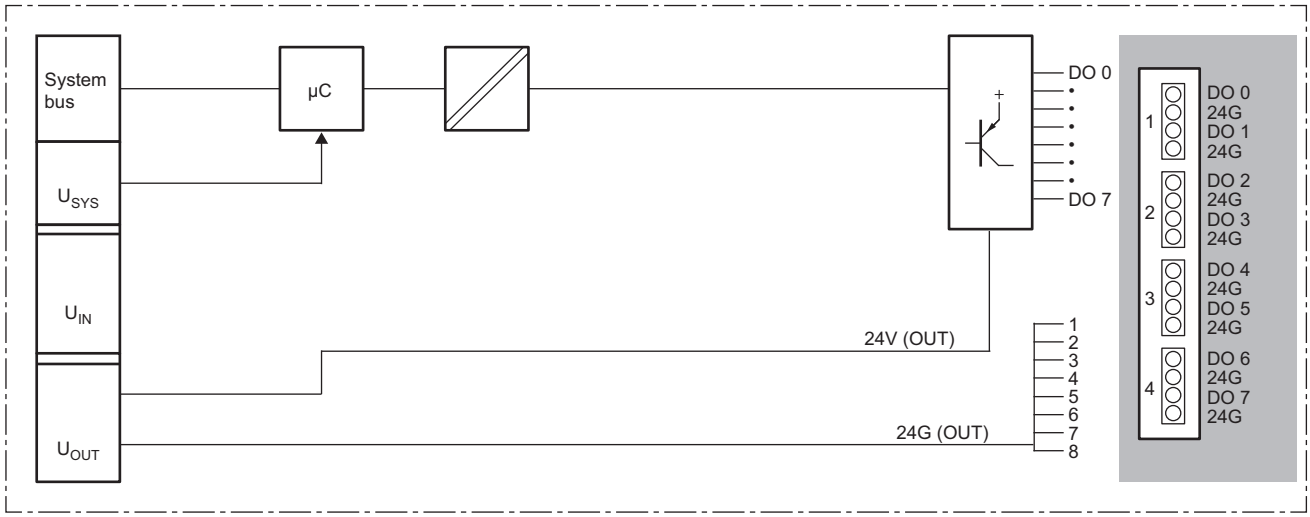
Performance specifications

This section describes the performance specifications of the NZ2FTS2-8TE. (☞ Page 30 General Specifications).

Item		NZ2FTS2-8TE
System bus transfer speed		48Mbps
Number of points		8
Output type		Source output type
Load type		Resistive load, inductive load, lamp load
Response time		L → H: 100μs H → L: 250μs
Maximum output current	Per channel	0.5A
	Per module	4A
Switching frequency	Resistive load (47Ω minimum)	1kHz
	Inductive load (DC13)	When no flyback diode is used: 0.2Hz When an appropriate flyback diode is used: 1kHz
	Lamp load (12W)	1kHz
External device connection method		2-wire
Supply to external device		Not provided
Short circuit protection		Provided
Protection circuit		When the prescribed current flows, the temperature switch interrupts the circuit, and the module resets automatically.
Current control circuit response time		Less than 100μs
Module diagnostics		Provided
External power supply voltage		24VDC +20%/-15%
Module current consumption		50mA
Weight		96g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS2-8TE.



Substitute value setting function and parameter setting

The following table lists the parameters that can be set for the NZ2FTS2-8TE.

Item		Description	Setting range*1
DO 0 (Channel 0)	Substitute value	Sets the output ON/OFF state when a fieldbus error has occurred. It depends on the setting of the parameter "Output behaviour on fieldbus error" of the coupler.	• Off (0) • On (1) (Default: Off)
DO 1 (Channel 1)			
DO 2 (Channel 2)			
DO 3 (Channel 3)			
DO 4 (Channel 4)			
DO 5 (Channel 5)			
DO 6 (Channel 6)			
DO 7 (Channel 7)			

*1 (0) and (1) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

Process data

The following table lists the Process data of the NZ2FTS2-8TE.

Input/ Output	Address (byte)	Bit	Description
Output	0	b0	DO 0 (Channel 0)
		b1	DO 1 (Channel 1)
		b2	DO 2 (Channel 2)
		b3	DO 3 (Channel 3)
		b4	DO 4 (Channel 4)
		b5	DO 5 (Channel 5)
		b6	DO 6 (Channel 6)
		b7	DO 7 (Channel 7)

Troubleshooting

For troubleshooting the NZ2FTS2-8TE, refer to the following.

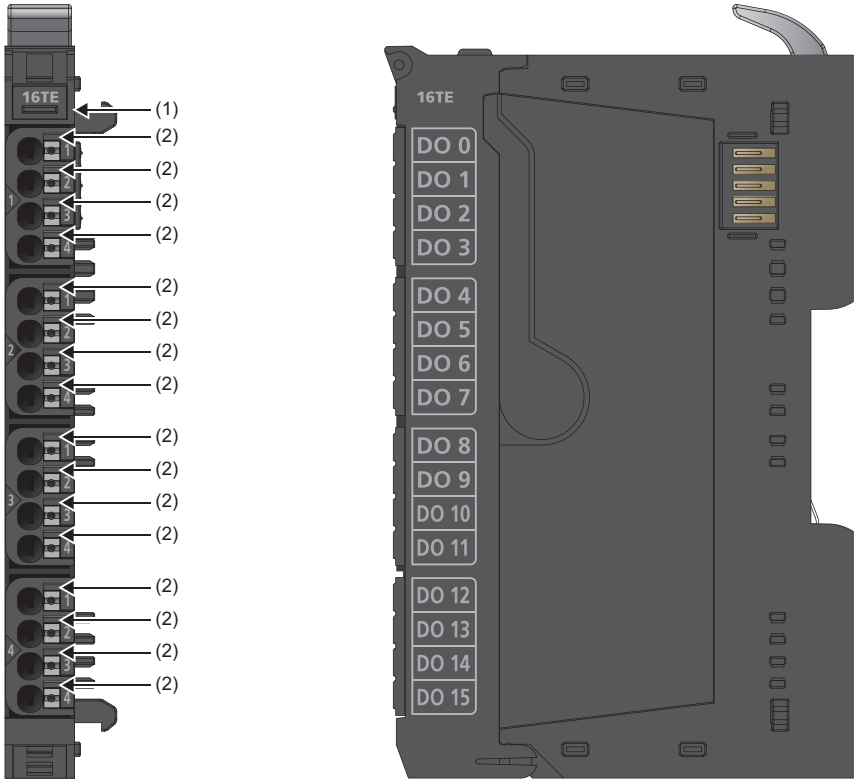
☞ Page 474 Troubleshooting for Digital Output Modules

15.3 NZ2FTS1-16TE

This is a 1-wire digital output module with 24VDC (0.5A) transistor output (source type) at 16 output points.

Part names

This section describes the name of each LED of the NZ2FTS1-16TE. (☞ Page 414 I/O Module Common Part Names).

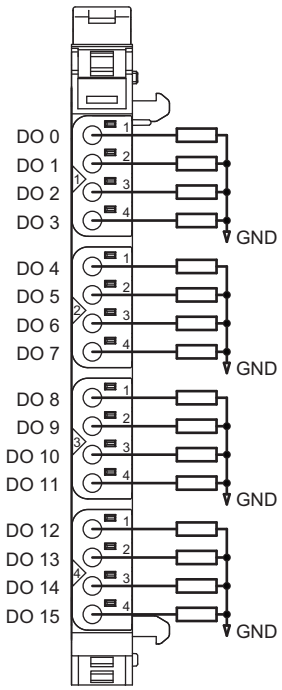


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 474 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the output ON/OFF states of each channel. On in yellow: Output is on. Off: Output is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS1-16TE and external devices. Connect GND of the external load to 24G of the output power supply connector of a coupler.

Ex.



When using an inductive load, consider installing a flyback diode externally.

Power is fed back through the channels when the inductive loads are switched off. The output modules shut off the energy depending on the switching frequency, resulting in energy loss. If the permissible output power loss is exceeded, the module shuts down temporarily.

Feedback energy can be prevented by installing a flyback diode. With a flyback diode, the switching rate equivalent to a resistive load can be achieved with an inductive load.

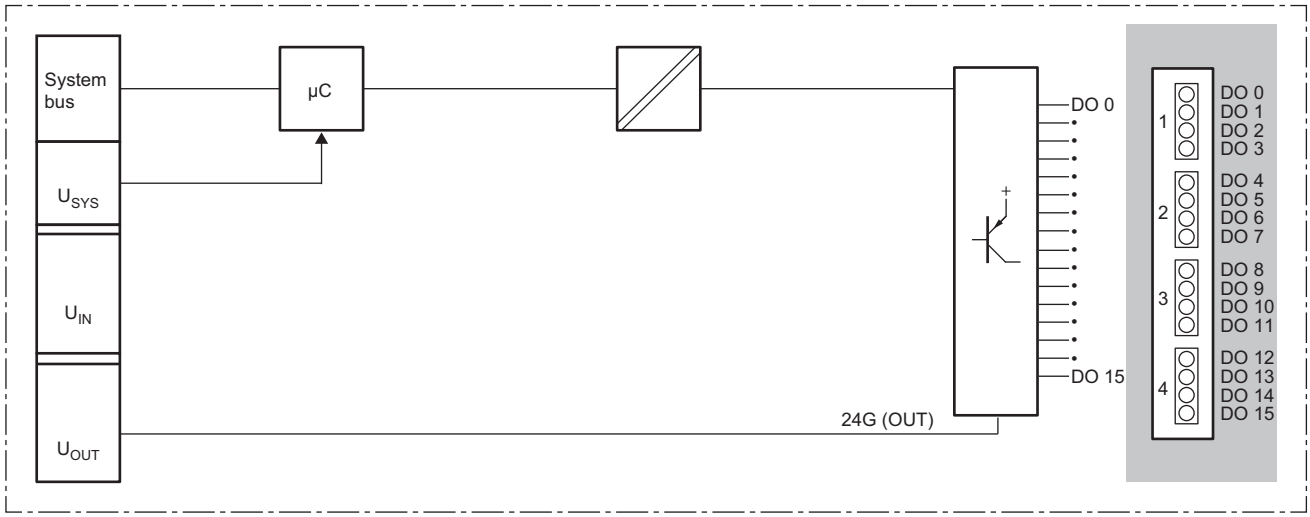
Performance specifications

This section describes the performance specifications of the NZ2FTS1-16TE. (☞ Page 30 General Specifications).

Item		NZ2FTS1-16TE
System bus transfer speed		48Mbps
Number of points		16
Output type		Source output type
Load type		Resistive load, inductive load, lamp load
Response time		L → H: 100μs H → L: 250μs
Maximum output current	Per channel	0.5A
	Per module	8A
Switching frequency	Resistive load (47Ω minimum)	1kHz
	Inductive load (DC13)	When no flyback diode is used: 0.2Hz When an appropriate flyback diode is used: 1kHz
	Lamp load (12W)	1kHz
External device connection method		1-wire
Supply to external device		Not provided
Short circuit protection		Provided
Protection circuit		When the prescribed current flows, the temperature switch interrupts the circuit, and the module resets automatically.
Current control circuit response time		Less than 100μs
Module diagnostics		Provided
External power supply voltage		24VDC +20%/-15%
Module current consumption		40mA
Weight		99g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS1-16TE.



Parameter setting

No parameters can be set for the NZ2FTS1-16TE.

Process data

The following table lists the Process data of the NZ2FTS1-16TE.

Input/ Output	Address (byte)	Bit	Description
Output	0	b0	DO 0 (Channel 0)
		b1	DO 1 (Channel 1)
		b2	DO 2 (Channel 2)
		b3	DO 3 (Channel 3)
		b4	DO 4 (Channel 4)
		b5	DO 5 (Channel 5)
		b6	DO 6 (Channel 6)
		b7	DO 7 (Channel 7)
	1	b8	DO 8 (Channel 8)
		b9	DO 9 (Channel 9)
		b10	DO 10 (Channel 10)
		b11	DO 11 (Channel 11)
		b12	DO 12 (Channel 12)
		b13	DO 13 (Channel 13)
		b14	DO 14 (Channel 14)
		b15	DO 15 (Channel 15)

Troubleshooting

For troubleshooting the NZ2FTS1-16TE, refer to the following.

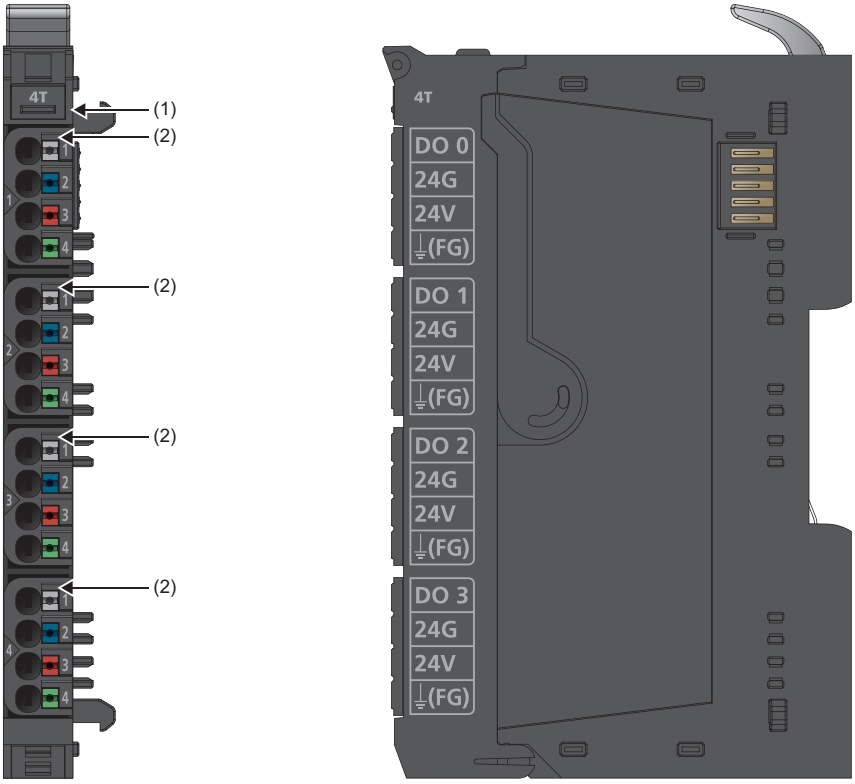
☞ Page 474 Troubleshooting for Digital Output Modules

15.4 NZ2FTS4-4T

This is a 4-wire digital output module with 24VDC (0.5A) transistor output (sink type) at four output points.

Part names

This section describes the name of each LED of the NZ2FTS4-4T. (☞ Page 414 I/O Module Common Part Names)

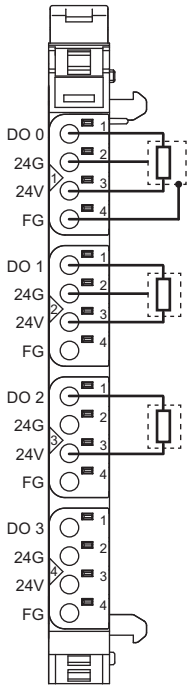


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 474 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the output ON/OFF states of each channel. On in yellow: Output is on. Off: Output is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS4-4T and external devices.

Ex.



When using an inductive load, consider installing a flyback diode externally.

Power is fed back through the channels when the inductive loads are switched off. The output modules shut off the energy depending on the switching frequency, resulting in energy loss. If the permissible output power loss is exceeded, the module shuts down temporarily.

Feedback energy can be prevented by installing a flyback diode. With a flyback diode, the switching rate equivalent to a resistive load can be achieved with an inductive load.

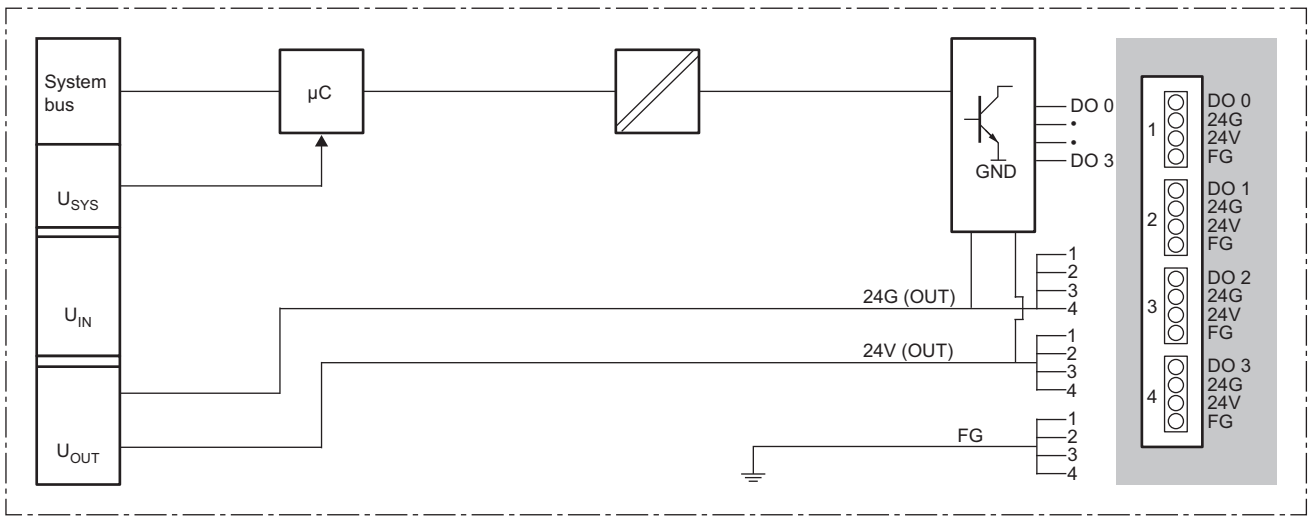
Performance specifications

This section describes the performance specifications of the NZ2FTS4-4T. (☞ Page 30 General Specifications)

Item		NZ2FTS4-4T
System bus transfer speed		48Mbps
Number of points		4
Output type		Sink type output
Load type		Resistive load, inductive load, lamp load
Response time		L→H: 100μs H→L: 250μs
Maximum output current	Per channel	0.5A
	Per module	2A
Switching frequency	Resistive load (47Ω minimum)	1kHz
	Inductive load (DC13)	When no flyback diode is used: 2Hz When an appropriate flyback diode is used: 1kHz
	Lamp load (12W)	10Hz
External device connection method		2-wire, 3-wire, 3-wire + FG
Supply to external device		2A maximum per circuit 8A in total
Short circuit protection		Available
Protection circuit		When the prescribed current flows, the temperature switch interrupts the circuit, and the module resets automatically.
Current control circuit response time		Less than 100μs
Module diagnostics		Available
External power supply voltage		24VDC +20%/-15%
Input power supply current consumption		35mA
Current consumption of external power supply for output part		10mA + load
Weight		95g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS4-4T.



Substitute value setting function and parameter setting

The following table lists the parameters that can be set for the NZ2FTS4-4T.

Item		Description	Setting range*1
DO 0 (Channel 0)	Substitute value	Sets the output ON/OFF state when a fieldbus error has occurred. It depends on the setting of the parameter "Output behaviour on fieldbus error" of the coupler.	• Off (0) • On (1) (Default: Off)
DO 1 (Channel 1)			
DO 2 (Channel 2)			
DO 3 (Channel 3)			

*1 (0) and (1) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

Process data

The following table lists the Process data of the NZ2FTS4-4T.

Input/Output	Address (byte)	Bit	Description
Output	0	b0	DO 0 (Channel 0)
		b1	DO 1 (Channel 1)
		b2	DO 2 (Channel 2)
		b3	DO 3 (Channel 3)
		b4 to b7	System area

Troubleshooting

For troubleshooting the NZ2FTS4-4T, refer to the following.

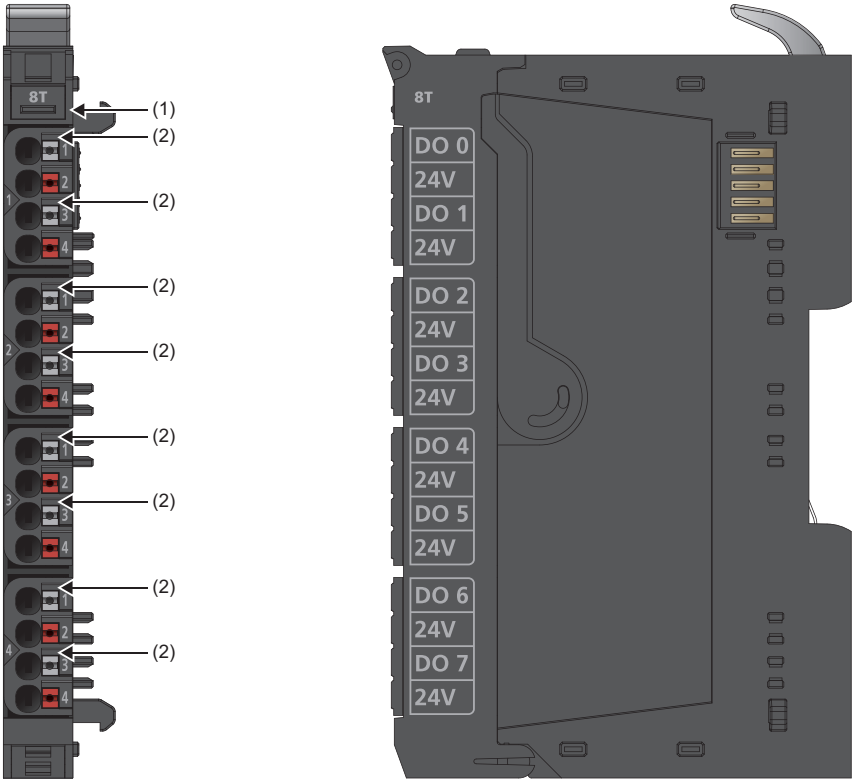
☞ Page 474 Troubleshooting for Digital Output Modules

15.5 NZ2FTS2-8T

This is a 2-wire digital output module with 24VDC (0.5A) transistor output (sink type) at eight output points.

Part names

This section describes the name of each LED of the NZ2FTS2-8T. (☞ Page 414 I/O Module Common Part Names)

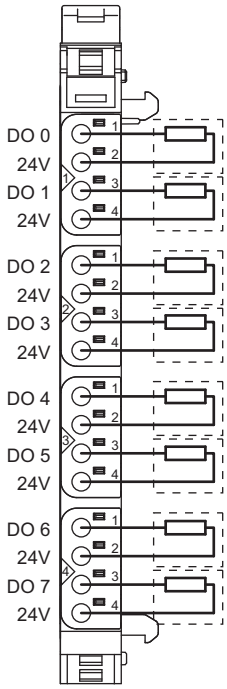


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 474 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the output ON/OFF states of each channel. On in yellow: Output is on. Off: Output is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS2-8T and external devices.

Ex.



When using an inductive load, consider installing a flyback diode externally.

Power is fed back through the channels when the inductive loads are switched off. The output modules shut off the energy depending on the switching frequency, resulting in energy loss. If the permissible output power loss is exceeded, the module shuts down temporarily.

Feedback energy can be prevented by installing a flyback diode. With a flyback diode, the switching rate equivalent to a resistive load can be achieved with an inductive load.

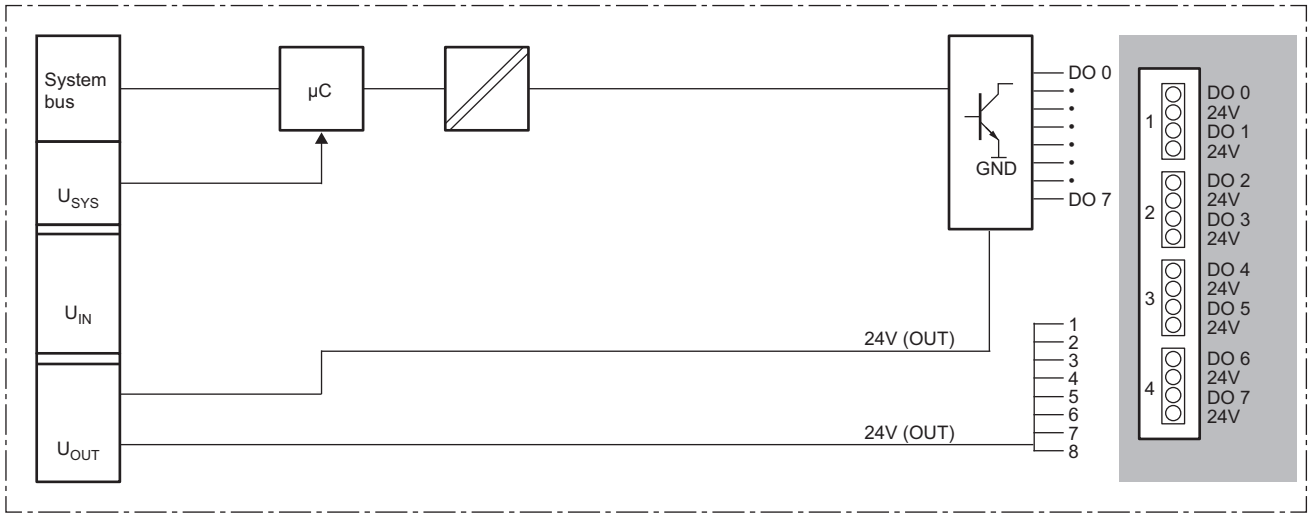
Performance specifications

This section describes the performance specifications of the NZ2FTS2-8T. (☞ Page 30 General Specifications)

Item		NZ2FTS2-8T
System bus transfer speed		48Mbps
Number of points		8
Output type		Sink type output
Load type		Resistive load, inductive load, lamp load
Response time		L→H: 100μs H→L: 250μs
Maximum output current	Per channel	0.5A
	Per module	4A
Switching frequency	Resistive load (47Ω minimum)	1kHz
	Inductive load (DC13)	When no flyback diode is used: 2Hz When an appropriate flyback diode is used: 1kHz
	Lamp load (12W)	10Hz
External device connection method		2-wire
Supply to external device		Not available
Short circuit protection		Available
Protection circuit		When the prescribed current flows, the temperature switch interrupts the circuit, and the module resets automatically.
Current control circuit response time		Less than 100μs
Module diagnostics		Available
External power supply voltage		24VDC +20%/-15%
Input power supply current consumption		40mA
Current consumption of external power supply for output part		15mA + load
Weight		95g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS2-8T.



Substitute value setting function and parameter setting

The following table lists the parameters that can be set for the NZ2FTS2-8T.

Item		Description	Setting range*1
DO 0 (Channel 0)	Substitute value	Sets the output ON/OFF state when a fieldbus error has occurred. It depends on the setting of the parameter "Output behaviour on fieldbus error" of the coupler.	• Off (0) • On (1) (Default: Off)
DO 1 (Channel 1)			
DO 2 (Channel 2)			
DO 3 (Channel 3)			
DO 4 (Channel 4)			
DO 5 (Channel 5)			
DO 6 (Channel 6)			
DO 7 (Channel 7)			

*1 (0) and (1) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

Process data

The following table lists the Process data of the NZ2FTS2-8T.

Input/Output	Address (byte)	Bit	Description
Output	0	b0	DO 0 (Channel 0)
		b1	DO 1 (Channel 1)
		b2	DO 2 (Channel 2)
		b3	DO 3 (Channel 3)
		b4	DO 4 (Channel 4)
		b5	DO 5 (Channel 5)
		b6	DO 6 (Channel 6)
		b7	DO 7 (Channel 7)

Troubleshooting

For troubleshooting the NZ2FTS2-8T, refer to the following.

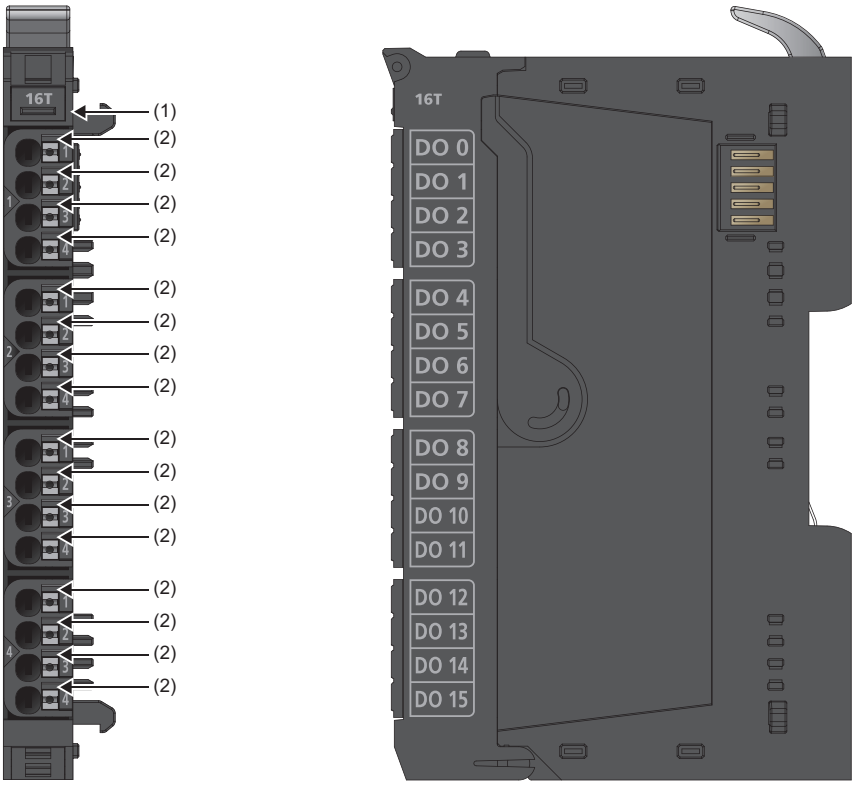
☞ Page 474 Troubleshooting for Digital Output Modules

15.6 NZ2FTS1-16T

This is a 1-wire digital output module with 24VDC (0.5A) transistor output (sink type) at 16 output points.

Part names

This section describes the name of each LED of the NZ2FTS1-16T. (☞ Page 414 I/O Module Common Part Names)

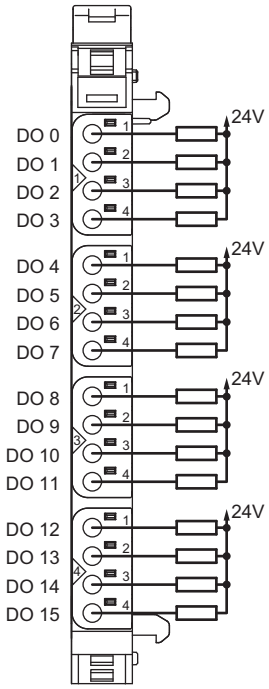


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 474 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the output ON/OFF states of each channel. On in yellow: Output is on. Off: Output is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS1-16T and external devices.

Ex.



When using an inductive load, consider installing a flyback diode externally.

Power is fed back through the channels when the inductive loads are switched off. The output modules shut off the energy depending on the switching frequency, resulting in energy loss. If the permissible output power loss is exceeded, the module shuts down temporarily.

Feedback energy can be prevented by installing a flyback diode. With a flyback diode, the switching rate equivalent to a resistive load can be achieved with an inductive load.

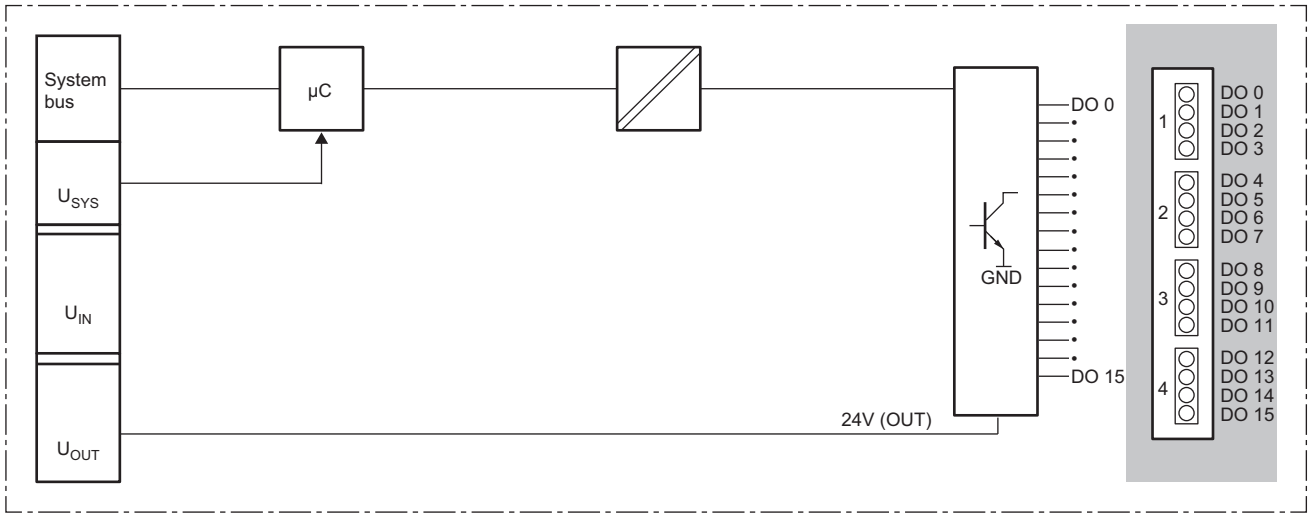
Performance specifications

This section describes the performance specifications of the NZ2FTS1-16T. (☞ Page 30 General Specifications)

Item		NZ2FTS1-16T
System bus transfer speed		48Mbps
Number of points		16
Output type		Sink type output
Load type		Resistive load, inductive load, lamp load
Response time		L→H: 100μs H→L: 250μs
Maximum output current	Per channel	0.5A
	Per module	8A
Switching frequency	Resistive load (47Ω minimum)	1kHz
	Inductive load (DC13)	When no flyback diode is used: 0.2Hz When an appropriate flyback diode is used: 1kHz
	Lamp load (12W)	10Hz
External device connection method		1-wire
Supply to external device		Not available
Short circuit protection		Available
Protection circuit		When the prescribed current flows, the temperature switch interrupts the circuit, and the module resets automatically.
Current control circuit response time		Less than 100μs
Module diagnostics		Available
External power supply voltage		24VDC +20%/-15%
Input power supply current consumption		30mA
Current consumption of external power supply for output part		30mA + load
Weight		96g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS1-16T.



Parameter setting

No parameters can be set for the NZ2FTS1-16T.

Process data

The following table lists the Process data of the NZ2FTS1-16T.

Input/Output	Address (byte)	Bit	Description
Output	0	b0	DO 0 (Channel 0)
		b1	DO 1 (Channel 1)
		b2	DO 2 (Channel 2)
		b3	DO 3 (Channel 3)
		b4	DO 4 (Channel 4)
		b5	DO 5 (Channel 5)
		b6	DO 6 (Channel 6)
		b7	DO 7 (Channel 7)
	1	b8	DO 8 (Channel 8)
		b9	DO 9 (Channel 9)
		b10	DO 10 (Channel 10)
		b11	DO 11 (Channel 11)
		b12	DO 12 (Channel 12)
		b13	DO 13 (Channel 13)
		b14	DO 14 (Channel 14)
		b15	DO 15 (Channel 15)

Troubleshooting

For troubleshooting the NZ2FTS1-16T, refer to the following.

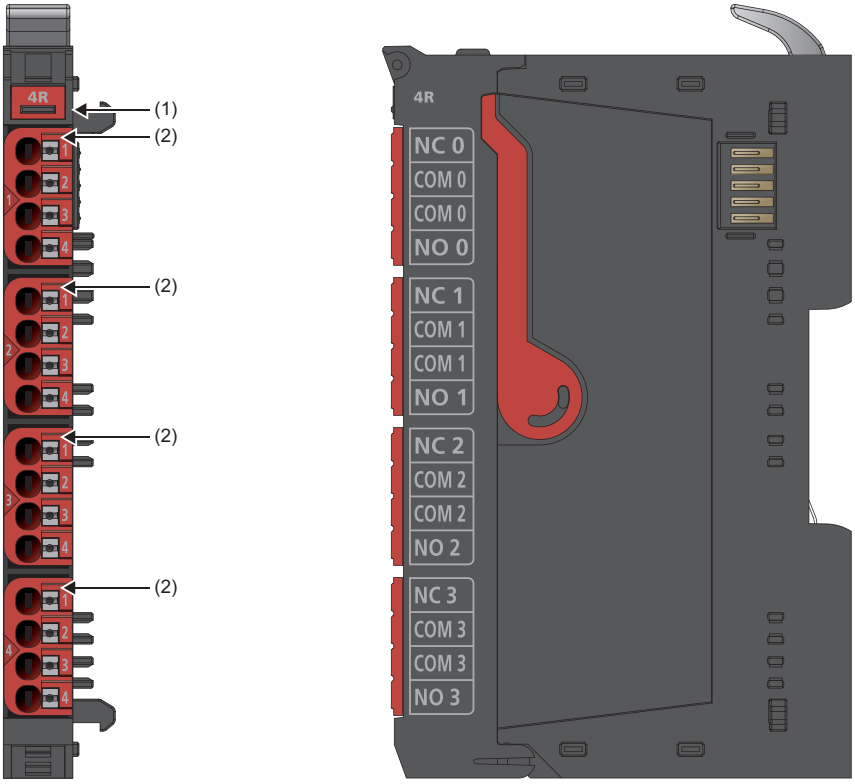
☞ Page 474 Troubleshooting for Digital Output Modules

15.7 NZ2FTS3-4R

This is a 3-wire digital output module with contact output 255VAC/24VDC, 6A at four output points.

Part names

This section describes the name of each LED of the NZ2FTS3-4R. (☞ Page 414 I/O Module Common Part Names)

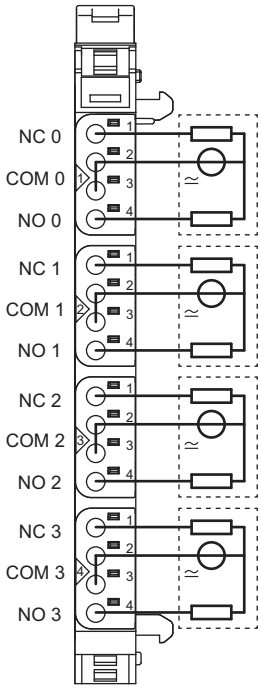


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 474 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the output ON/OFF states of each channel. On in yellow: Output is on. Off: Output is off.

Connection diagram

The following figure shows the connection diagram between the NZ2FTS3-4R and external devices.

Ex.



Controls up to 4 actuators with a 6A maximum. Power is supplied to the relay coil from the output current path (I_{OUT}).

Precautions

When using the module in an environment where there is a risk of explosion, observe the following.

- Install the module in an environment without condensation, corrosives, or conductive dust.
- If the switching voltage or input voltage exceeds 63V, prepare a transient protection device that limits the peak voltage to 500V or less during transitions.
- Be sure that the temperature does not exceed the temperature class T4 limit, because the relay may wear out. Contact resistance that exceeds 110mΩ results in a failure.
- Use only resistive loads.

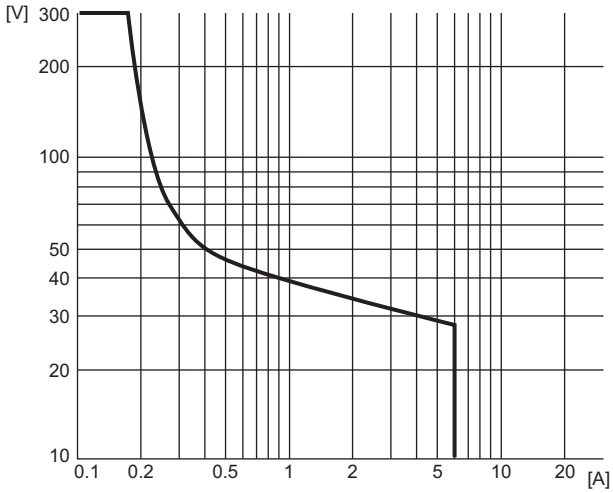
Performance specifications

This section describes the performance specifications of the NZ2FTS3-4R. (☞ Page 30 General Specifications)

Item		NZ2FTS3-4R
System bus transfer speed		48Mbps
Number of points		4
Output type		Relay output
Response time		20ms
Maximum output current	Per channel	Between 55℃ and 60℃: 5A 55℃ or lower: 6A (IECEx/ATEX: Between 55℃ and 60℃: 2.4A) (IECEx/ATEX: 55℃ or lower: 3A)
	Per module	Between 55℃ and 60℃: 20A 55℃ or lower: 24A (IECEx/ATEX: Between 55℃ and 60℃: 9.6A) (IECEx/ATEX: 55℃ or lower: 12A)
Switching frequency	Resistive load (47Ω minimum)	5Hz maximum
Supply to external device		Not available
Short circuit protection		Not available
Protection circuit		6A external fuse
Life (15VAC, load current 1A)		300.000 times or more
Module diagnostics		Available
External power supply voltage		24VDC +20%/-15%
Input power supply current consumption		35mA
Current consumption of external power supply for output part		4mA + 4mA/active relay
Weight		117g

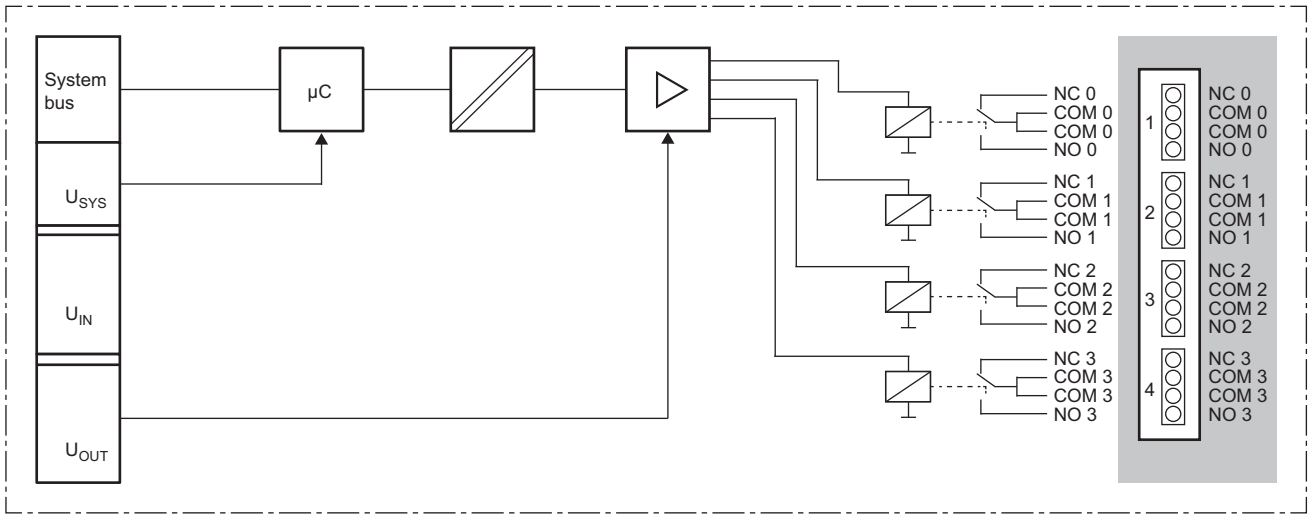
Derating

The following figure shows the derating curve of the maximum switching voltage for the resistive load of the NZ2FTS3-4R.



Block diagram

The following figure shows the internal block diagram of the NZ2FTS3-4R.



Substitute value setting function and parameter setting

The following table lists the parameters that can be set for the NZ2FTS3-4R.

Item		Description	Setting range*1
DO 0 (Channel 0)	Substitute value	Sets the output ON/OFF state when a fieldbus error has occurred. It depends on the setting of the parameter "Output behaviour on fieldbus error" of the coupler.	• Off (0) • On (1) (Default: Off)
DO 1 (Channel 1)			
DO 2 (Channel 2)			
DO 3 (Channel 3)			

*1 (0) and (1) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

Process data

The following table lists the Process data of the NZ2FTS3-4R.

Input/Output	Address (byte)	Bit	Description
Output	0	b0	DO 0 (Channel 0)
		b1	DO 1 (Channel 1)
		b2	DO 2 (Channel 2)
		b3	DO 3 (Channel 3)
		b4	System area
		b5	System area
		b6	System area
		b7	System area

Troubleshooting

For troubleshooting the NZ2FTS3-4R, refer to the following.

☞ Page 474 Troubleshooting for Digital Output Modules

15.8 Troubleshooting for Digital Output Modules

If problems occur on the digital output module, perform the following.

Checking with LEDs

When the module status LED turns on in red

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.
Is the I/O module mounted properly?	Mount the I/O module again by pressing it to the coupler until it clicks.
Is the rated load voltage within the specified range?	Set the rated load voltage within the range of the performance specifications.

If the problem persists even after checking the above, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

Troubleshooting by symptom

ON/OFF status of an external output cannot be output

Check the following items in order from the top.

Item	Action
Does the LED of the coupler indicate normal operation?	If the LED that indicates an error on the coupler is on, an error has occurred. Perform troubleshooting.
Is the module status LED of the digital output module on in red?	If the module status LED of the digital output module is on in red, an error has occurred. Perform troubleshooting. (☞ Page 474 Checking with LEDs)
Does the channel status LED of the digital output module turn on when Process data is turned on? Check the channel status LED of the actual digital input module, not the Web server. When the output power supply voltage is lowered, the indication of both channel status LEDs may not match.	If the output power supply LED 4.1 is off, there is a problem with the output power cable (24VDC OUT, GND OUT). Check that the output power cable is not disconnected or short-circuited. Then, change the wiring if necessary.
Is the output module forced on in Force mode, and does the channel status LED of the output module turn on?	■Other than NZ2FTS3-4R If the channel status LED of the output module remains off, the module may have failed. Replace the module. ■NZ2FTS3-4R • When the channel status LED of the output module is on The switching voltage may be out of the specified range. Check whether the switching voltage is within the specified range, and adjust it to within the specified range. (☞ Page 472 Derating) • When the channel status LED of the output module remains off The module may have failed. Check whether the switching voltage is within the specified range, and then replace the module as necessary. (☞ Page 472 Derating)
Is the output module forced off in Force mode, and does the channel status LED of the output module turn off?	If the channel status LED of the output module remains on, the module may have failed. Replace the module.
Are the refresh settings configured?	If the refresh settings have been configured, specify the CPU module device that is the refresh source.

If the ON/OFF status of the external output still cannot be output after checking all of the above and checking the LED of the coupler, Web server, and so on, there is a risk of a hardware failure in the digital output module.
Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

16 ANALOG INPUT MODULE

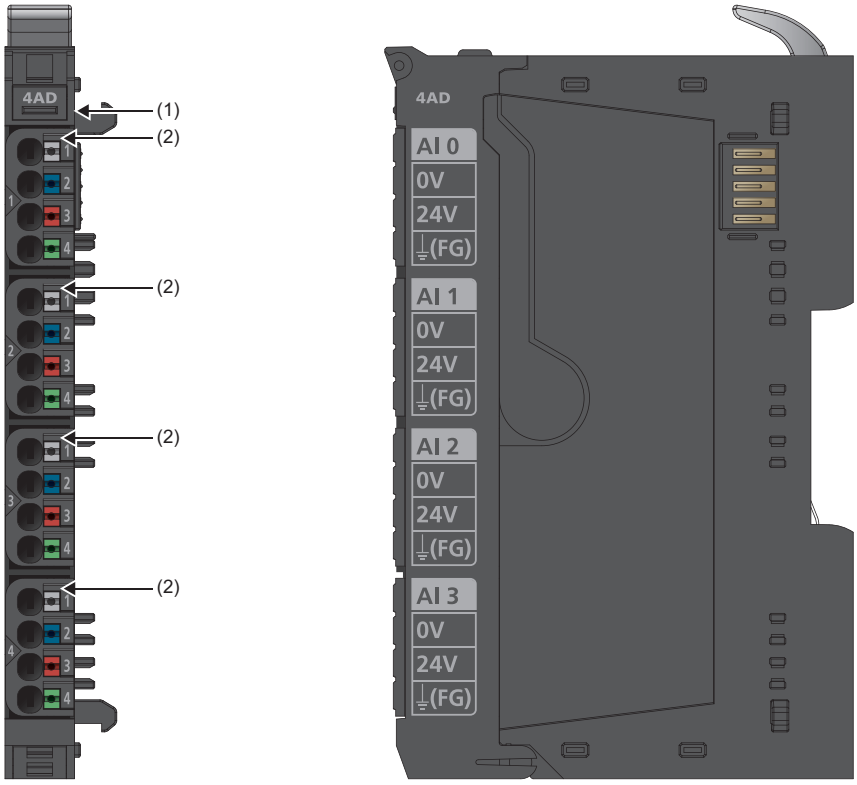
This chapter describes the details of the analog input module.

16.1 NZ2FTS-60AD4

This is a 4ch analog input module.

Part names

This section describes the name of each LED of NZ2FTS-60AD4. (☞ Page 414 I/O Module Common Part Names)

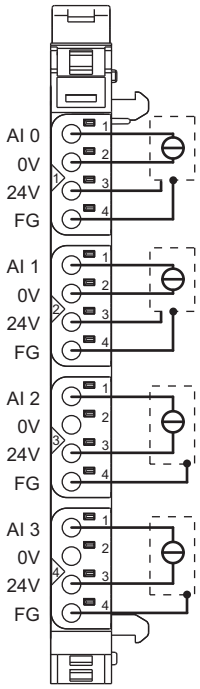


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 485 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the operating status of the channel. On in red: Channel error (☞ Page 485 When the channel status LED turns on in red) Off: No error

Connection diagram

The following figure shows the connection diagram between the NZ2FTS-60AD4 and external devices.

Ex.



Each input channel is protected against voltage surges and overcurrent. However, voltage over ±30V may damage the module. As a protection against overcurrent, the module temporarily switches to the voltage mode.

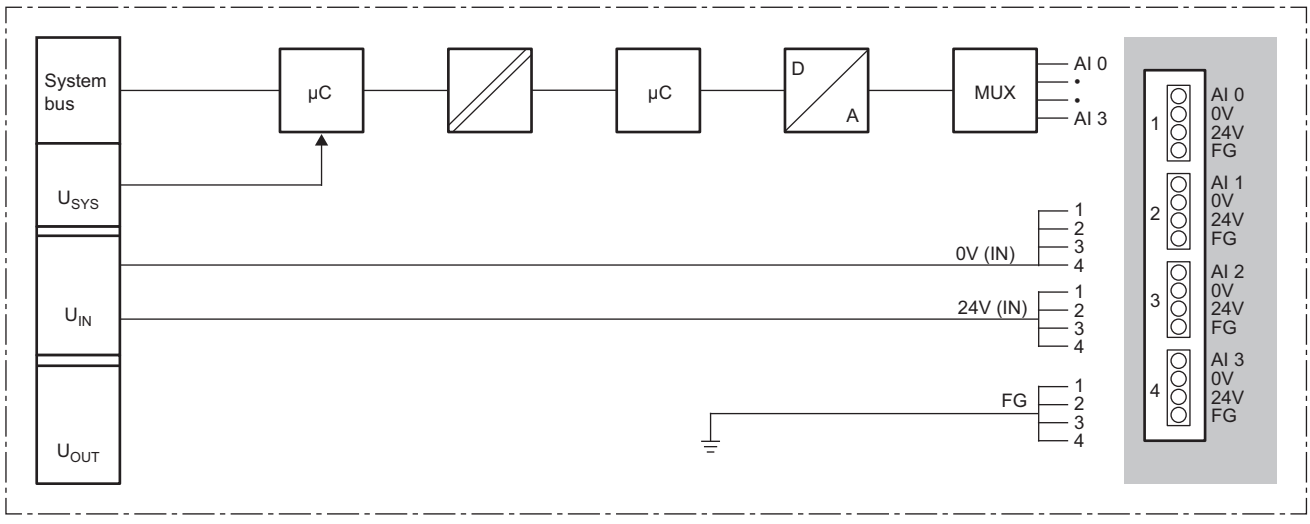
Performance specifications

This section describes the performance specifications of the NZ2FTS-60AD4. (☞ Page 30 General Specifications)

Item	NZ2FTS-60AD4
System bus transfer speed	48Mbps
Number of points	4
Input range	■Voltage • 0 to 5V • -5 to 5V • 0 to 10V • -10 to 10V • 1 to 5V • 2 to 10V ■Current • 0 to 20mA • 4 to 20mA
Resolution	16 bits
Accuracy	0.1% maximum at 25℃ ±50ppm/K maximum as temperature coefficient In the voltage mode, the accuracy variation increases depending on the power supply current amount to the external device (+10mV/A maximum).
Supply to external device	2A maximum per circuit, 8A in total
External device connection method	2-wire, 3-wire, 3-wire + FG
Conversion time	1ms
Internal resistance	Voltage input (U): 100kΩ Current input (I): Approx. 42Ω
Reverse polarity protection	Provided
Short circuit protection	Provided
Protection circuit response time	< 50ms
Module diagnostics	Provided
External power supply voltage	24VDC + 20%/-15%
Module current consumption	40mA
Current consumption of external power supply for output part	25mA + supply to external device
Weight	96g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS-60AD4.

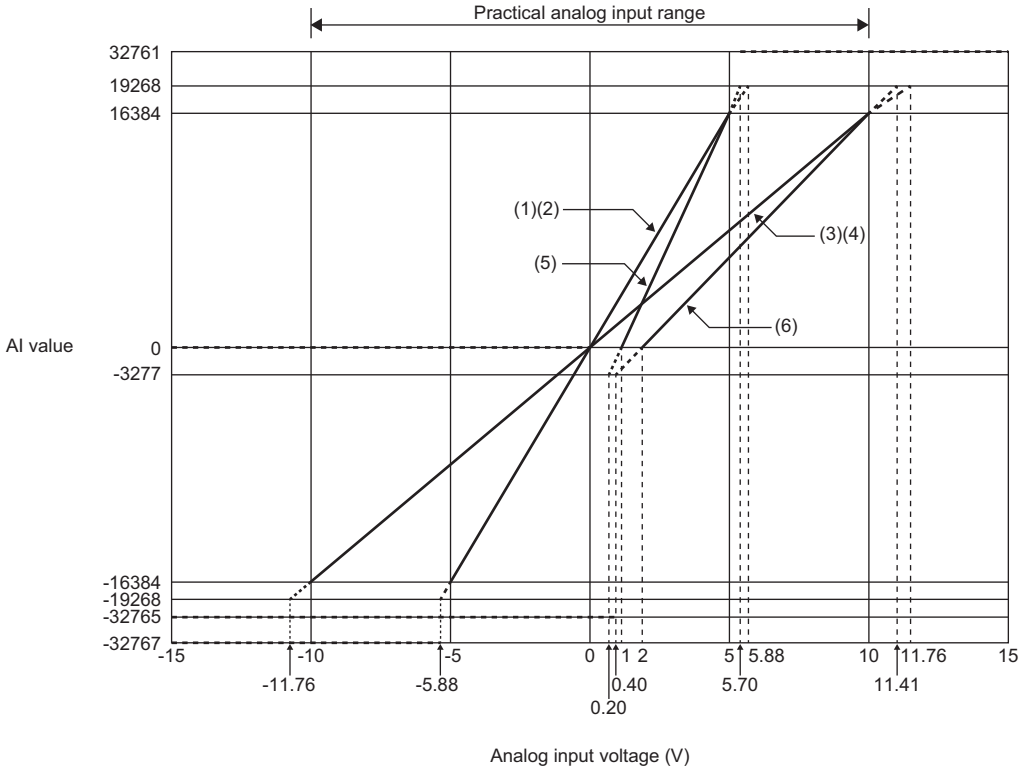


Input characteristics and maximum resolution

This section describes input characteristics and maximum resolution for each parameter setting of the NZ2FTS-60AD4.

■Voltage input characteristics

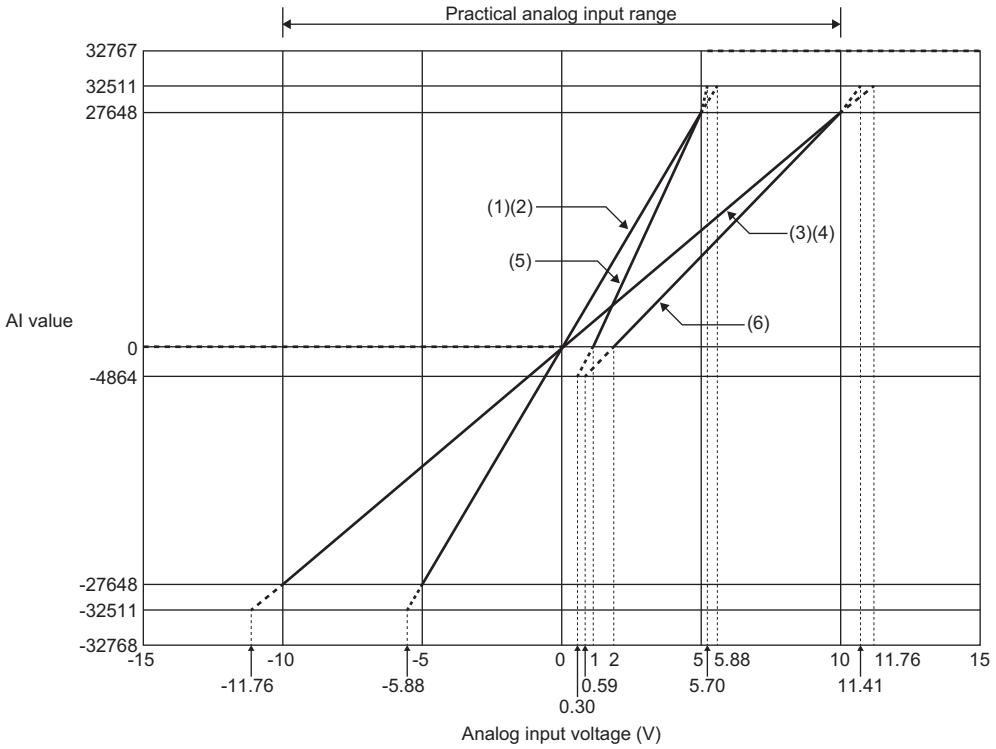
When the parameter "Data format" is "Normal resolution format"



No.	Measurement range	AI value	Maximum resolution
(1)	0 ... 5V	0 to 16384 (When the voltage input is less than 0V, the AI value is 0.)	2441.5μV
(2)	-5 ... 5V	-16384 to 16384 (When the voltage input is less than -5.88V, the AI value is -32767.)	2441.5μV
(3)	0 ... 10V	0 to 16384 (When the voltage input is less than 0V, the AI value is 0.)	4882.9μV
(4)	-10 ... 10V	-16384 to 16384 (When the voltage input is less than -11.76V, the AI value is -32767.)	4882.9μV
(5)	1 ... 5V	0 to 16384 (When the voltage input is less than 0.20V, the AI value is -32765.)	1953.2μV
(6)	2 ... 10V	0 to 16384 (When the voltage input is less than 0.40V, the AI value is -32765.)	3906.3μV

For Normal resolution format, the lower 3 bits of the AI value contain bit information that indicates the status. (☞ Page 483 For "Normal resolution format")

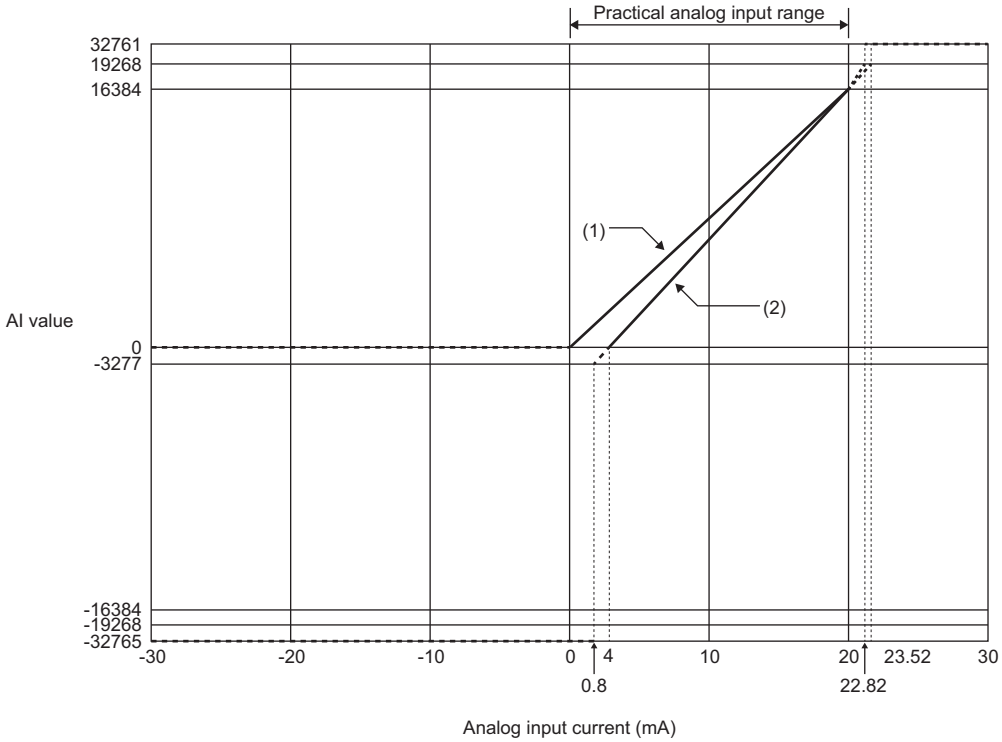
When the parameter "Data format" is "High resolution format"



No.	Measurement range	AI value	Maximum resolution
(1)	0 ... 5V	0 to 27648 (When the voltage input is less than 0V, the AI value is 0.)	180.9μV
(2)	-5 ... 5V	-27648 to 27648	180.9μV
(3)	0 ... 10V	0 to 27648 (When the voltage input is less than 0V, the AI value is 0.)	361.7μV
(4)	-10 ... 10V	-27648 to 27648	361.7μV
(5)	1 ... 5V	0 to 27648	144.7μV
(6)	2 ... 10V	0 to 27648	289.4μV

■Current input characteristics

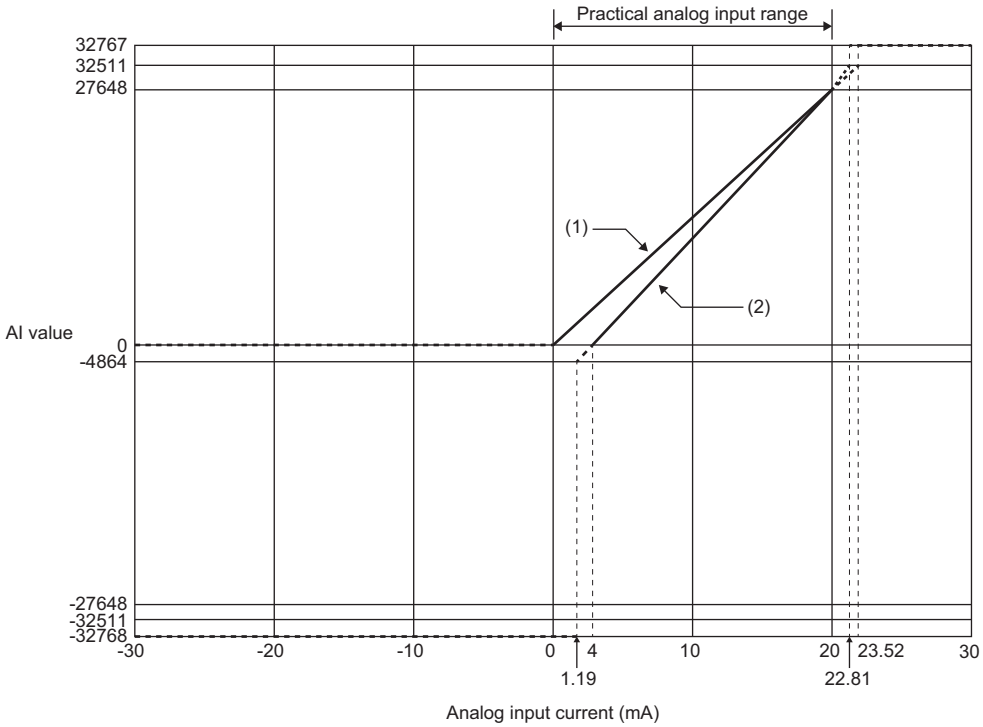
When the parameter "Data format" is "Normal resolution format"



No.	Measurement range	AI value	Maximum resolution
(1)	0 ... 20mA	0 to 16384	9765.7nA
(2)	4 ... 20mA	0 to 16384	7812.5nA

For Normal resolution format, the lower 3 bits of the AI value contain bit information that indicates the status. (☞ Page 483 For "Normal resolution format")

When the parameter "Data format" is "High resolution format"



No.	Measurement range	AI value	Maximum resolution
(1)	0 ... 20mA	0 to 27648	723.4nA
(2)	4 ... 20mA	0 to 27648	578.8nA

Functions

This section describes the functions of the NZ2FTS-60AD4.

Function list

Item	Description	Reference
Noise filter function	Eliminates external noises through noise filtering.	Page 482 Noise filter function
Resolution mode function	Sets the resolution of AI values by switching the resolution mode according to the application.	Page 483 Resolution mode function
Range switching function	Sets the input range for each channel. The input range is set with the parameter "Measurement range".	Page 484 Parameter settings

Noise filter function

This function eliminates external noises through noise filtering.

The parameter "Frequency suppression" applies to all channels.

■When "Frequency suppression" is "50Hz"

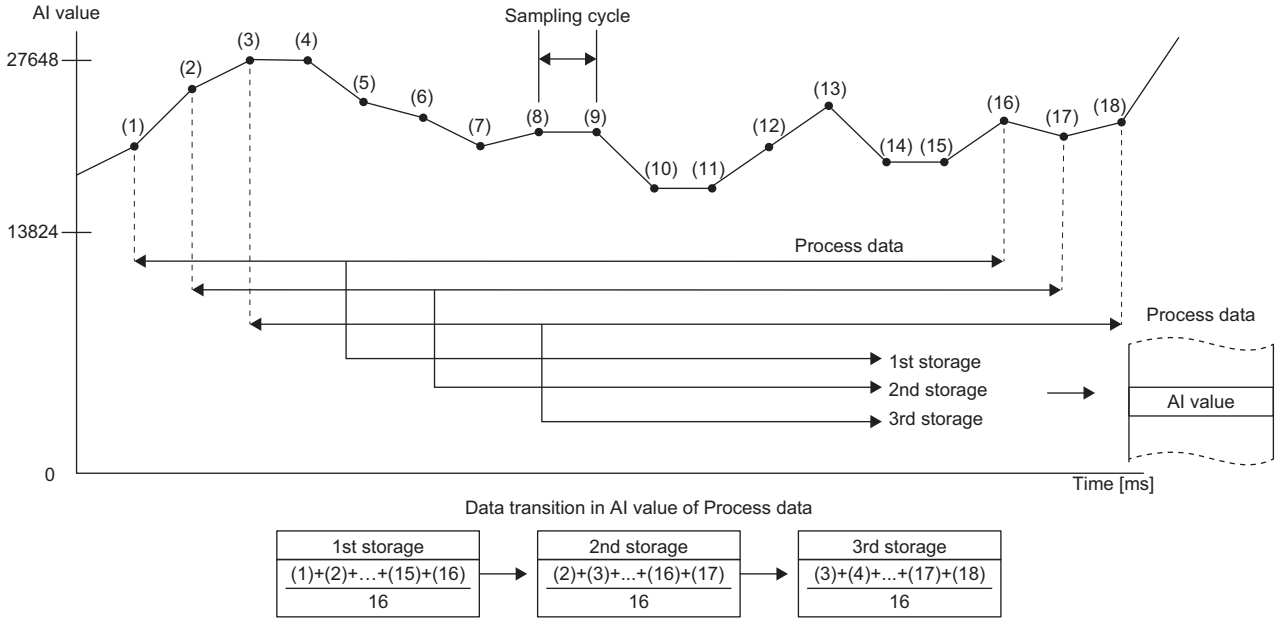
External noises (50Hz) are eliminated.

■When "Frequency suppression" is "60Hz"

External noises (60Hz) are eliminated.

■When "Frequency suppression" is "Average over 16 values"

The average of the last 16 AI values (including the current value) obtained at every sampling cycle is stored in the AI value of the Process data. The target range for average processing moves at each sampling, thereby allowing an AI value to be obtained for every conversion cycle.



■When "Frequency suppression" is "2Hz low pass"

The frequency components that are unnecessary for the input signal (those higher than 2Hz) are eliminated.

Resolution mode function

This function sets the resolution of AI values according to the application.

The resolution is set with the parameter "Data format" for each channel. (☞ Page 484 Parameter settings)

■For "Normal resolution format"

The following table shows the data configuration of AI values when "Normal resolution format" is set.

Data bit	b7	b6	b5	b4	b3	b2	b1	b0
Byte 0 (High byte)	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}
Byte 1 (Low byte)	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	A	F	O

The lower 3 bits of byte 1 contain bit information that indicates the status.
A: 0 = Disabled, 1 = Enabled
F: 0 = During power-on, 1 = Disconnection
O: 0 = 0 to 4095 units, 1 = ±4096 units (overflow)

■For "High resolution format"

The following table shows the data configuration of AI value when "High resolution format" is set.

Data bit	b7	b6	b5	b4	b3	b2	b1	b0
Byte 0 (High byte)	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}
Byte 1 (Low byte)	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}

Parameter settings

The following table lists the parameters that can be set for the NZ2FTS-60AD4.

Item		Description	Setting range*1
General	Frequency suppression	Eliminates external noises through noise filtering.	• Disabled (0) • 50Hz (1) • 60Hz (2) • Average over 16 values (3) • 2Hz low pass (4) (Default: Disabled)
AI 0 (Channel 0) to AI 3 (Channel 3)	Data format	Sets the resolution of AI values. For the maximum resolution and AI value of each analog input range, refer to the following. ☞ Page 478 Input characteristics and maximum resolution	• Normal resolution format (0) • High resolution format (1) (Default: High resolution format)
	Measurement range	Switches the analog input range for each channel. Switching the range changes I/O conversion characteristic too.	• 0 ... 20mA (0) • 4 ... 20mA (1) • 0 ... 10V (2) • -10 ... 10V (3) • 0 ... 5V (4) • -5 ... 5V (5) • 1 ... 5V (6) • 2 ... 10V (7) • Disabled (8) (Default: Disabled)

*1 (0) to (8) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

Process data

The following table lists the Process data of the NZ2FTS-60AD4.

Input/ Output	Address (byte)	Description	Data format
Input	0 to 1	AI 0 (Channel 0)	Word
	2 to 3	AI 1 (Channel 1)	Word
	4 to 5	AI 2 (Channel 2)	Word
	6 to 7	AI 3 (Channel 3)	Word

Troubleshooting

If problems occur on the NZ2FTS-60AD4, perform the following.

Checking with LEDs

■When the module status LED turns on in red

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.
Is the I/O module mounted properly?	Mount the I/O module again by pressing it to the coupler until it clicks.
Has a channel error occurred?	Check whether the channel status LED is on in red. If it is, perform the actions required when the channel status LED is on in red.
Has a firmware error occurred?	Check the firmware version. Update it if necessary.

■When the module status LED turns off

Check the following item.

Item	Action
Does the externally supplied coupler power supply voltage reach the voltage of the performance specifications?	When all LEDs other than the module status LED are on in red, a coupler power supply bus error has occurred. Set the coupler power supply voltage within the range of the performance specifications.

■When the channel status LED turns on in red

Check the following items in order from the top.

Item	Action
Is the input signal (process value) within the input range?	Input signal is outside of the input range. Check that the input signal (process value) is within the input range. Revise the input signal or the input range setting if the input signal is outside of the range.
Does the externally supplied coupler power supply voltage reach the voltage of the performance specifications?	Set the coupler power supply voltage within the range of the performance specifications.

If the problem persists even after checking the above, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

Troubleshooting by symptom

■AI values cannot be read

Check the following items in order from the top.

Item	Action
Is there any problem with the wiring, such as looseness or disconnection of analog signal lines?	Check the faulty area by checking the signal line visually or conductively.
Is the CPU module in the STOP state?	Change the CPU module to the RUN state.
Is the parameter Measurement range set correctly?	Check the setting of the parameter Measurement range. If the setting is incorrect, set it again.
Does the externally supplied voltage of the input power supply (24VDC) reach the voltage of the performance specifications?	Check whether the voltage of the input power supply (24VDC) is within the range of the performance specifications. (☞ Page 477 Performance specifications)

If the AI values still cannot be read normally after checking all of the above and checking the LED of the coupler, Web server, and so on, there is a risk of a hardware failure in the analog module.

Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

■The AI value is out of the accuracy range

Check the following item.

Item	Action
Are measures against noise taken?	Take measures to reduce noise with a shielded cable for connection.

17 ANALOG OUTPUT MODULE

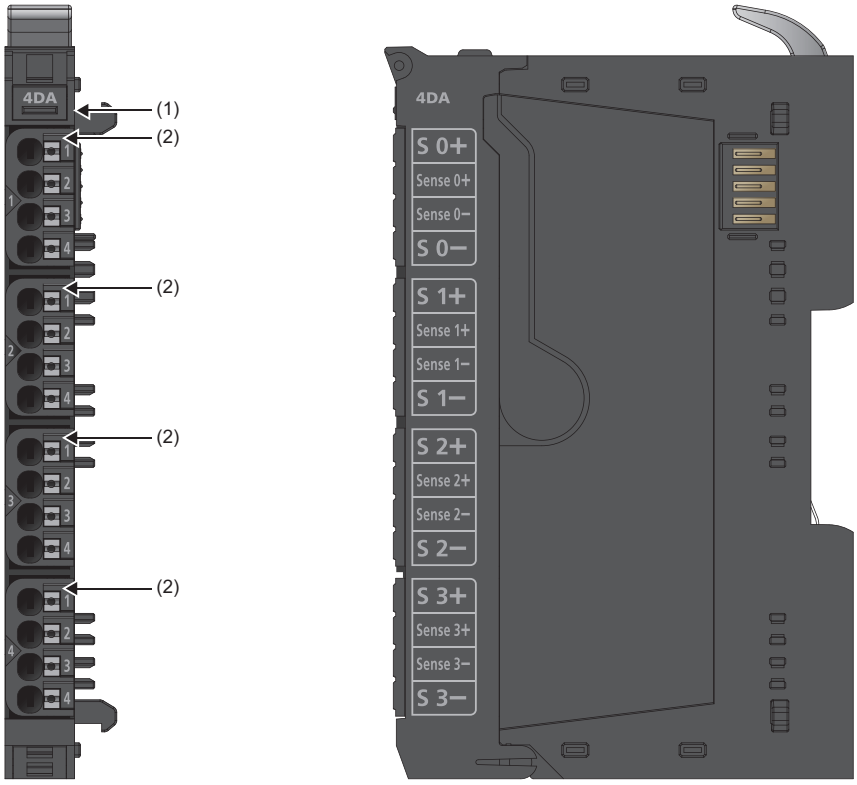
This chapter describes the details of the analog output module.

17.1 NZ2FTS-60DA4

This is a 4ch analog output module.

Part names

This section describes the name of each LED of NZ2FTS-60DA4. (☞ Page 414 I/O Module Common Part Names)

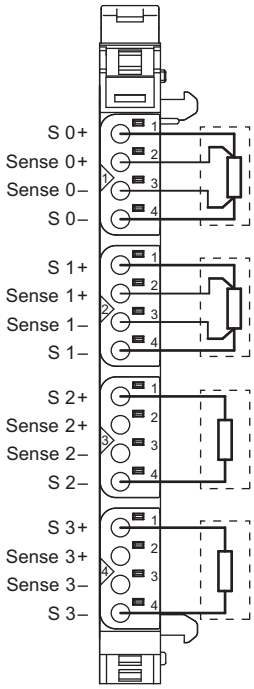


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 497 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the operating status of the channel. On in red (at current output): Overload or short circuit (☞ Page 497 When the channel status LED turns on in red) On in red (at voltage output): Shunt resistance is too high or disconnection is detected (☞ Page 497 When the channel status LED turns on in red). Off: No error

Connection diagram

The following figure shows the connection diagram between the NZ2FTS-60DA4 and external devices.

Ex.



Precautions

S 0-, S 1-, S 2-, and S 3- are connected to the power supply potential (24G).

Perform wiring in such a way that no compensation current will flow through the module. If compensation current flows through the module, it may be broken.

To ensure the modules function properly, follow the instructions below for wiring.

- Use shielded cables and connect them to ground on both ends. When there is a potential difference between the ends, ground one end only.
- Always use 2-core shielded twisted pair cables when connecting external devices.
- Pull the cable shield into the control panel and apply the functional ground. When the control panel is not used, apply it to a shield bus.

Performance specifications

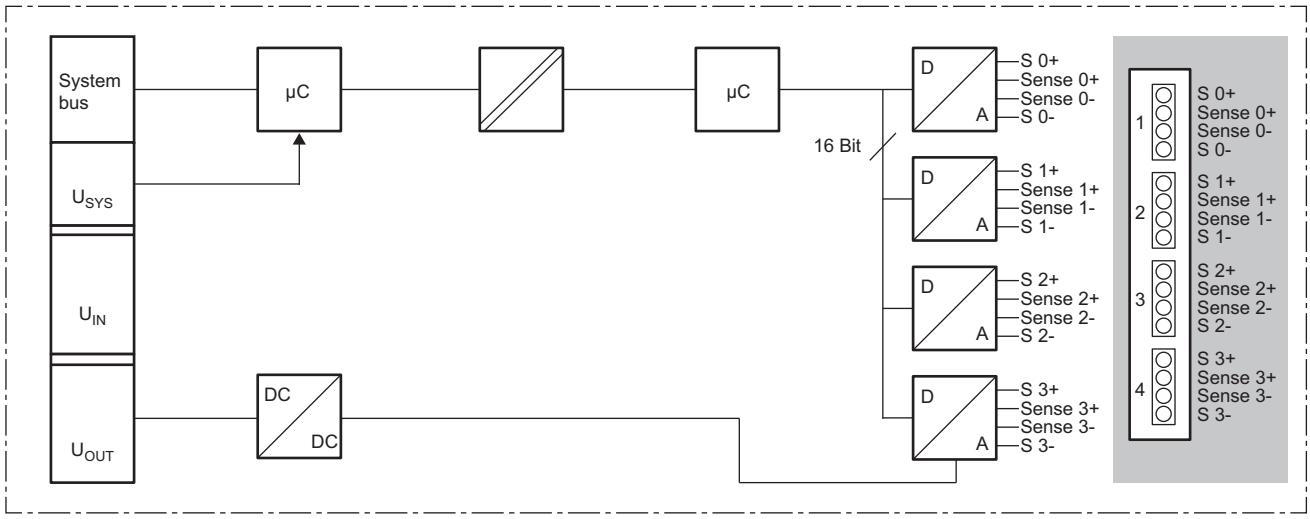
This section describes the performance specifications of the NZ2FTS-60DA4. (☞ Page 30 General Specifications)

Item		NZ2FTS-60DA4
System bus transfer speed		48Mbps
Potential insulation	Channel/system bus	Provided
	Channel/channel	Not provided
Number of points		4
Output level		■Voltage • 0 to 5V • -5 to 5V • 0 to 10V • -10 to 10V • 1 to 5V • 2 to 10V ■Current • 0 to 20mA • 4 to 20mA
Response time		1ms for 4 channels
Resolution		16 bits
Accuracy		0.1%FSR maximum, 0.05%FSR typ.
Temperature coefficient		30ppm/K
Maximum number of errors between T_min and T_max		±0.24%FSR
Monotone		Provided
Inter-channel crosstalk		±0.001%FSR maximum
Reproduction accuracy		< ±1mV eff.
Output ripple		0.001% maximum
Voltage load resistance		≥1kΩ*1
Current load resistance		≤600Ω
External device connection method		2-wire (current and voltage, automatic detection), 4-wire (voltage)
Short circuit protection		Provided
Module diagnostics		Provided
Substitute value		Provided
External power supply voltage		24VDC +20%/-15%
Module current consumption		130mA
Current consumption of external power supply for output part		110mA
Weight		83g

*1 If an ambient temperature exceeds 50℃, the total current of the external device is 25mA maximum.

Block diagram

The following figure shows the internal block diagram of the NZ2FTS-60DA4.

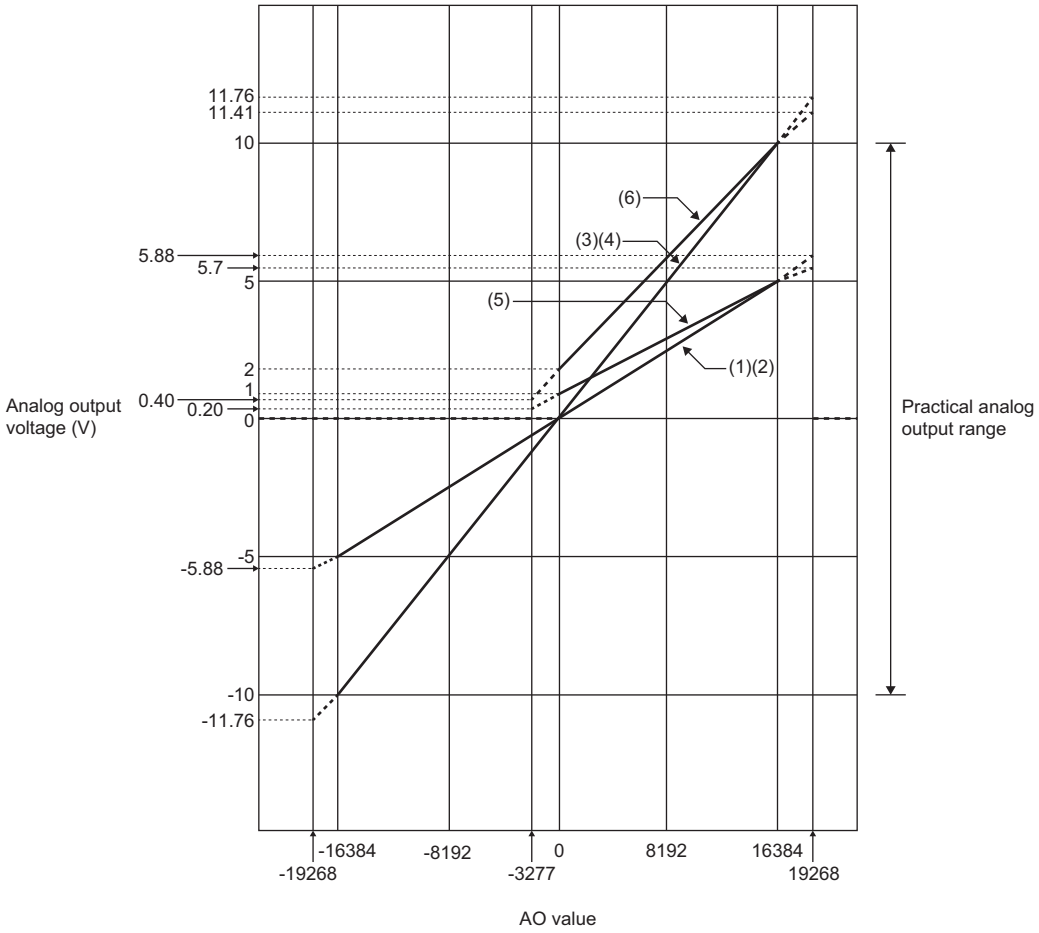


Output characteristics and maximum resolution

This section describes output characteristics and maximum resolution of each parameter setting.

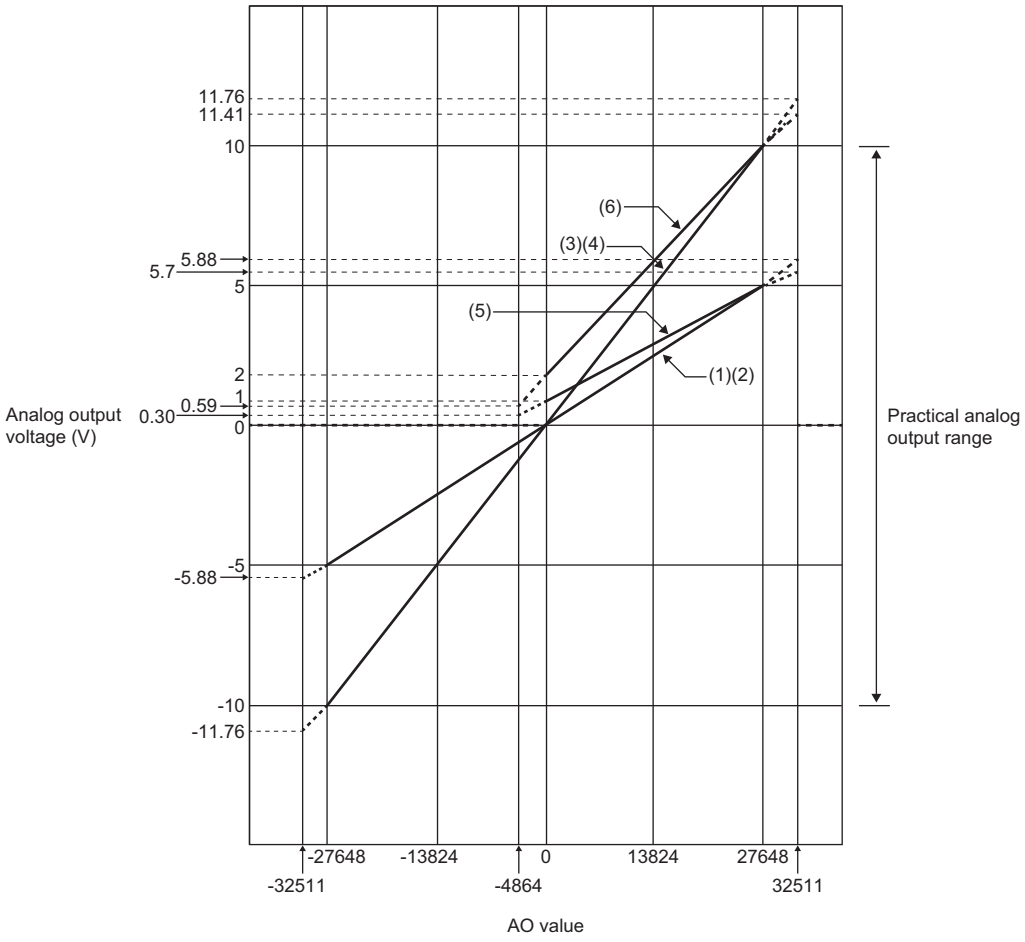
■Voltage output characteristic

When the parameter "Data format" is "Normal resolution format"



No.	Output range	AO value	Maximum resolution
(1)	0 ... 5V	0 to 16384 (When the AO value is less than 0, 0V is output.)	2441.5μV
(2)	-5 ... 5V	-16384 to 16384	2441.5μV
(3)	0 ... 10V	0 to 16384 (When the AO value is less than 0, 0V is output.)	4882.9μV
(4)	-10 ... 10V	-16384 to 16384	4882.9μV
(5)	1 ... 5V	0 to 16384	1953.2μV
(6)	2 ... 10V	0 to 16384	3906.3μV

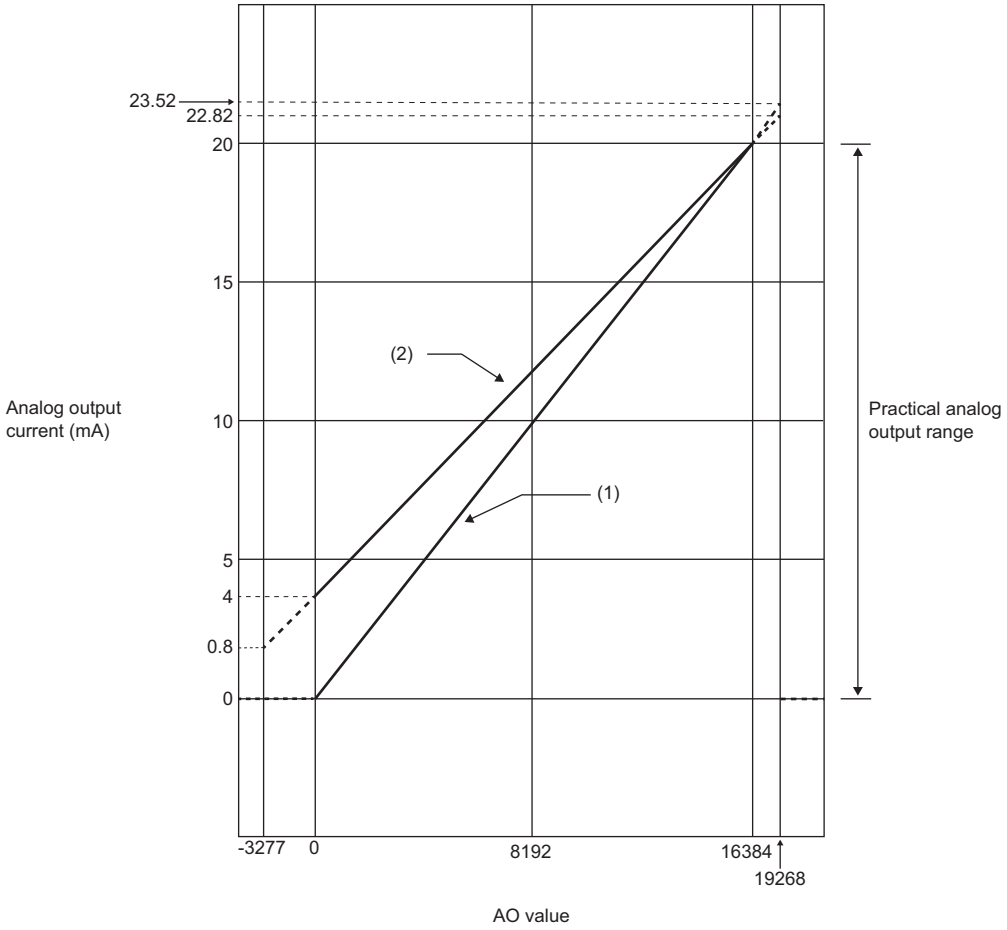
When the parameter "Data format" is "High resolution format"



No.	Output range	AO value	Maximum resolution
(1)	0 ... 5V	0 to 27648 (When the AO value is less than 0, 0V is output.)	180.9μV
(2)	-5 ... 5V	-27648 to 27648	180.9μV
(3)	0 ... 10V	0 to 27648 (When the AO value is less than 0, 0V is output.)	361.7μV
(4)	-10 ... 10V	-27648 to 27648	361.7μV
(5)	1 ... 5V	0 to 27648	144.7μV
(6)	2 ... 10V	0 to 27648	289.4μV

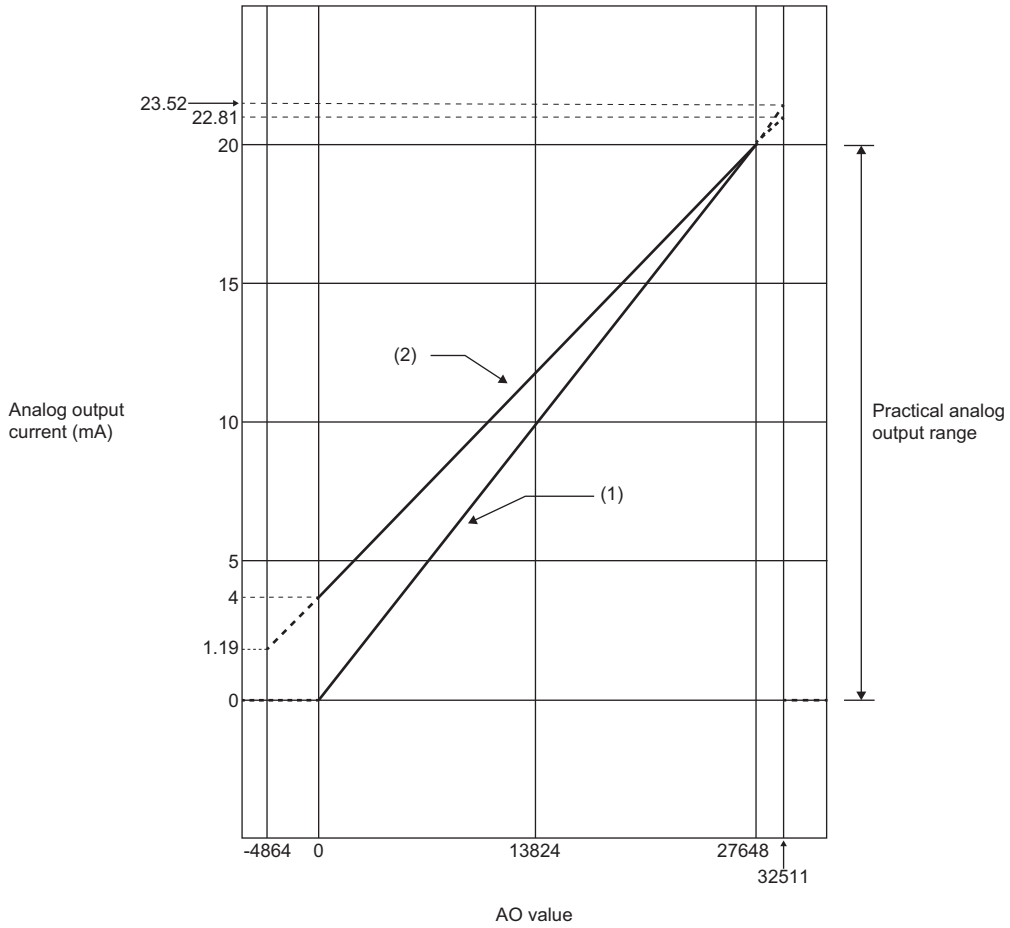
■Current output characteristic

When the parameter "Data format" is "Normal resolution format"



No.	Output range	AO value	Maximum resolution
(1)	0 ... 20mA	0 to 16384	9765.7nA
(2)	4 ... 20mA	0 to 16384	7812.5nA

When the parameter "Data format" is "High resolution format"



No.	Output range	AO value	Maximum resolution
(1)	0 ... 20mA	0 to 27648	723.4nA
(2)	4 ... 20mA	0 to 27648	578.8nA

Functions

This section describes the functions of the NZ2FTS-60DA4.

Function list

Item	Description	Reference
Resolution mode function	Sets the resolution of AO values by switching the resolution mode according to the application.	Page 495 Resolution mode function
Range switching function	Sets the output range for each channel. The output range is set with the parameter "Measurement range".	Page 496 Parameter settings
Preset function	Performs analog output using the preset value (Substitute value) when a fieldbus error occurs.	Page 495 Preset function

Resolution mode function

This function sets the resolution of AO values according to the application.

The resolution is set with the parameter "Data format" for each channel. (☞ Page 496 Parameter settings)

■For "Normal resolution format"

The following table shows the data configuration of AO values when "Normal resolution format" is set.

Data bit	b7	b6	b5	b4	b3	b2	b1	b0
Byte 0 (High byte)	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}
Byte 1 (Low byte)	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	—	—	—

■For "High resolution format"

The following shows the data configuration of AO values when "High resolution format" is set.

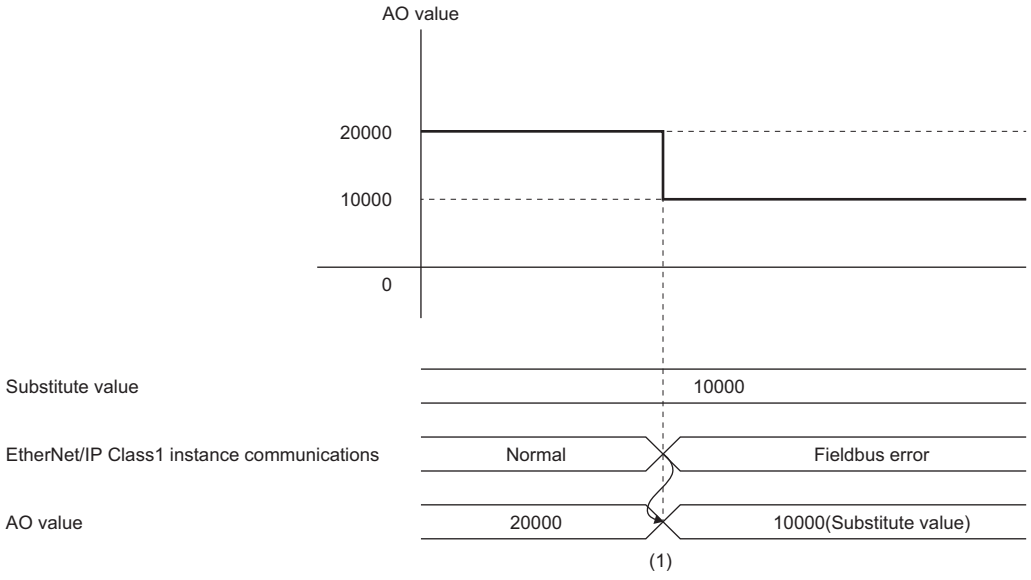
Data bit	b7	b6	b5	b4	b3	b2	b1	b0
Byte 0 (High byte)	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}
Byte 1 (Low byte)	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}

Preset function

This function changes the AO value to the preset value (Substitute value) when a fieldbus error occurs.

Ex.

When "Substitute value" is stored at a fieldbus error occurrence in the EtherNet/IP Class1 instance communications



(1) "Substitute value" is stored in the AO value when a fieldbus error occurs.

Parameter settings

The following table lists the parameters that can be set for the NZ2FTS-60DA4.

Item		Description	Setting range*1
AO 0 (Channel 0) to AO 3 (Channel 3)	Data format	Sets the resolution of AO values. For the maximum resolution and AO value of each analog output range, refer to the following. ☞ Page 489 Performance specifications	• Normal resolution format (0) • High resolution format (1) (Default: High resolution format)
	Output range	Switches the analog output range for each channel. Switching the range changes output conversion characteristic too.	• 0 ... 20mA (0) • 4 ... 20mA (1) • 0 ... 10V (2) • -10 ... 10V (3) • 0 ... 5V (4) • -5 ... 5V (5) • 1 ... 5V (6) • 2 ... 10V (7) • Disabled (8) (Default: Disabled)
	Substitute value	Performs analog output using the preset value when a fieldbus error occurs. It depends on the setting of the parameter "Output behaviour on fieldbus error" of the coupler.	• -32768 to 32767 (16-bit signed binary value) (Default: 0)

*1 (0) to (8) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

Process data

The following table lists the Process data of the NZ2FTS-60DA4.

Input/ Output	Address (byte)	Description	Data format
Output	0 to 1	AO 0 (Channel 0)	Word
	2 to 3	AO 1 (Channel 1)	Word
	4 to 5	AO 2 (Channel 2)	Word
	6 to 7	AO 3 (Channel 3)	Word

Troubleshooting

If problems occur on the NZ2FTS-60DA4, perform the following.

Checking with LEDs

■When the module status LED turns on in red

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.
Is the I/O module mounted properly?	Mount the I/O module again by pressing it to the coupler until it clicks.
Has a channel error occurred?	Check whether the channel status LED is on in red. If it is, perform the actions required when the channel status LED is on in red.

■When the module status LED turns off

Check the following item.

Item	Action
Does the externally supplied coupler power supply voltage reach the voltage of the performance specifications?	When all LEDs other than the module status LED are on in red, a coupler power supply bus error has occurred. Set the coupler power supply voltage within the range of the performance specifications.

■When the channel status LED turns on in red

Check the following items in order from the top.

Item	Action
Are the output values within the output range?	Check that the output values (voltage/current) are within the output range. Revise the output values if they are outside of the range.
Are there any problems with the cable wiring?	Check that the cable wiring is not disconnected/short circuited.
Does the externally supplied coupler power supply voltage reach the voltage of the performance specifications?	Set the coupler power supply voltage within the range of the performance specifications.

If the problem persists even after checking the above, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

Troubleshooting by symptom

■AO value has no corresponding analog output

Check the following items in order from the top.

Item	Action
Is there any problem with the wiring, such as looseness or disconnection of analog signal lines?	Check the faulty area by checking the signal line visually or conductively.
Does the externally supplied voltage of the output power supply (24VDC) reach the voltage of the performance specifications?	Check whether the voltage of the output power supply (24VDC) is within the range of the performance specifications. (☞ Page 489 Performance specifications)
Is the CPU module in the STOP state?	Change the CPU module to the RUN state.
Is the parameter Output range set correctly?	Check the setting of parameter Output range. If the setting is incorrect, set it again.

18 TEMPERATURE INPUT MODULE

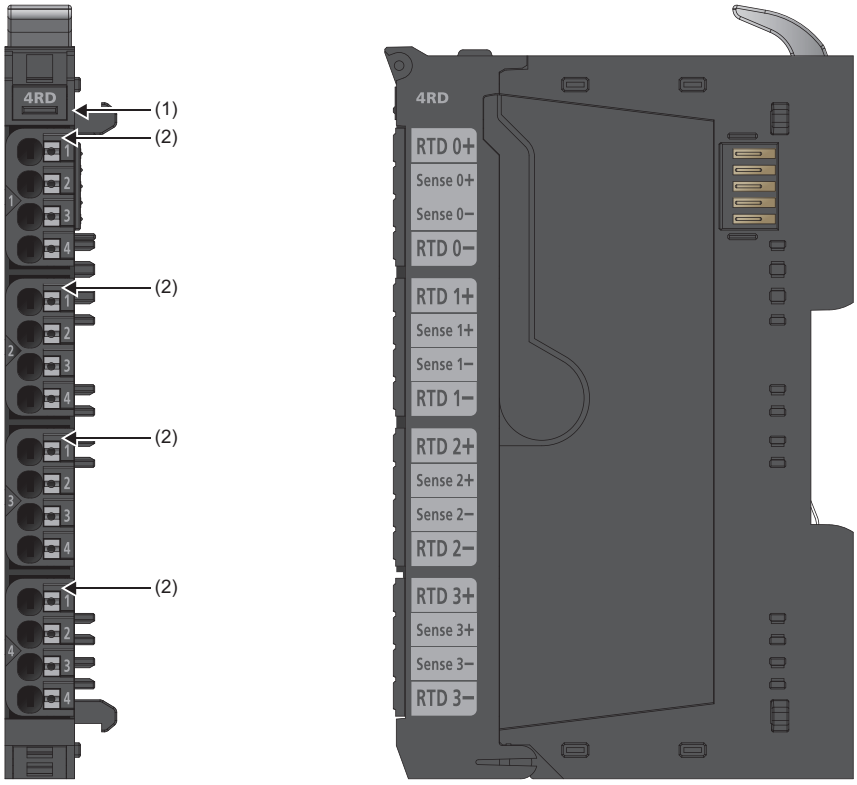
This chapter describes the details of the analog temperature input modules.

18.1 NZ2FTS-60RD4

This is a 4ch analog temperature input module that uses a resistance temperature detector.

Part names

This section describes the name of each LED of the NZ2FTS-60RD4. (☞ Page 414 I/O Module Common Part Names)

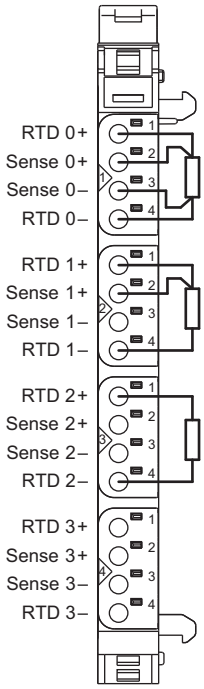


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 507 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the operating status of the channel. On in red: Input signal outside the permissible range, disconnection, or short circuit (☞ Page 507 When the channel status LED turns on in red) Off: No error

Connection diagram

The following figure shows the connection diagram between the NZ2FTS-60RD4 and external devices.

Ex.



Each input channel is protected against voltage surges and overcurrent. However, voltage over ±30V may damage the module.

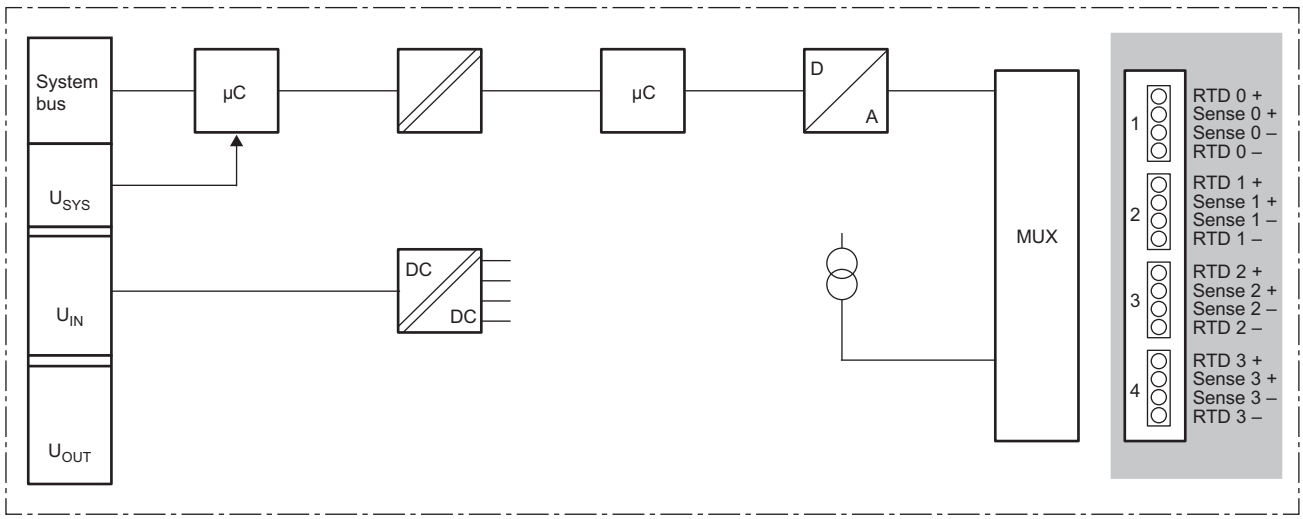
Performance specifications

This section describes the performance specifications of the NZ2FTS-60RD4. (☞ Page 30 General Specifications)

Item		NZ2FTS-60RD4
System bus transfer speed		48Mbps
Internal insulation	Channel/system bus	Provided
	Channel/channel	Not provided
Number of points		4
Thermocouple type		Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, 40Ω, 80Ω, 150Ω, 300Ω, 500Ω, 1kΩ, 2kΩ, 4kΩ
Resolution		16 bits
Accuracy (when the conversion time is 80ms or longer)		Maximum: 0.2%FSR For Ni: 0.3%FSR For Cu10: 0.6% FSR
Thermocouple connection method		2-wire, 3-wire, 4-wire
Thermocouple current		It depends on the thermocouple type. • 0.75mA (Pt100, Ni100, Ni120, Cu10, 40Ω, 80Ω, 150Ω, 300Ω) • 0.25mA (Pt200, Pt500, Pt1000, Ni200, Ni500, Ni1000, 500Ω, 1kΩ, 2kΩ, 4kΩ)
Maximum wire resistance/measurement width		2.5Ω/40Ω, 5Ω/80Ω, 10Ω/150Ω/Cu10, 25Ω
Cold junction compensation		Not provided
Temperature coefficient		±50ppm/K maximum
Temperature width		-200 to +850℃
Conversion time		36 to 240ms (adjustable for each channel)
Common mode input voltage width	Between channels	±2V maximum
	Between channel and voltage supply	±50V maximum
Internal resistance		Not provided
Reverse polarity protection		Provided
Module diagnostics		Provided
External power supply voltage		24VDC +20%/-15%
Module current consumption		30mA
Current consumption of external power supply for output part		< 20mA
Weight		91g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS-60RD4.



Measurement range

The following table lists the measurement range of the resistance value of the NZ2FTS-60RD4.

Measurement range	Resistance value	Decimal	Hexadecimal	Range
40Ω	>47.04Ω	32767	7FFFH	Overload or disconnection
	47.04Ω	32511	7EFFH	Overload
	40Ω	27648	6C00H	Normal range
	0	0	0000H	—
80Ω	>94.07Ω	32767	7FFFH	Overload or disconnection
	94.07Ω	32511	7EFFH	Overload
	80Ω	27648	6C00H	Normal range
	0	0	0000H	—
150Ω	>176.4Ω	32767	7FFFH	Overload or disconnection
	176.4Ω	32511	7EFFH	Overload
	150Ω	27648	6C00H	Normal range
	0	0	0000H	—
300Ω	>352.77Ω	32767	7FFFH	Overload or disconnection
	352.77Ω	32511	7EFFH	Overload
	300Ω	27648	6C00H	Normal range
	0	0	0000H	—
500Ω	>587.9Ω	32767	7FFFH	Overload or disconnection
	587.9Ω	32511	7EFFH	Overload
	500Ω	27648	6C00H	Normal range
	0	0	0000H	—
1kΩ	>1.177kΩ	32767	7FFFH	Overload or disconnection
	1.177kΩ	32511	7EFFH	Overload
	1.0kΩ	27648	6C00H	Normal range
	0	0	0000H	—
2kΩ	>2.352kΩ	32767	7FFFH	Overload or disconnection
	2.352kΩ	32511	7EFFH	Overload
	2.0kΩ	27648	6C00H	Normal range
	0	0	0000H	—
4kΩ	>4.703kΩ	32767	7FFFH	Overload or disconnection
	4.703kΩ	32511	7EFFH	Overload
	4.0kΩ	27648	6C00H	Normal range
	0	0	0000H	—

The following table lists the temperature measurement range of the NZ2FTS-60RD4.

Measurement range	Value in °C 0.1°C resolution	Value in °F 0.1°/digit	Value in K 0.1K/digit	Range
Pt100	-2000 to 8500	-3280 to 15620	732 to 11232	-200℃ to +850℃
	-2040	-3352	692	Underload
	8540	15692	11272	Overload
	32767	32767	32767	Disconnection
Pt200	-2000 to 8500	-3280 to 15620	732 to 11232	-200℃ to +850℃
	-2040	-3352	692	Underload
	8540	15692	11272	Overload
	32767	32767	32767	Disconnection
Pt500	-2000 to 8500	-3280 to 15620	732 to 11232	-200℃ to +850℃
	-2040	-3352	692	Underload
	8540	15692	11272	Overload
	32767	32767	32767	Disconnection
Pt1000	-2000 to 8500	-3280 to 15620	732 to 11232	-200℃ to +850℃
	-2040	-3352	692	Underload
	8540	15692	11272	Overload
	32767	32767	32767	Disconnection
Ni100	-600 to +2500	-760 to 4820	2132 to 5232	-60℃ to 250℃
	-640	-832	2092	Underload
	2540	4892	5272	Overload
	32767	32767	32767	Disconnection
Ni120	-800 to +2600	-1120 to +5000	1932 to 5332	-80℃ to 260℃
	-840	-1192	1892	Underload
	2640	5072	5372	Overload
	32767	32767	32767	Disconnection
Ni200	-600 to +2500	-760 to 4820	2132 to 5232	-60℃ to 250℃
	-640	-832	2092	Underload
	2540	4892	5272	Overload
	32767	32767	32767	Disconnection
Ni500	-600 to +2500	-760 to 4820	2132 to 5232	-60℃ to 250℃
	-640	-832	2092	Underload
	2540	4892	5272	Overload
	32767	32767	32767	Disconnection
Ni1000	-600 to +2500	-760 to 4820	2132 to 5232	-60℃ to 250℃
	-640	-832	2092	Underload
	2540	4892	5272	Overload
	32767	32767	32767	Disconnection
Cu10	-1000 to +2600	-1480 to 5000	1732 to 5332	-100℃ to 260℃
	-1040	-1552	1692	Underload
	2640	5072	5372	Overload
	32767	32767	32767	Disconnection

Functions

This section describes the functions of the NZ2FTS-60RD4.

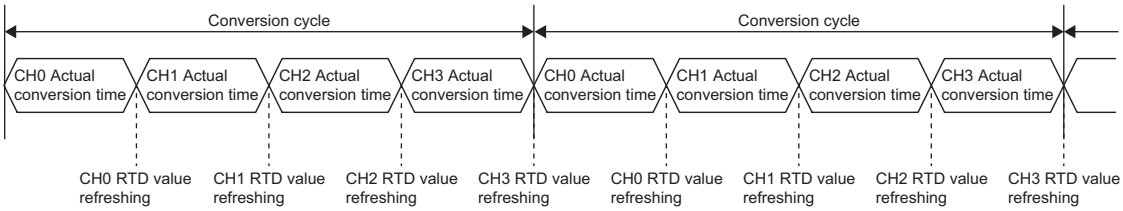
Function list

Item	Description	Reference
Temperature unit selection	Sets a unit of temperature (Celsius/Fahrenheit/Kelvin). The unit of temperature is set with the parameter "Temperature unit".	Page 505 Parameter settings
Range switching	Sets the input range for each channel according to the type of the thermocouple to be connected. The input range is set with the parameter "Measurement range".	Page 505 Parameter settings
Connection method switching	Sets the connection method. The connection method is set with the parameter "Connection type".	Page 505 Parameter settings
Conversion time switching	Set the conversion time to the RTD value for each channel.	Page 505 Parameter settings Page 503 Conversion time switching
Warning output (Process alarm)	Outputs a warning when the measured temperature value enters within the preset range for each channel.	Page 504 Warning output (Process alarm)

Conversion time switching

The conversion time to the RTD value can be set for each channel. The conversion time is set by the parameter "Conversion time". (☞ Page 505 Parameter settings)

The conversion cycle of the RTD value is the total of the actual conversion times of all channels.



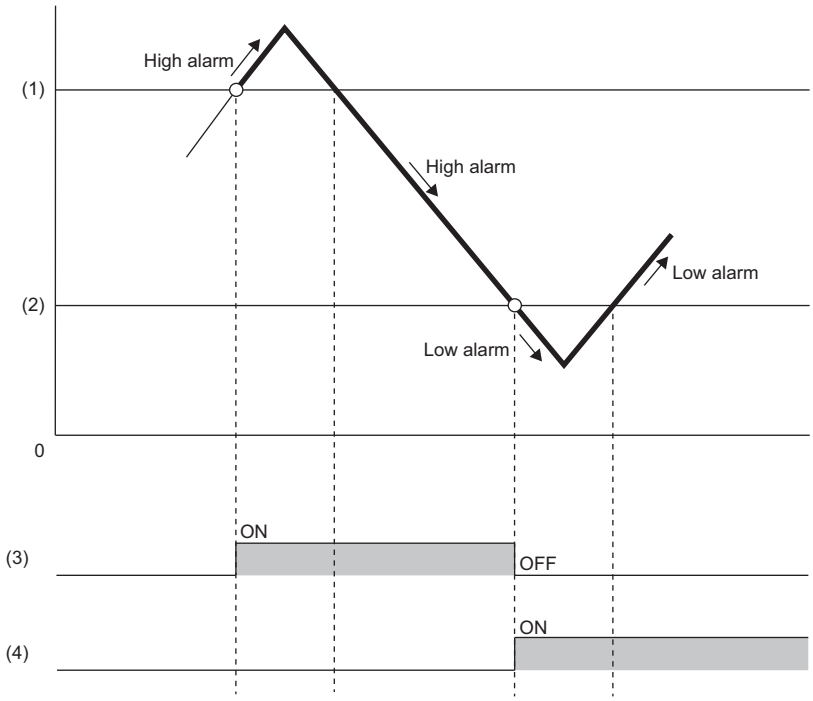
Warning output (Process alarm)

Outputs a warning when the measured temperature value enters within the preset range for each channel. The warning is stored in High alarm or Low alarm of the Process alarm data. (☞ Page 506 Warning data (Process alarm data))
Enabling/disabling the Process alarm is set by the parameter "Limit value monitoring". The upper limit value and lower limit value are set with the parameter "High limit value" and "Low limit value". (☞ Page 505 Parameter settings)
The issued Process alarm will be held even if the measured temperature value becomes not greater than the upper limit or not less than the lower limit.
For the procedure for checking the presence or absence of the process alarm and reading it, refer to Checking warning output (Process alarm) of each coupler. (It cannot be checked on the Web server.)

Point

If the parameter was set to "Low limit value" > "High limit value", the High alarm judgment has priority. The Low alarm is judged when the High alarm did not occur.

Ex.
For Channel 0



(1) Set upper limit
(2) Set lower limit
(3) b0 of "High alarm" of Process alarm data
(4) b0 of "Low alarm" of Process alarm data

Parameter settings

The following table lists the parameters that can be set for the NZ2FTS-60RD4.

Item		Description	Setting range*1
General	Temperature unit	Sets a unit of temperature (Celsius/Fahrenheit/Kelvin). The specified unit of temperature is used for all channels.	• Degree Celsius (0) • Degree Fahrenheit (1) • Kelvin (2) (Default: Degree Celsius)
RTD 0 (Channel 0) to RTD 3 (Channel 3)	Measurement range	Sets the input range for each channel according to the type of the thermocouple to be connected.	• PT100 -200 ... 850 degree C (0) • PT200 -200 ... 850 degree C (1) • PT500 -200 ... 850 degree C (2) • PT1000 -200 ... 850 degree C (3) • NI100 -60 ... 250 degree C (4) • NI120 -80 ... 260 degree C (5) • NI200 -60 ... 250 degree C (6) • NI500 -60 ... 250 degree C (7) • NI1000 -60 ... 250 degree C (8) • Cu10 -100 ... 260 degree C (9) • Resistor 40 Ohm (10) • Resistor 80 Ohm (11) • Resistor 150 Ohm (12) • Resistor 300 Ohm (13) • Resistor 500 Ohm (14) • Resistor 1000 Ohm (15) • Resistor 2000 Ohm (16) • Resistor 4000 Ohm (17) • Disabled (18) (Default: Disabled)
	Connection type	Sets the connection method.	• 2-wire (0) • 3-wire (1) • 4-wire (2) (Default: 2-wire)
	Conversion time	Set the conversion time to the RTD value for each channel. The total of the actual conversion times of all channels is the conversion cycle of the RTD value.	• 240ms (0) • 130ms (1) • 80ms (2) • 55ms (3) • 43ms (4) • 36ms (5) (Default: 80ms)
	Channel diagnostics	Sets Disabled (default).	• Disabled (0) • Enabled (1) (Default: Disabled)
	Limit value monitoring	Outputs an alert when a measurement value falls within the alert output range set in advance. The alert output range is set with "High limit value" and "Low limit value".	• Disabled (0) • Enabled (1) (Default: Disabled)
	High limit value	Sets the upper limit value of the warning output (Process alarm).*2	• -32768 to 32767 (16-bit signed binary value) (Default: 32767)
	Low limit value	Sets the lower limit value of the warning output (Process alarm).*2	• -32768 to 32767 (16-bit signed binary value) (Default: -32768)

*1 (0) to (18) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

*2 Set values within the input range that was set in the parameter "Measurement range". For the range of the input range, refer to the following.

☞ Page 501 Measurement range

Process data

The following table lists the Process data of the NZ2FTS-60RD4.

Input/ Output	Address (byte)	Description	Data format
Input	0 to 1	RTD 0 (Channel 0)	Word
	2 to 3	RTD 1 (Channel 1)	Word
	4 to 5	RTD 2 (Channel 2)	Word
	6 to 7	RTD 3 (Channel 3)	Word

Warning data (Process alarm data)

The following table lists the Process alarm data for the NZ2FTS-60RD4.

Address (byte)	Item	Description	
0	High alarm	b0	Upper limit exceeded channel 0
		b1	Upper limit exceeded channel 1
		b2	Upper limit exceeded channel 2
		b3	Upper limit exceeded channel 3
		b4 to b7	System area
1	Low alarm	b0	Lower limit underrun channel 0
		b1	Lower limit underrun channel 1
		b2	Lower limit underrun channel 2
		b3	Lower limit underrun channel 3
		b4 to b7	System area
2 to 3	16 Bit Time stamp	16 Bit Time stamp	

Troubleshooting

If problems occur on the NZ2FTS-60RD4, perform the following.

Checking with LEDs

■When the module status LED turns on in red

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.
Is the I/O module mounted properly?	Mount the I/O module again by pressing it to the coupler until it clicks.
Has a channel error occurred?	Check whether the channel status LED is on in red. If it is, perform the actions required when the channel status LED is on in red.
Has a firmware error occurred?	Check the firmware version. Update it if necessary.

■When the module status LED turns off

Check the following item.

Item	Action
Does the externally supplied coupler power supply voltage reach the voltage of the performance specifications?	When all LEDs other than the module status LED are on in red, a coupler power supply bus error has occurred. Set the coupler power supply voltage within the range of the performance specifications.

■When the channel status LED turns on in red

Check the following items in order from the top.

Item	Action
Is the input signal (process value) within the input range?	Check that the input signal (process value) is within the input range. Revise the input signal or the input range setting if the input signal is outside of the range.
Are there any problems with the cable wiring?	Check that the cable wiring is not disconnected/short circuited.
Does the externally supplied coupler power supply voltage reach the voltage of the performance specifications?	Set the coupler power supply voltage within the range of the performance specifications.
Is there a problem with the connection of the cold junction compensation resistor?	Check that the cold junction compensation resistor is connected to the channel set with the parameter "Cold junction compensation".

If the problem persists after checking the above, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

Troubleshooting by symptom

■RTD values cannot be read

Check the following items in order from the top.

Item	Action
Is there any problem with the wiring, such as looseness or disconnection of analog signal lines?	Check the faulty area by checking the signal line visually or conductively.
Is the CPU module in the STOP state?	Change the CPU module to the RUN state.
Are the parameters Temperature unit and Measurement range set correctly?	Check the settings of the parameters Temperature unit and Measurement range. If the setting is incorrect, set it again.
Is the resistance temperature detector connected incompletely?	Connect the resistance temperature detector securely.

■The RTD value is out of the accuracy range

Check the following items in order from the top.

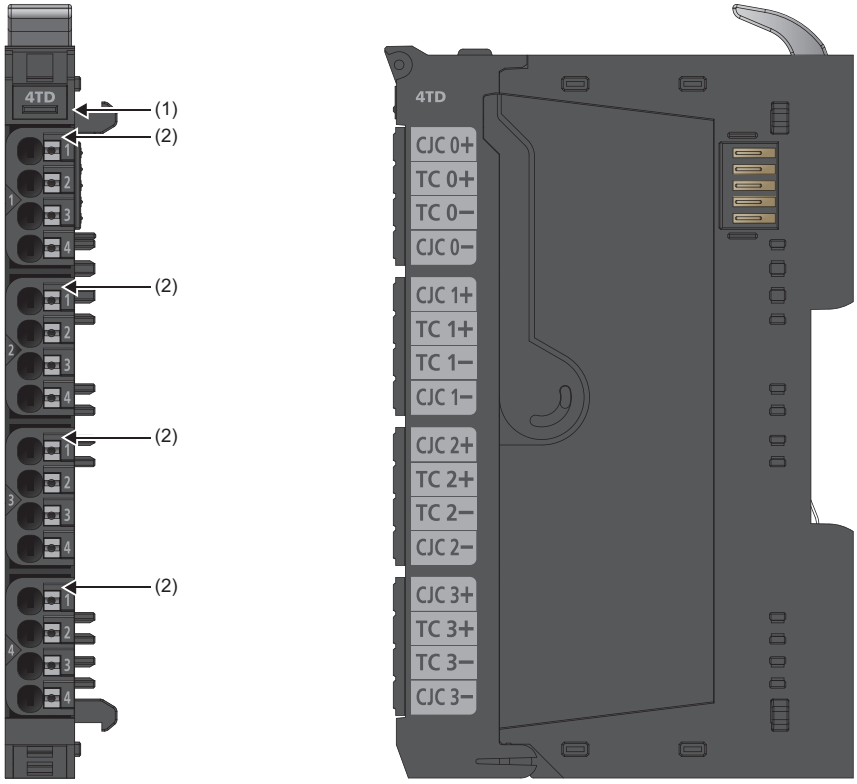
Item	Action
Are measures against noise taken?	Take measures to reduce noise with a shielded cable for connection.
Is noise intruding into the resistance temperature detector input?	Use a shielded cable for the connection, and ground the shielded cable of each channel. In addition, check the influence of adjacent devices, and take measures to reduce noise.
Is the resistance value of the wiring too large? Alternatively, is the wiring length too long?	The larger the resistance value in each wiring, the greater the accuracy error. Reduce the wiring resistance value by shortening the wiring length. For example, install the I/O module close to the temperature measurement target.

18.2 NZ2FTS-60TD4

This is a 4ch analog temperature input module that uses a thermocouple.

Part names

This section describes the name of each LED of the NZ2FTS-60TD4. (☞ Page 414 I/O Module Common Part Names)

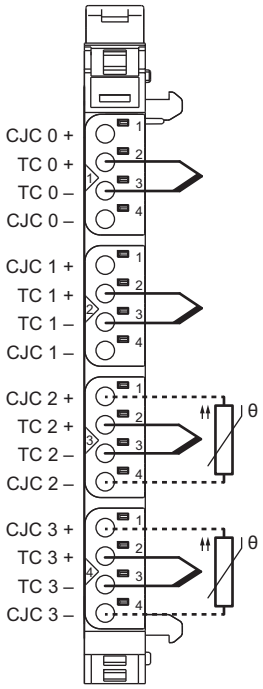


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 519 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED	Indicates the operating status of the channel. On in red: Input signal outside the permissible range, disconnection, or cold junction compensation error (☞ Page 519 When the channel status LED turns on in red) Off: No error

Connection diagram

The following figure shows the connection diagram between the NZ2FTS-60TD4 and external devices.

Ex.



Each input channel is protected against voltage surges and overcurrent. However, voltage over ±30V may damage the module.

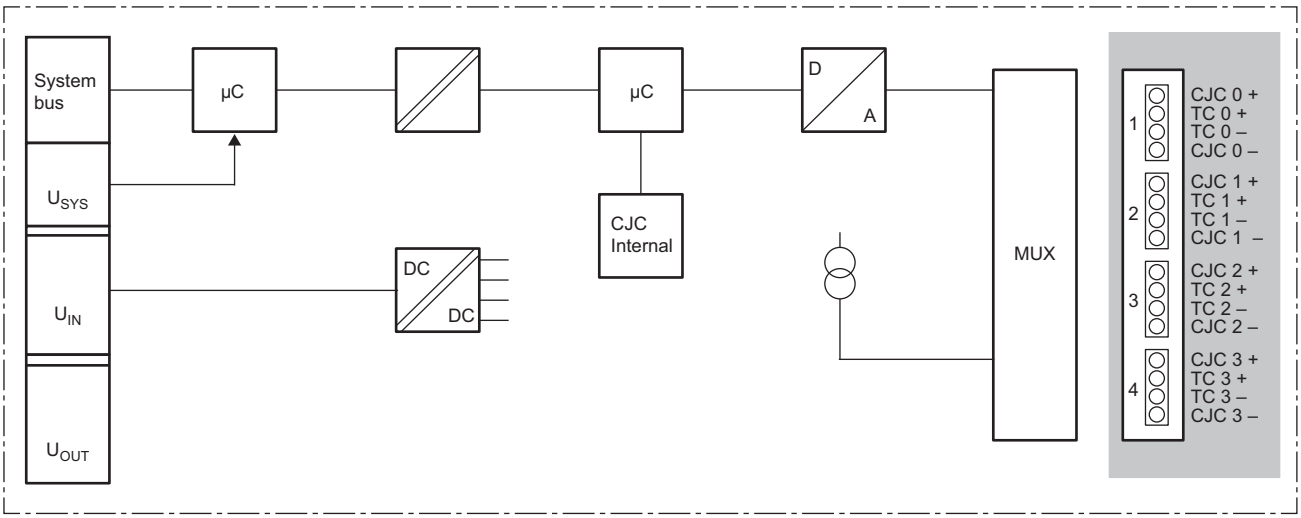
Performance specifications

This section describes the performance specifications of the NZ2FTS-60TD4. (☞ Page 30 General Specifications)

Item		NZ2FTS-60TD4
System bus transfer speed		48Mbps
Internal insulation	Channel/system bus	Available
	Channel/channel	Not available
Number of points		4
Thermocouple type		J, K, T, B, N, E, R, S, L, U, C, mV
Resolution		16 bits
Accuracy (when the conversion time is 80ms or longer)		10μV + 0.1% (of voltage measurement range) (excluding errors due to cold junction compensation)
External device connection method		2-wire
Output current for detected temperature		0.25mA with cold junction compensation made of Pt1000
Cold junction compensation		Internal and external cold junction compensation (Pt1000), internal cold junction compensation accuracy ≤3K
Temperature coefficient		±50ppm/K maximum
Temperature width		-210 to +2315℃
Conversion time		36 to 240ms (adjustable for each channel)
Common mode input voltage width	Between channels	±2V
	Between channel and voltage supply	±50V maximum
Internal resistance		> 1MΩ
Reverse polarity protection		Available
Module diagnostics		Available
External power supply voltage		24VDC +20%/-15%
Module current consumption		30mA
Current consumption of external power supply for output part		20mA
Weight		99g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS-60TD4.



Measurement range

The following table lists the voltage measurement range of the NZ2FTS-60TD4.

Measurement range	Voltage	Decimal signal range	Hexadecimal signal range
±15.625mV	15.625mV	32767	7FFFH
	-15.625mV	-32768	8000H
±31.25mV	31.25mV	32767	7FFFH
	-31.25mV	-32768	8000H
±62.5mV	62.5mV	32767	7FFFH
	-62.5mV	-32768	8000H
±125mV	125mV	32767	7FFFH
	-125mV	-32768	8000H
±250mV	250mV	32767	7FFFH
	-250mV	-32768	8000H
±500mV	500mV	32767	7FFFH
	-500mV	-32768	8000H
±1V	+1V	32767	7FFFH
	-1V	-32768	8000H
±2V	+2V	32767	7FFFH
	-2V	-32768	8000H

The following table lists the temperature measurement range of the NZ2FTS-60TD4.

Measurement range	Value in °C 0.1°C resolution	Value in °F 0.1°/digit	Value in K 0.1K/digit	Range
Type K	-2000 to 13720	-3280 to 25016	732 to 16452	-200℃ to +1372℃
	-2040	-3352	692	Underload
	13760	25088	16492	Overload
	32767	32767	32767	Disconnection, cold compensation error
Type J	-2100 to 12000	-3460 to 21920	632 to 14732	-210℃ to +1200℃
	-2140	-3532	592	Underload
	12040	21992	14772	Overload
	32767	32767	32767	Disconnection, cold compensation error
Type B	500 to 18200	1220 to 32767 (limited range) 3276.7℉ = 1802.6℃	3232 to 20932	+50℃ to +1820℃
	460	1148	3192	Underload
	18240	32767	20972	Overload
	32767	32767	32767	Disconnection, cold compensation error
Type N	-2000 to +13000	-3280 to 23720	4732 to 15732	-200℃ to +1300℃
	-2040	-3352	692	Underload
	13040	23792	15772	Overload
	32767	32767	32767	Disconnection, cold compensation error
Type E	-2000 to +10000	-3280 to 18320	4732 to 12732	-200℃ to +1000℃
	-2040	-3352	692	Underload
	10040	18392	12772	Overload
	32767	32767	32767	Disconnection, cold compensation error
Type R	-500 to +17680	-580 to +32144	3232 to 20412	-50℃ to +1768℃
	-540	-652	2192	Underload
	17720	32216	20452	Overload
	32767	32767	32767	Disconnection, cold compensation error

Measurement range	Value in °C 0.1°C resolution	Value in °F 0.1°/digit	Value in K 0.1K/digit	Range
Type S	-500 to +17680	-580 to +32144	3232 to 20412	-50℃ to +1768℃
	-540	-652	2192	Underload
	17720	32216	20452	Overload
	32767	32767	32767	Disconnection, cold compensation error
Type T	-2000 to +4000	-3280 to 7520	732 to 6732	-200℃ to +400℃
	-2040	-3352	692	Underload
	4040	7592	6772	Overload
	32767	32767	32767	Disconnection, cold compensation error
Type L	-2000 to +9000	-3280 to 16520	732 to 11732	-200℃ to +900℃
	-2040	-3352	692	Underload
	9040	16592	11772	Overload
	32767	32767	32767	Disconnection, cold compensation error
Type U	-2000 to +6000	-3280 to 11120	732 to 8732	-200℃ to +600℃
	-2040	-3352	692	Underload
	6040	11192	8772	Overload
	32767	32767	32767	Disconnection, cold compensation error
Type C	0 to 23150	320 to 32767 (limited range) 3276.7℉ = 1802.6℃	2732 to 25882	0℃ to +2315℃
	-40	248	2692	Underload
	23190	32767	25922	Overload
	32767	32767	32767	Disconnection, cold compensation error

Functions

This section describes the functions of the NZ2FTS-60TD4.

Function list

Item	Description	Reference
Temperature unit selection	Sets a unit of temperature (Celsius/Fahrenheit/Kelvin). The unit of temperature is set with the parameter "Temperature unit".	Page 517 Parameter settings
Range switching	Sets the input range for each channel according to the type of the thermocouple to be connected. The input range is set with the parameter "Measurement range".	Page 517 Parameter settings
Cold junction compensation setting	Sets whether to use the internal or external cold junction compensation resistor for each channel. Set with the parameter "Cold junction compensation".	Page 514 Cold junction compensation setting
Conversion time switching	Sets the conversion time to the TC value for each channel. The conversion time is set by the parameter "Conversion time".	Page 515 Conversion time switching
Warning output (Process alarm)	Outputs a warning when the measured temperature value enters within the preset range for each channel.	Page 516 Warning output (Process alarm)

Cold junction compensation setting

For each channel, set whether to use the cold junction compensation resistor built into the module or the cold junction compensation resistor connected externally.

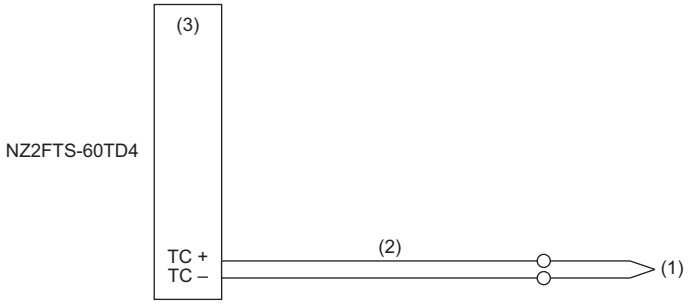
Point

The cold junction compensation resistor connected to CJC 0 to 3 and the input to TC 0 to 3 can be used in any combination.

For example, if a cold junction compensation resistor is connected to CJC3 +/- and the parameter Cold junction compensation is set to "External Channel 3" for channels 0 to 3, the cold junction compensation resistor connected to CJC3 +/- can be shared by channels 0 to 3.

■When using the cold junction compensation resistor built into the module

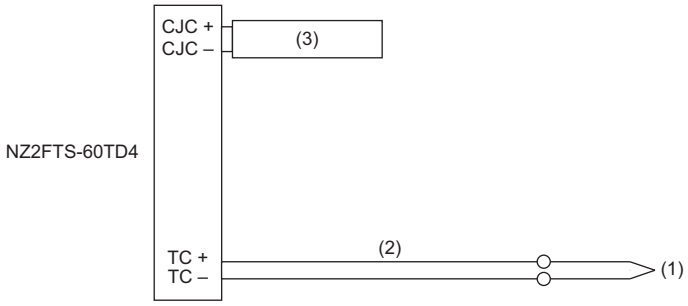
Cold junction compensation is performed using the resistance temperature detector Pt1000 built into the NZ2FTS-60TD4.



(1) Thermocouple
(2) Compensating lead wire
(3) Resistance temperature detector Pt1000

■When using an external cold junction compensation resistor

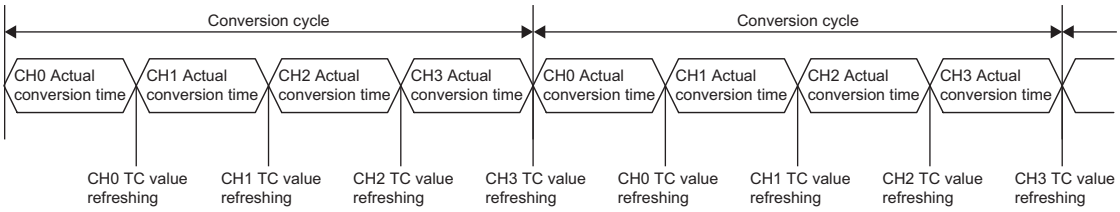
A high-accuracy resistance temperature detector Pt1000 is connected externally for cold junction compensation.
When the accuracy when using the cold junction compensation resistor built into the module cannot be ignored as an error, this improves the accuracy.



(1) Thermocouple
(2) Compensating lead wire
(3) Resistance temperature detector Pt1000

Conversion time switching

The conversion time to the TC value can be set for each channel.
The conversion cycle of the TC value is the total of the actual conversion times of all channels.



The following table lists the calculation method of the actual conversion time for each channel.

Parameter setting		Actual conversion time
Measurement range	**Cold junction compensation**	
TC Type J(0) to TC Type U(10)	Internal(0)	Conversion time of own channel + 10 (ms) + N
	External Channel 0 (1) to External Channel 3 (4)	
±15.625mV (11) to ±2000mV (18)	—	Conversion time of own channel + N
Disabled (19)		0 (ms) + N

N is as follows.

- If using cold junction compensation for the target channel: N = Conversion time of own channel
- If not using cold junction compensation for the target channel: N = 0 (ms)

For example, when converting the TC value of CH2, if the cold junction compensation resistor of CJC 2+/- is used, in the calculation of the actual conversion time of CH2, N = Conversion time of CH2.
When converting the TC value of CH2, if the cold junction compensation resistor of CJC 0+/- is used, in the calculation of the actual conversion time of CH2, N = 0 (ms), and in the calculation of the actual conversion time of CH0, N = Conversion time of CH0.

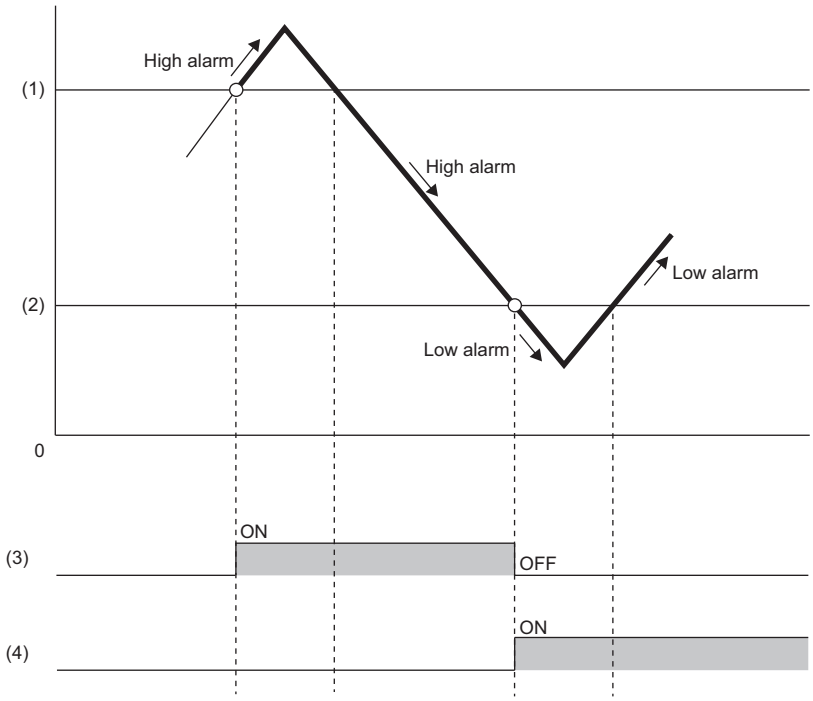
Warning output (Process alarm)

Outputs a warning when the measured temperature value enters within the preset range for each channel. The warning is stored in High alarm or Low alarm of the Process alarm data. (☞ Page 518 Warning data (Process alarm data))
Enabling/disabling the Process alarm is set by the parameter "Limit value monitoring". The upper limit value and lower limit value are set with the parameter "High limit value" and "Low limit value". (☞ Page 517 Parameter settings)
The issued Process alarm will be held even if the measured temperature value becomes not greater than the upper limit or not less than the lower limit.
For the procedure for checking the presence or absence of the process alarm and reading it, refer to Checking warning output (Process alarm) of each coupler. (It cannot be checked on the Web server.)

Point

If the parameter was set to "Low limit value" > "High limit value", the High alarm judgment has priority. The Low alarm is judged when the High alarm did not occur.

Ex.
For Channel 0



(1) Set upper limit
(2) Set lower limit
(3) b0 of "High alarm" of Process alarm data
(4) b0 of "Low alarm" of Process alarm data

Parameter settings

The following table lists the parameters that can be set for the NZ2FTS-60TD4.

Item		Description	Setting range*1
General	Temperature unit	Sets a unit of temperature (Celsius/Fahrenheit/Kelvin). The specified unit of temperature is used for all channels.	• Degree Celsius (0) • Degree Fahrenheit (1) • Kelvin (2) (Default: Degree Celsius)
TC 0 (Channel 0) to TC 3 (Channel 3)	Measurement range	Sets the input range for each channel according to the type of the thermocouple to be connected.	• TC Type J (0) • TC Type K (1) • TC Type N (2) • TC Type R (3) • TC Type S (4) • TC Type T (5) • TC Type B (6) • TC Type C (7) • TC Type E (8) • TC Type L (9) • TC Type U (10) • ±15.625mV (11) • ±31.25mV (12) • ±62.5mV (13) • ±125mV (14) • ±250mV (15) • ±500mV (16) • ±1000mV (17) • ±2000mV (18) • Disabled (19) (Default: Disabled)
	Cold junction compensation	Sets whether to use the internal or external cold junction compensation resistor.	• Internal (0) • External Channel 0 (1) • External Channel 1 (2) • External Channel 2 (3) • External Channel 3 (4) (Default: Internal)
	Conversion time	Sets the conversion time to the TC value for each channel. (☞ Page 515 Conversion time switching)	• 240ms (0) • 130ms (1) • 80ms (2) • 55ms (3) • 43ms (4) • 36ms (5) (Default: 80ms)
	Channel diagnostics	Sets Disabled (default).	• Disabled (0) • Enabled (1) (Default: Disabled)
	Limit value monitoring	Outputs an alert when a measurement value falls within the alert output range set in advance. The alert output range is set with "High limit value" and "Low limit value".	• Disabled (0) • Enabled (1) (Default: Disabled)
	High limit value	Sets the upper limit value of the warning output (Process alarm).*2	• -32768 to 32767 (16-bit signed binary value) (Default: 32767)
	Low limit value	Sets the lower limit value of the warning output (Process alarm).*2	• -32768 to 32767 (16-bit signed binary value) (Default: -32768)

*1 (0) to (19) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

*2 Set values within the input range that was set in the parameter "Measurement range". For the range of the input range, refer to the following.
☞ Page 512 Measurement range

Process data

The following table lists the Process data of the NZ2FTS-60TD4.

Input/Output	Address (byte)	Description	Data format
Input	0 to 1	TC 0 (Channel 0)	Word
	2 to 3	TC 1 (Channel 1)	Word
	4 to 5	TC 2 (Channel 2)	Word
	6 to 7	TC 3 (Channel 3)	Word

Warning data (Process alarm data)

The following table lists the Process alarm data for the NZ2FTS-60TD4.

Address (byte)	Item	Description	
0	High alarm	b0	Upper limit exceeded channel 0
		b1	Upper limit exceeded channel 1
		b2	Upper limit exceeded channel 2
		b3	Upper limit exceeded channel 3
		b4 to b7	System area
1	Low alarm	b0	Lower limit underrun channel 0
		b1	Lower limit underrun channel 1
		b2	Lower limit underrun channel 2
		b3	Lower limit underrun channel 3
		b4 to b7	System area
2 to 3	16 Bit Time stamp	16 Bit Time stamp	

Troubleshooting

If problems occur on the NZ2FTS-60TD4, perform the following.

Checking with LEDs

■When the module status LED turns on in red

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.
Is the I/O module mounted properly?	Mount the I/O module again by pressing it to the coupler until it clicks.
Has a channel error occurred?	Check whether the channel status LED is on in red. If it is, perform the actions required when the channel status LED is on in red.
Has a firmware error occurred?	Check the firmware version. Update it if necessary.

■When the module status LED turns off

Check the following item.

Item	Action
Does the externally supplied coupler power supply voltage reach the voltage of the performance specifications?	When all LEDs other than the module status LED are on in red, a coupler power supply bus error has occurred. Set the coupler power supply voltage within the range of the performance specifications.

■When the channel status LED turns on in red

Check the following items in order from the top.

Item	Action
Is the input signal (process value) within the input range?	Check that the input signal (process value) is within the input range. Revise the input signal or the input range setting if the input signal is outside of the range.
Are there any problems with the cable wiring?	Check that the cable wiring is not disconnected/short circuited.
Does the externally supplied coupler power supply voltage reach the voltage of the performance specifications?	Set the coupler power supply voltage within the range of the performance specifications.
Is there a problem with the connection of the cold junction compensation resistor?	Check that the cold junction compensation resistor is connected to the channel set with the parameter "Cold junction compensation".

If the problem persists after checking the above, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

Troubleshooting by symptom

■TC values cannot be read

Check the following items in order from the top.

Item	Action
Is there any problem with the wiring, such as looseness or disconnection of analog signal lines?	Check the faulty area by checking the signal line visually or conductively.
Is the CPU module in the STOP state?	Change the CPU module to the RUN state.
Are the parameters "Temperature unit" and "Measurement range" set correctly?	Check the settings of the parameters "Temperature unit" and "Measurement range". If a setting is incorrect, set it again.
Are the thermocouple and the compensating lead wire connected incompletely?	Connect the thermocouple and the compensating lead wire securely.
Is the thermocouple or the compensating lead wire connected in reverse?	Connect the thermocouple and the compensating lead wire correctly.
Is the cold junction compensation resistor connected incompletely?	Connect the cold junction compensation resistor and the compensating lead wire securely.
Is the parameter "Cold junction compensation" set correctly?	Check the setting of the parameter "Cold junction compensation". If the setting is incorrect, set it again.

■The TC value is out of the accuracy range

Check the following items in order from the top.

Item	Action
Are measures against noise taken?	Take measures to reduce noise with a shielded cable for connection.
Is noise intruding into the thermocouple input?	Use a shielded compensating lead wire for connection, and ground the shield of the compensating wire for each channel. In addition, check the influence of adjacent devices, and take measures to reduce noise.
Are there any disturbances (such as wind) that are causing sudden temperature changes around the module?	Since the temperature is measured based on the temperature of the cold junction compensation resistor, eliminate any disturbances that make the temperature of the cold junction compensation resistor unstable or non-uniform.

19 HIGH-SPEED COUNTER MODULE

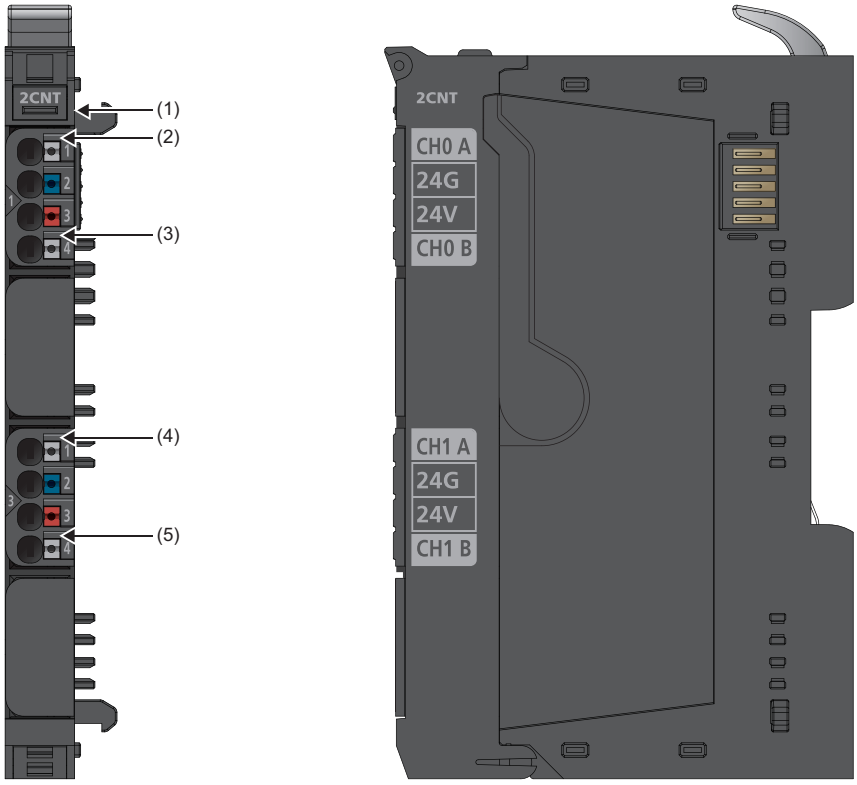
This chapter describes the details of the high-speed counter module.

19.1 NZ2FTS-D62P2

This is a 2ch counter input module.

Part names

This section describes the name of each LED of the NZ2FTS-D62P2. (☞ Page 414 I/O Module Common Part Names)

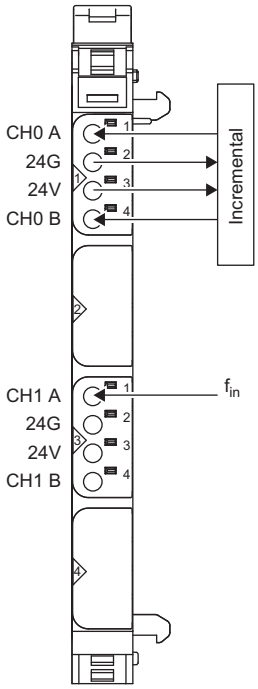


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 548 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED 1.1	Indicates the operating status of CH0. On in yellow: During A phase pulse control Off: Not operating
(3)	Channel status LED 1.4	Indicates the operating status of CH0. On in yellow: During B phase rotational direction control Off: Not operating
(4)	Channel status LED 3.1	Indicates the operating status of CH1. On in yellow: During A phase pulse control Off: Not operating
(5)	Channel status LED 3.4	Indicates the operating status of CH1. On in yellow: During B phase rotational direction control Off: Not operating

Connection diagram

The following figure shows the connection diagram between the NZ2FTS-D62P2 and external devices.

Ex.



When the parameter "Signal mode" is "Pulse and Direction", CH0 A and CH1 A are the inputs, and CH0 B and CH1 B are the directional inputs.

For "Rotary transducer - single/double/quadruple", connect the phase A and phase B of the incremental encoder.

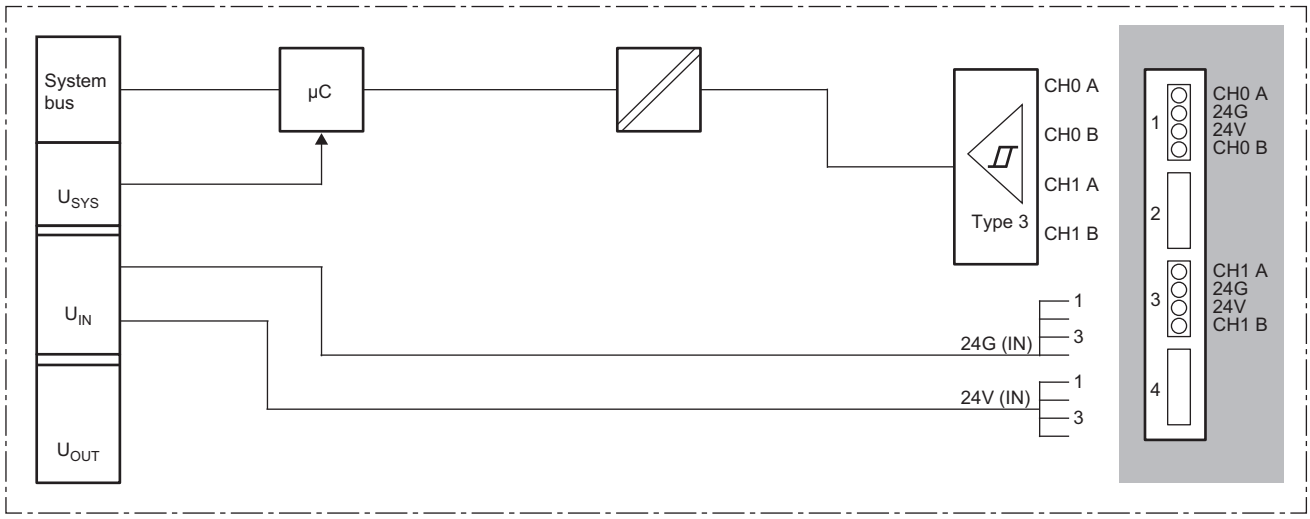
Performance specifications

This section describes the performance specifications of the NZ2FTS-D62P2. (☞ Page 30 General Specifications)

Item	NZ2FTS-D62P2
System bus transfer speed	48Mbps
Number of counter inputs	2
Input type	Incremental encoder compliant with EN61131-2 Type 1 and Type 3
Input filter	The filter time is adjustable between 0.01 and 1ms.
L level input voltage	< 5V
H level input voltage	> 11V
Maximum input current per channel	3.5mA
Supply to external device	Provided
External device connection method	2-wire, 3-wire
Reverse polarity protection	Provided
Module diagnostics	Provided
Counter width	32 bits
Maximum input frequency	100kHz
Operation mode	1-phase input/2-phase input (1x, 2x, 4x)
Status display	Provided
Process alarm	Provided (available to set as parameter)
External power supply voltage	24VDC +20%/-15%
Module current consumption	40mA
Current consumption of external power supply for output part	35mA
Weight	79g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS-D62P2.



Functions

This section describes the functions of the NZ2FTS-D62P2.

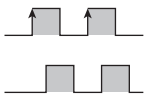
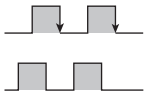
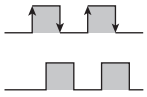
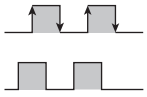
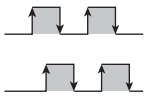
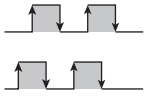
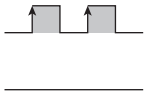
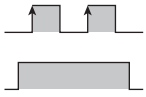
Function list

Item	Description	Reference
Pulse input mode setting function	Sets the pulse input method.	Page 524 Pulse input mode setting function
Counter function	Sets the count type and start operation to start counting.	Page 525 Counter function
Preset function	Rewrites Counter value to an arbitrary numerical value (preset value).	Page 534 Preset function
Digital filter function	Sets the filter time of the input signal for each channel. The filter time is set with the parameter "Filter time signal A" and "Filter time signal B".	Page 544 Parameter settings
Warning output (Process alarm)	Outputs a warning when the count value enters within the preset range.	Page 535 Warning output (Process alarm)

Pulse input mode setting function

This function sets the pulse input method.

The input method is set with the parameter "Signal mode".

Signal mode setting	Count timing		
Rotary transducer - single (2-Phase multiple of 1)	Up count		Counts on the rising edge of signal A (↑) while signal B is off.
	Down count		Counts on the falling edge of signal A (↓) while signal B is off.
Rotary transducer - double (2-Phase multiple of 2)	Up count		Counts on the rising edge of signal A (↑) while signal B is off. Counts on the falling edge of signal A (↓) while signal B is on.
	Down count		Counts on the rising edge of signal A (↑) while signal B is on. Counts on the falling edge of signal A (↓) while signal B is off.
Rotary transducer - quadruple (2-Phase multiple of 4)	Up count		Counts on the rising edge of signal A (↑) while signal B is off. Counts on the falling edge of signal A (↓) while signal B is on. Counts on the rising edge of signal B (↑) while signal A is on. Counts on the falling edge of signal B (↓) while signal A is off.
	Down count		Counts on the rising edge of signal A (↑) while signal B is on. Counts on the falling edge of signal A (↓) while signal B is off. Counts on the rising edge of signal B (↑) while signal A is off. Counts on the falling edge of signal B (↓) while signal A is on.
Pulse and Direction (1-Phase multiple of 1)	Up count		Counts on the rising edge of signal A (↑). Signal B remains off.
	Down count		Counts on the rising edge of signal A (↑). Signal B remains on.

Counter function

This function sets the count type and start operation to start counting.

To start counting, turn on Set SW gate (b2 of Process data output "Control word").

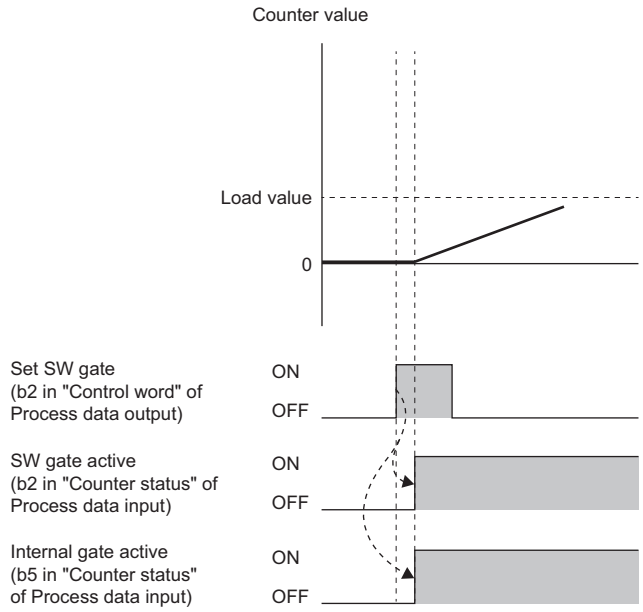
When Set SW gate is turned on, SW gate active (b2 of Process data input "Counter status") and Internal gate active (b5 of Process data input "Counter status") turn on.

When Reset SW gate (b10 of Process data output "Control word") is turned on, the counting stops.

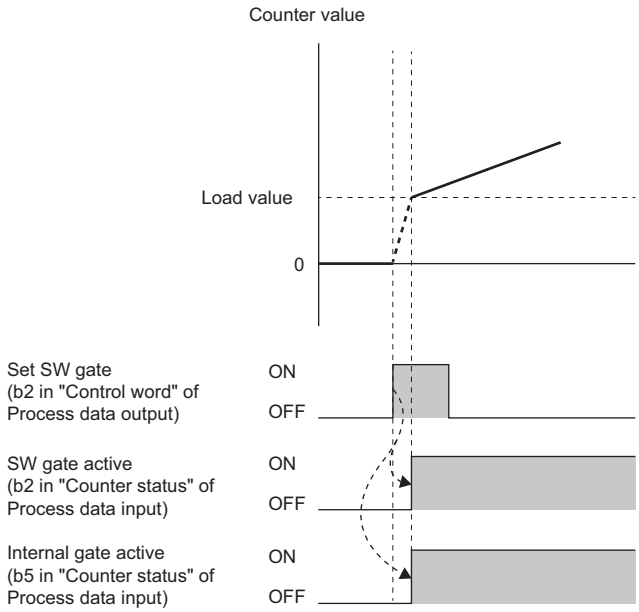
The value of Counter value when the counting starts differs depending on the setting of the parameter "Counter behaviour internal gate".

Parameter	Setting value	Description
Counter behaviour internal gate	Interrupt counting	The counting starts from Counter value.
	Cancel counting (default)	The value of Load value is stored in Counter value and the counting starts.

• When Interrupt counting is set



• When Cancel counting is set



The count type is set with the parameter "Counting mode".

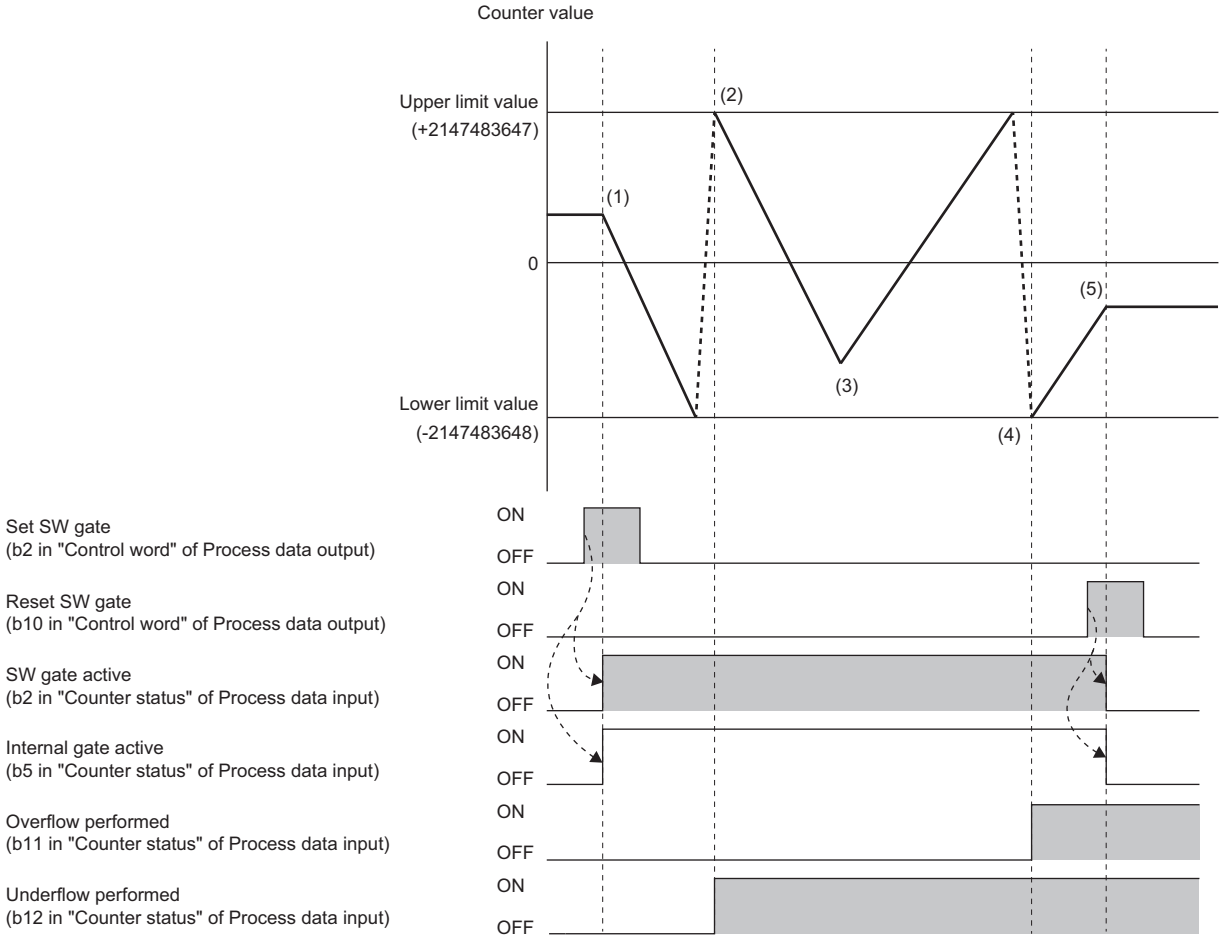
Parameter	Setting value	Description	Reference
Counting mode	Count endless (default)	Performs counting between the lower limit value (-2147483648) and upper limit value (2147483647). When the value goes below the lower limit value, the counting continues from the upper limit value and when it exceeds the upper limit value, the counting continues from the lower limit value.	Page 526 Count endless
	Once - forward	Performs counting between Load value and End value - 1. The counting stops when the value exceeds End value - 1. It is used to perform up counting only.	Page 527 Once - forward
	Once - backwards	Performs counting between the "Load value" and "End value + 1". The counting stops when the value exceeds End value + 1. It is used to perform down counting only.	Page 528 Once - backwards
	Once - no main direction	Performs counting between the lower limit value (-2147483648) and upper limit value (2147483647). The counting stops when the value exceeds the upper limit value or goes below the lower limit value.	Page 529 Once - no main direction
	Periodic - forward	Performs counting between Load value and End value - 1. When the value exceeds End value - 1, the counting continues from Load value. It is used to perform up counting only.	Page 531 Periodic - forward
	Periodic - backwards	Performs counting between the "Load value" and "End value + 1". When the value exceeds End value + 1, the counting continues from Load value. It is used to perform down counting only.	Page 532 Periodic - backwards
	Periodic - no main direction	Performs counting between the lower limit value (-2147483648) and upper limit value (2147483647). When the value exceeds the upper limit value or goes below the lower limit value, the counting continues from Load value.	Page 533 Periodic - no main direction

■Count endless

This function performs counting between the lower limit value (-2147483648) and upper limit value (2147483647). When the value goes below the lower limit value, the counting continues from the upper limit value and when it exceeds the upper limit value, the counting continues from the lower limit value.

Ex.

When Count endless is set (when "Counter behaviour internal gate" is set to "Interrupt counting")



(1) When the Set SW gate is turned on, the counting starts.
When the counting starts, SW gate active and Internal gate active turn on.
(2) If Counter value goes below the lower limit value during down counting, the upper limit value is stored in Counter value.
At this time, the counting continues and Underflow performed turns on.
(3) The input pulse is switched from subtraction pulse to addition pulse.
(4) If Counter value exceeds the upper limit value during up counting, the lower limit value is stored in Counter value.
At this time, the counting continues and Overflow performed turns on.
(5) When Reset SW gate is turned on, the counting stops.
When the counting stops, SW gate active and Internal gate active turn off.

Point

Underflow performed and Overflow performed are held until Reset status bits (b6 of Process data output "Control word") is turned on.

■Once - forward

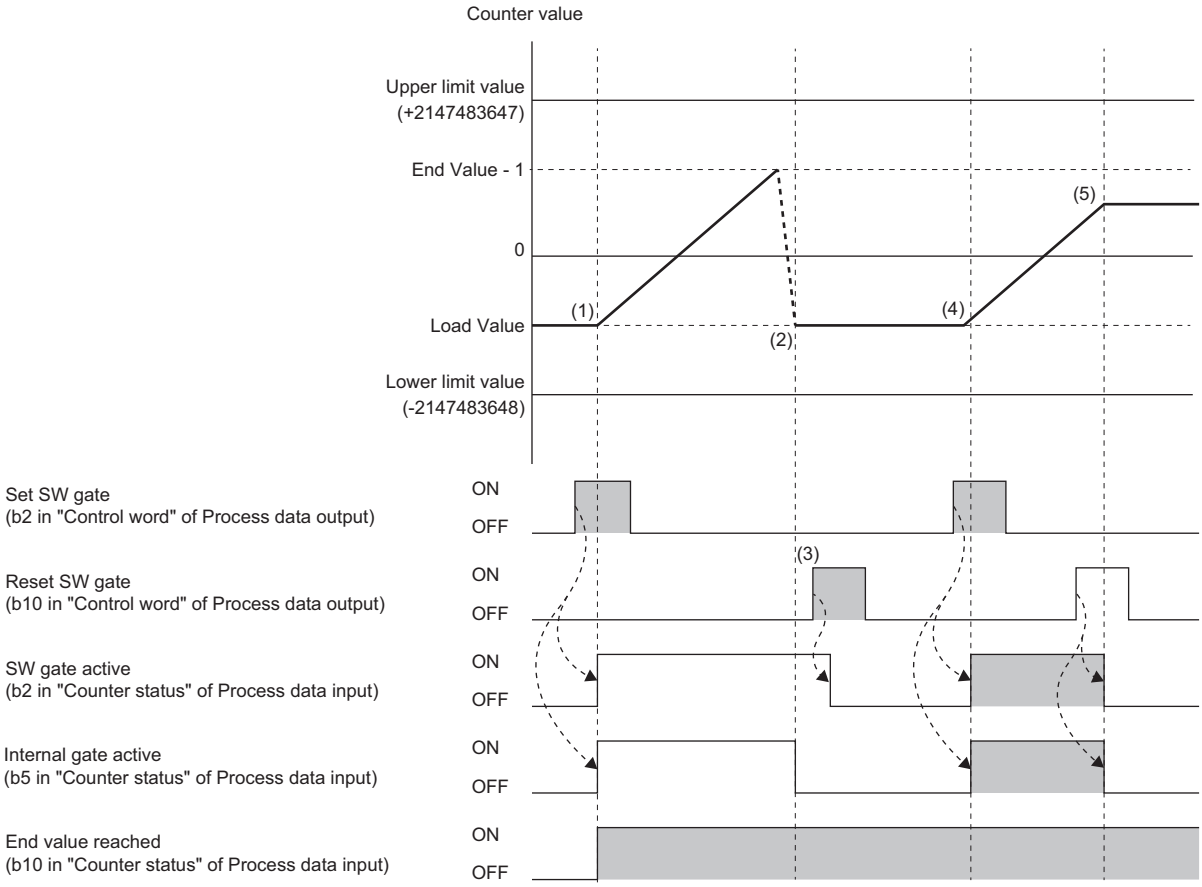
This function performs counting between Load value and End value - 1. The counting stops when the value exceeds End value - 1.

It is used to perform up counting only.

To use this function in combination with the preset function, set the preset value between Load value and End value - 1.

Ex.

When Once - forward is set (when "Counter behaviour internal gate" is set to "Interrupt counting")



(1) When the Set SW gate is turned on, the counting starts.
When the counting starts, SW gate active and Internal gate active turn on.

(2) If Counter value exceeds "End value - 1" during up counting, Load value is stored in Counter value.
At this time, the counting stops automatically, Internal gate active turns off, and End value reached turns on.

(3) When Reset SW gate is turned on, SW gate active turns off.

(4) When Set SW gate is turned on, the counting restarts.
After restarting the counting, SW gate active and Internal gate active turn on.

(5) When Reset SW gate is turned on, the counting stops.
When the counting stops, SW gate active and Internal gate active turn off.

■Once - backwards

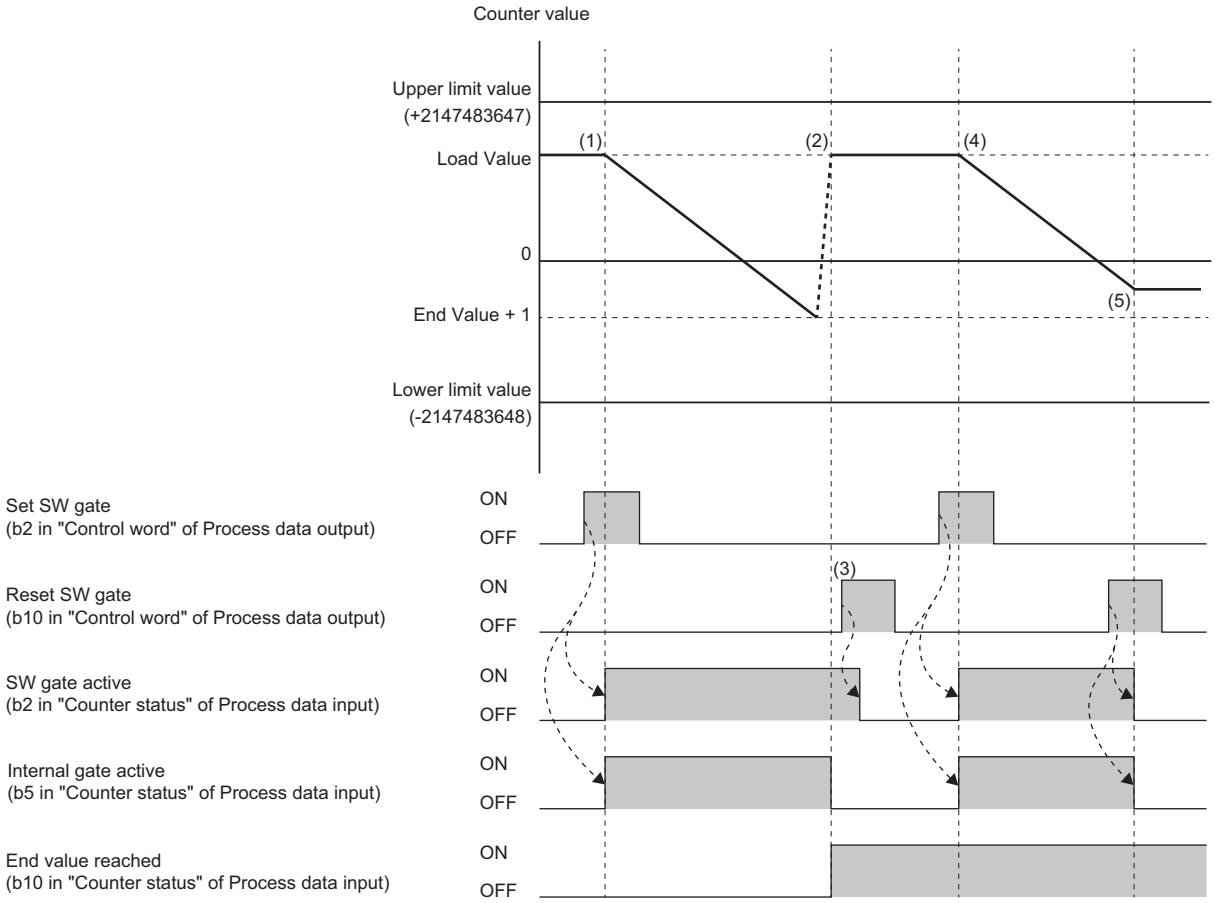
This function performs counting between the "Load value" and "End value + 1". The counting stops when the value exceeds End value + 1.

It is used to perform down counting only.

To use this function in combination with the preset function, set the preset value between Load value and End value + 1.

Ex.

When Once - backwards is set (when "Counter behaviour internal gate" is set to "Interrupt counting")



(1) When the Set SW gate is turned on, the counting starts.
When the counting starts, SW gate active and Internal gate active turn on.

(2) If Counter value goes below End value + 1 during down counting, Load value is stored in Counter value.
At this time, the counting stops automatically, Internal gate active turns off, and End value reached turns on.

(3) When Reset SW gate is turned on, SW gate active turns off.

(4) When Set SW gate is turned on, the counting restarts.
After restarting the counting, SW gate active and Internal gate active turn on.

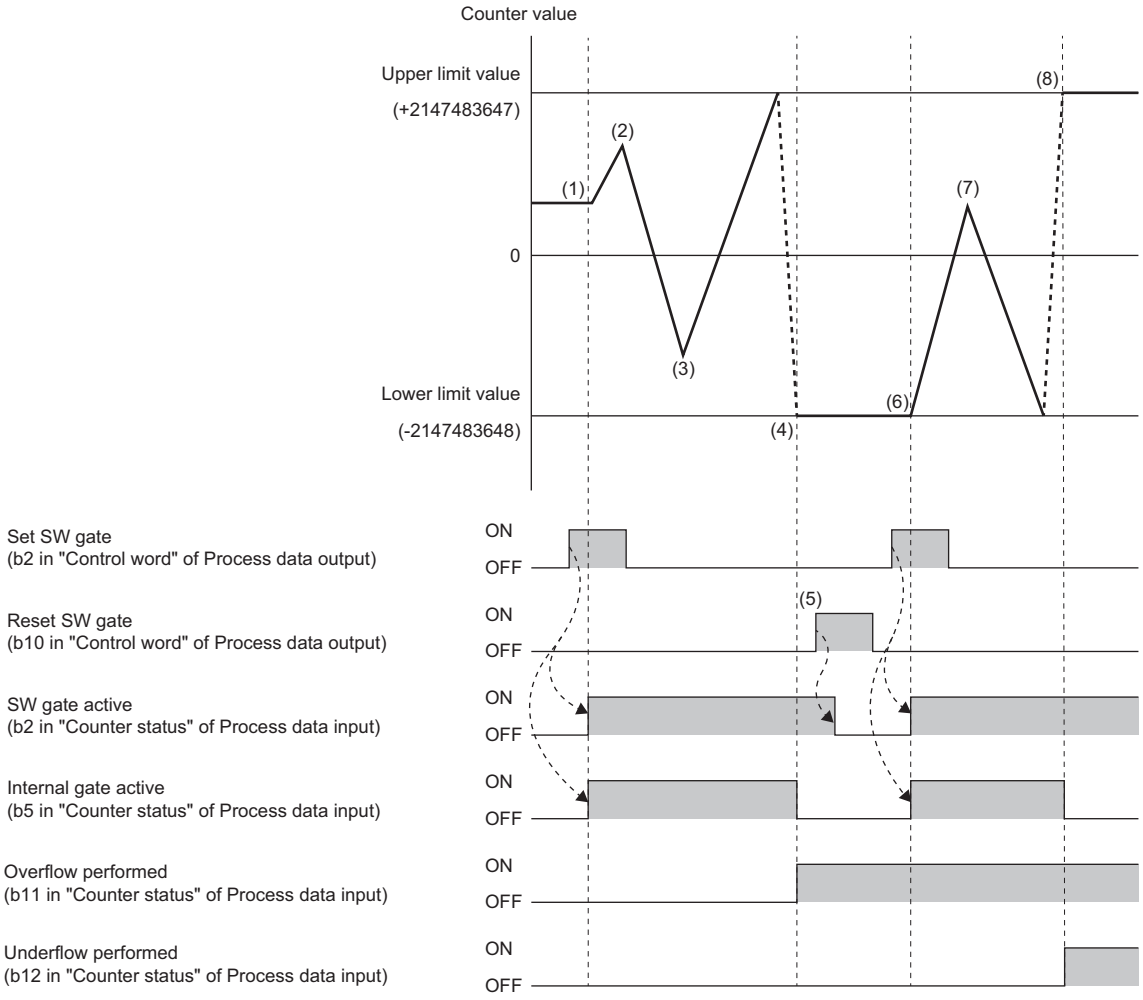
(5) When Reset SW gate is turned on, the counting stops.
When the counting stops, SW gate active and Internal gate active turn off.

■Once - no main direction

This function performs counting between the lower limit value (-2147483648) and upper limit value (2147483647). The counting stops when the value exceeds the upper limit value or goes below the lower limit value.

Ex.

When Once - no main direction is set (when "Counter behaviour internal gate" is set to "Interrupt counting")



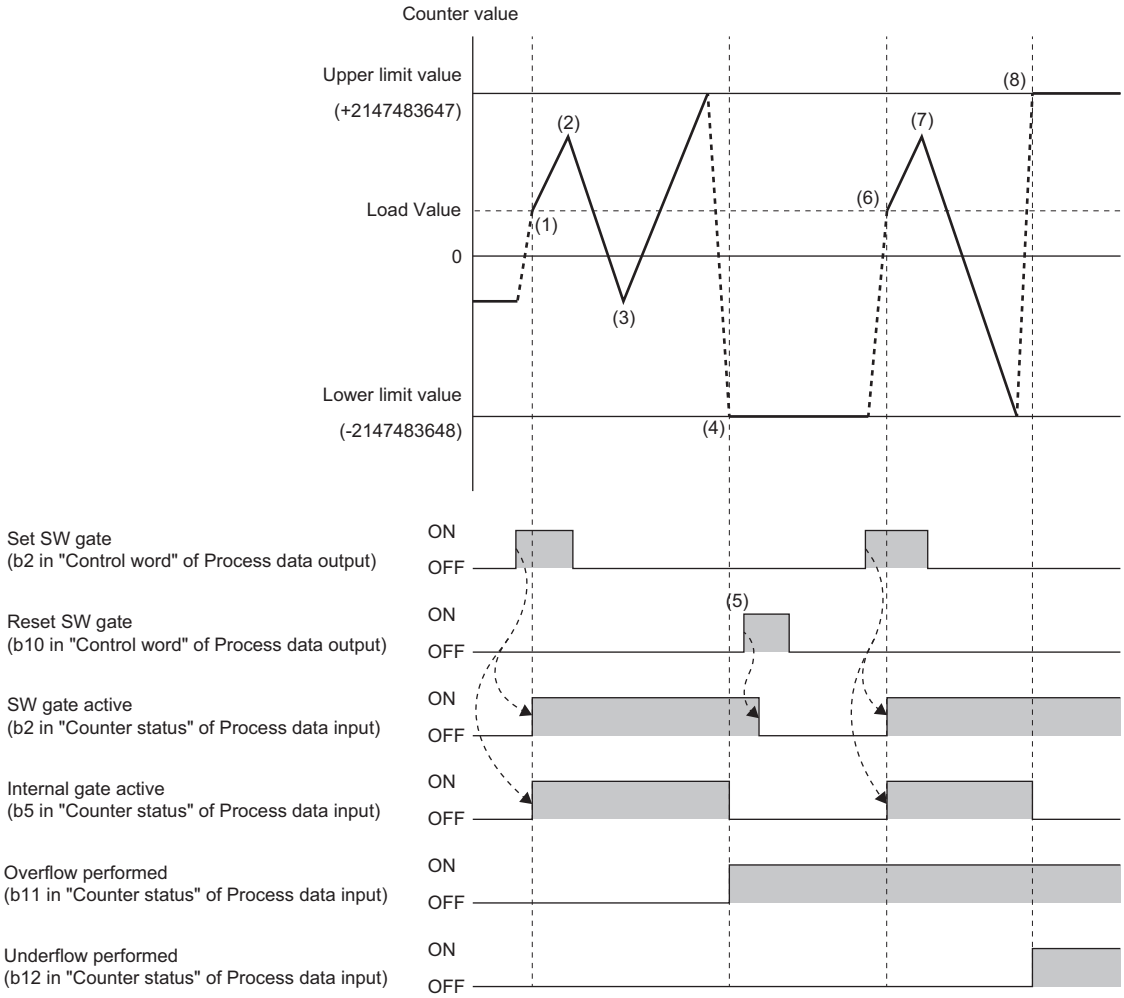
(1) When the Set SW gate is turned on, the counting starts.
When the counting starts, SW gate active and Internal gate active turn on.
(2) The input pulse is switched from subtraction pulse to addition pulse.
(3) The input pulse is switched from subtraction pulse to addition pulse.
(4) If Counter value exceeds the upper limit value during up counting, the lower limit value is stored in Counter value.
At this time, the counting stops automatically, Internal gate active turns off, and Overflow performed turns on.
(5) When Reset SW gate is turned on, SW gate active turns off.
(6) When Set SW gate is turned on, the counting restarts.
After restarting the counting, SW gate active and Internal gate active turn on.
(7) The input pulse is switched from subtraction pulse to addition pulse.
(8) If Counter value goes below the lower limit value during down counting, the upper limit value is stored in Counter value.
At this time, the counting stops automatically, Internal gate active turns off, and Underflow performed turns on.

Point

Underflow performed and Overflow performed are held until Reset status bits (b6 of Process data output "Control word") is turned on.

Ex.

When Once - no main direction is set (when "Counter behaviour internal gate" is set to "Cancel counting")



(1) When Set SW gate is turned on, Load value is stored to Counter value and the counting starts.
When the counting starts, SW gate active and Internal gate active turn on.

(2) The input pulse is switched from subtraction pulse to addition pulse.

(3) The input pulse is switched from subtraction pulse to addition pulse.

(4) If Counter value exceeds the upper limit value during up counting, the lower limit value is stored in Counter value.
At this time, the counting stops automatically, Internal gate active turns off, and Overflow performed turns on.

(5) When Reset SW gate is turned on, SW gate active turns off.

(6) When Set SW gate is turned on, Load value is stored to Counter value and the counting restarts.
After restarting the counting, SW gate active and Internal gate active turn on.

(7) The input pulse is switched from subtraction pulse to addition pulse.

(8) If Counter value goes below the lower limit value during down counting, the upper limit value is stored in Counter value.
At this time, the counting stops automatically, Internal gate active turns off, and Underflow performed turns on.

■Periodic - forward

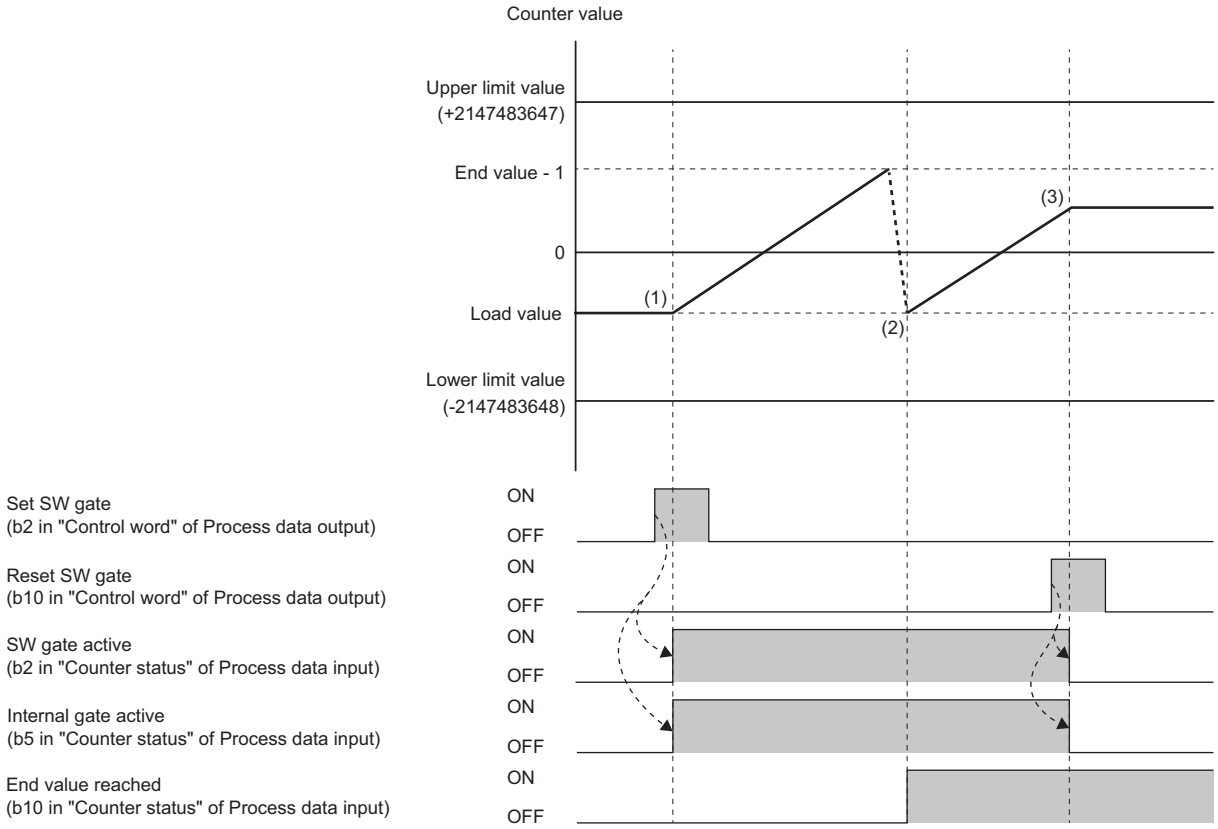
This function performs counting between Load value and End value - 1. When the value exceeds End value - 1, the counting continues from Load value.

It is used to perform up counting only.

To use this function in combination with the preset function, set the preset value between Load value and End value - 1.

Ex.

When Periodic - forward is set



(1) When the Set SW gate is turned on, the counting starts.
When the counting starts, SW gate active and Internal gate active turn on.

(2) If Counter value exceeds "End value - 1" during up counting, Load value is stored in Counter value.
At this time, the counting continues and End value reached turns on.

(3) When Reset SW gate is turned on, the counting stops.
When the counting stops, SW gate active and Internal gate active turn off.

■Periodic - backwards

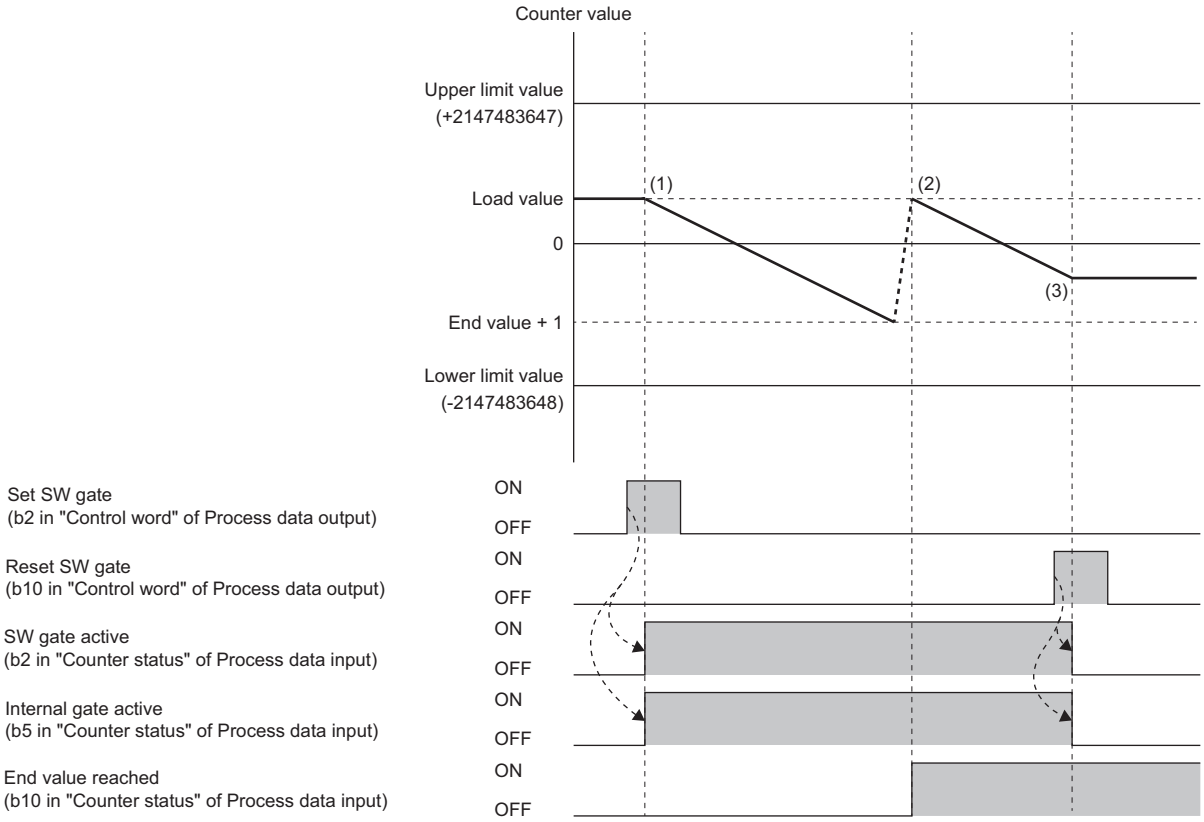
This function performs counting between the "Load value" and "End value + 1". When the value exceeds End value + 1, the counting continues from Load value.

It is used to perform down counting only.

To use this function in combination with the preset function, set the preset value between Load value and End value + 1.

Ex.

When Periodic - backwards is set



(1) When the Set SW gate is turned on, the counting starts.
When the counting starts, SW gate active and Internal gate active turn on.

(2) If Counter value goes below End value + 1 during down counting, Load value is stored in Counter value.
At this time, the counting continues and End value reached turns on.

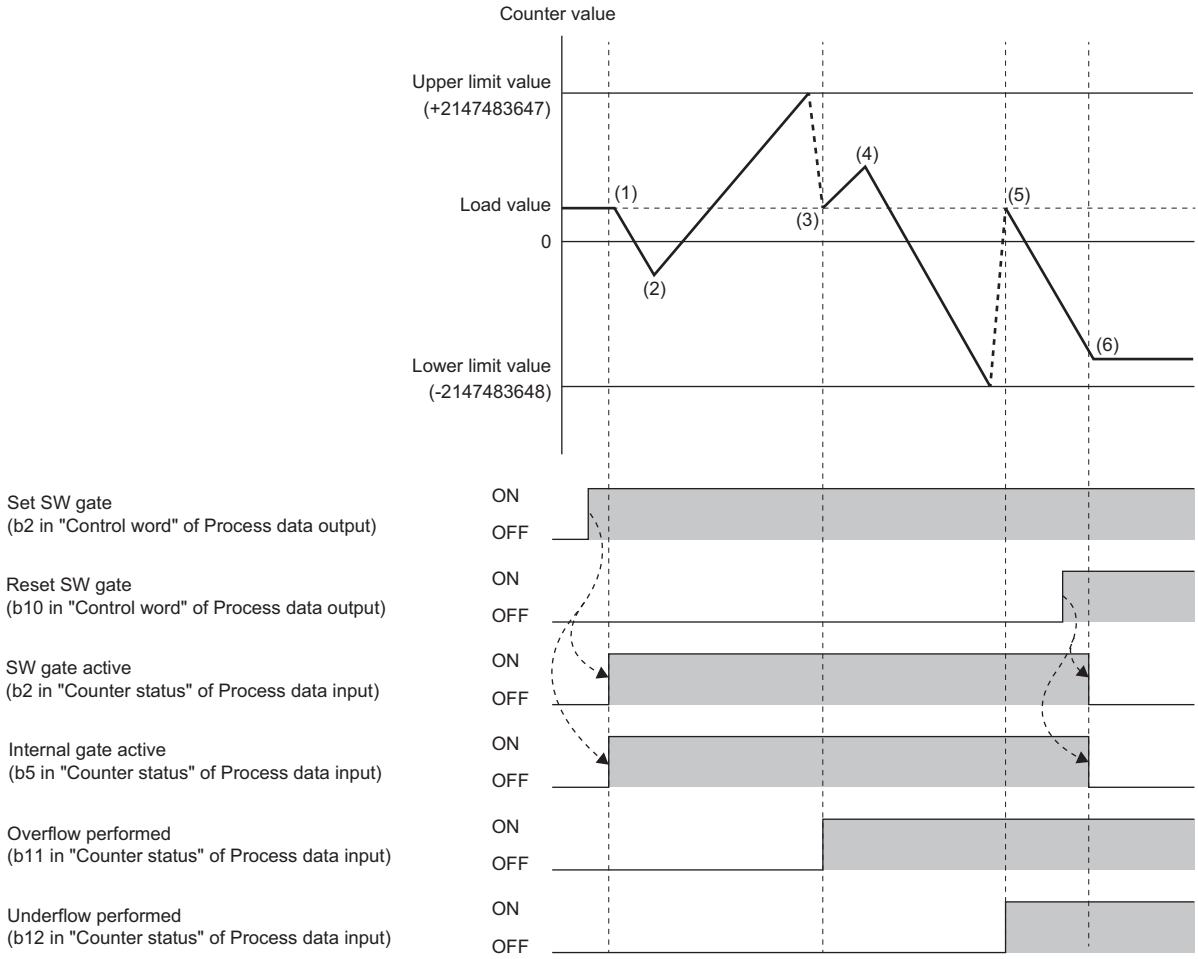
(3) When Reset SW gate is turned on, the counting stops.
When the counting stops, SW gate active and Internal gate active turn off.

■Periodic - no main direction

This function performs counting between the lower limit value (-2147483648) and upper limit value (2147483647). When the value exceeds the upper limit value or goes below the lower limit value, the counting continues from Load value.

Ex.

When Periodic - no main direction is set



(1) When the Set SW gate is turned on, the counting starts.
When the counting starts, SW gate active and Internal gate active turn on.
(2) The input pulse is switched from subtraction pulse to addition pulse.
(3) If Counter value exceeds the upper limit value during up counting, Load value is stored in Counter value.
At this time, the counting continues and Overflow performed turns on.
(4) The input pulse is switched from subtraction pulse to addition pulse.
(5) If Counter value goes below the lower limit value during down counting, Load value is stored in Counter value.
At this time, the counting continues and Underflow performed turns on.
(6) When Reset SW gate is turned on, the counting stops.
When the counting stops, SW gate active and Internal gate active turn off.

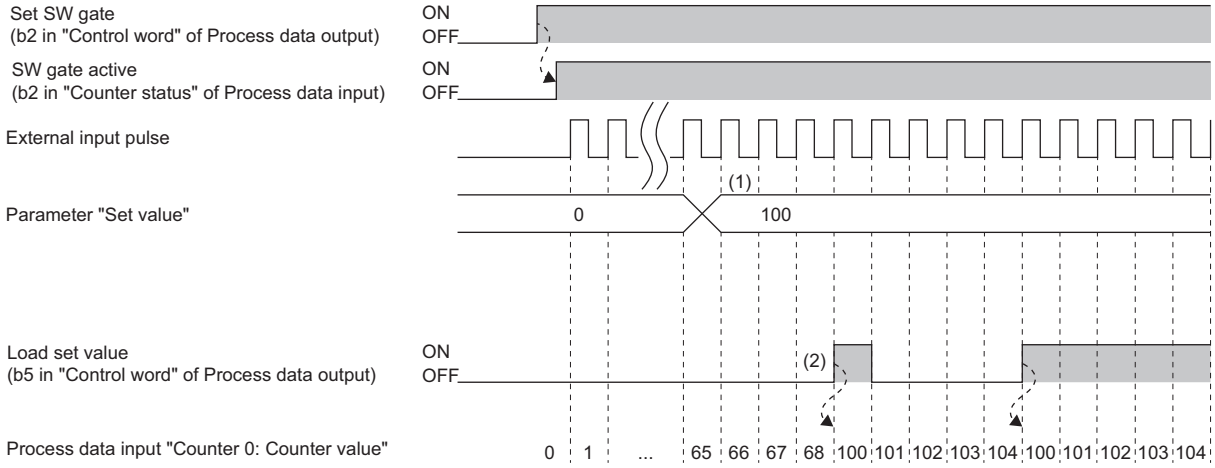
Point

Underflow performed and Overflow performed are held until Reset status bits (b6 of Process data output "Control word") is turned on.

Preset function

This function rewrites Counter value to an arbitrary numerical value (preset value). The preset function can be used to start pulse counting from the preset value at arbitrary timing.

Turning on Load set value (b5 of Process data output "Control word") stores the value of the parameter "Set value".



(1) An arbitrary value is written into the parameter "Set value" in the 32-bit signed binary data format.

(2) Set value is stored in Counter 0: Counter value on the rising edge (off → on) of Load set value.

Warning output (Process alarm)

A warning is output when the count value enters within the preset range. The content is stored in Process alarm data. (☞ Page 547 Warning data (Process alarm data))

The alert is cleared by reading the issued Process alarm.

For the procedure for checking the presence or absence of the process alarm and reading it, refer to Checking warning output (Process alarm) of each coupler. (It cannot be checked on the Web server.)

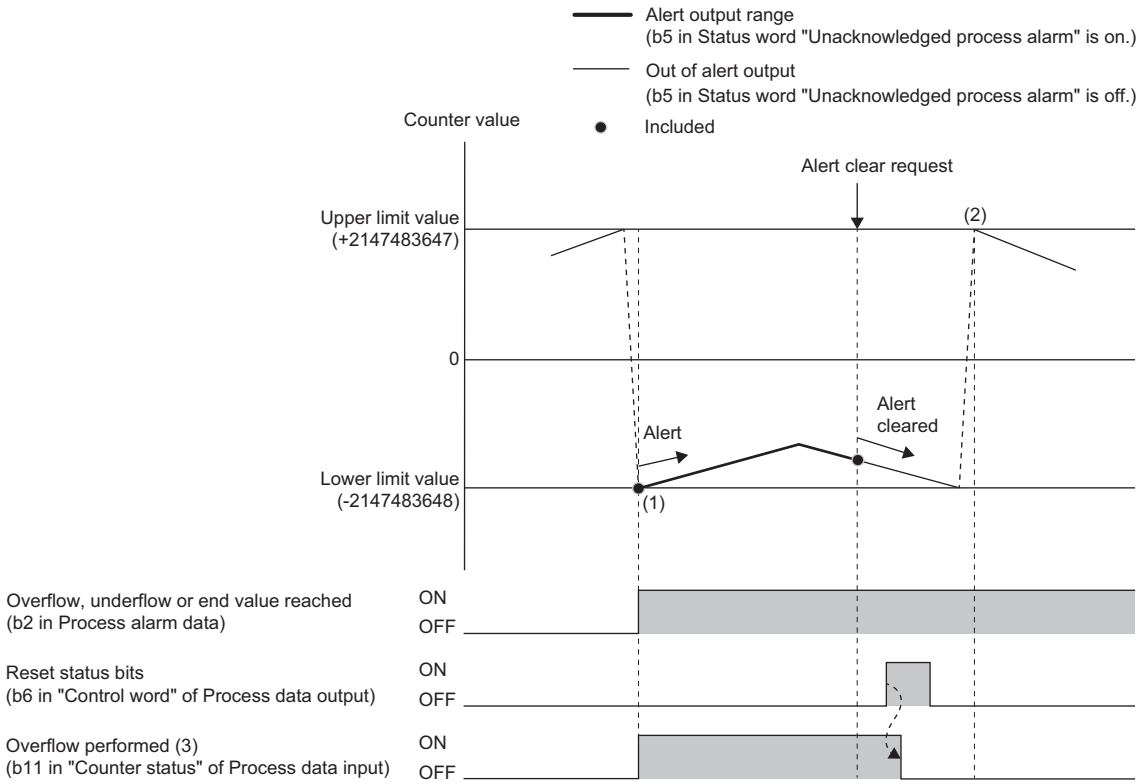
■Process alarm overflow

When the parameter "Process alarm overflow" is set to "Enabled", overflow is detected when Counter value exceeds the upper limit value.

The following shows an operation example when the parameter "Counting mode" is set to "Count endless" using NZ2FT-EIP.

Ex.

When Process alarm overflow is set



(1) The lower limit value is stored as Counter value because up counting is performed when Counter value is the upper limit value.

(2) The upper limit value is stored as Counter value because down counting is performed when Counter value is the lower limit value.

(3) Overflow performed operates regardless of the parameter settings.

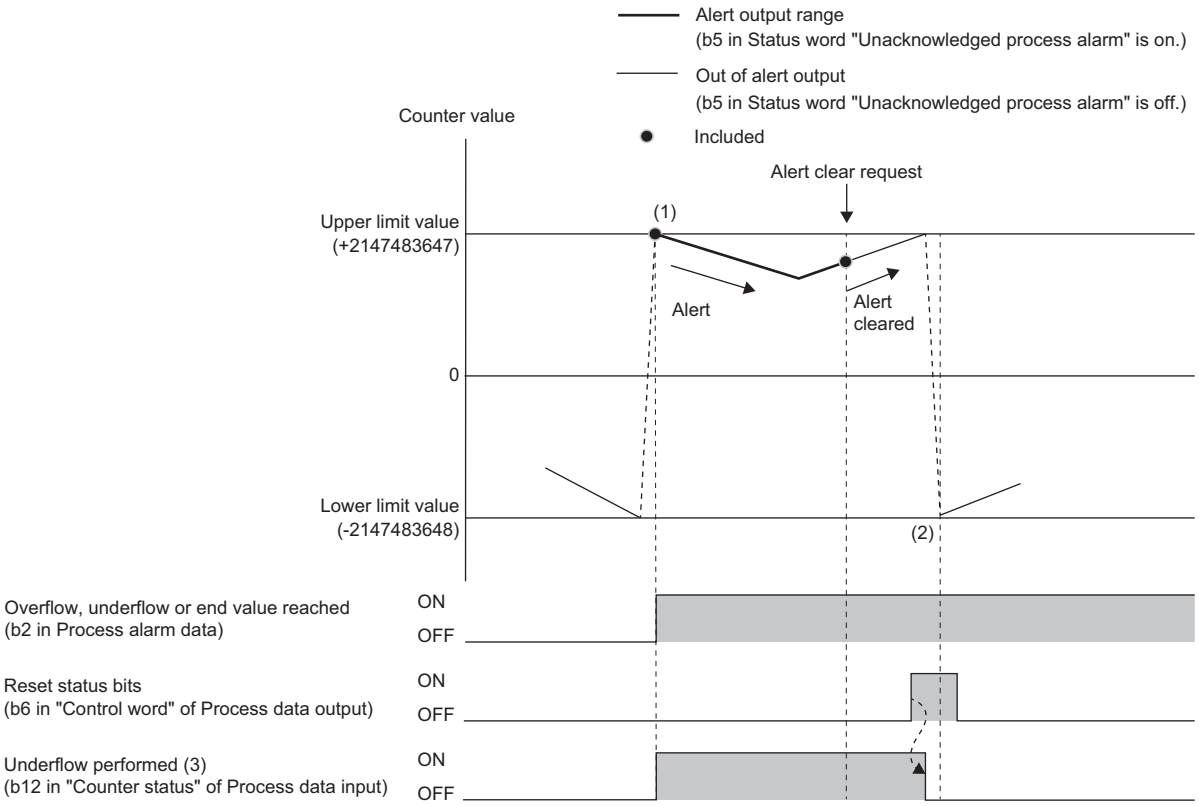
■Process alarm underflow

When the parameter "Process alarm underflow" is set to "Enabled", underflow is detected when Counter value goes below the lower limit value.

The following shows an operation example when the parameter "Counting mode" is set to "Count endless" using NZ2FT-EIP.

Ex.

When Process alarm underflow is set



(1) The upper limit value is stored as Counter value because down counting is performed when Counter value is the lower limit value.

(2) The lower limit value is stored as Counter value because up counting is performed when Counter value is the upper limit value.

(3) Underflow performed operates regardless of the parameter settings.

■Process alarm comp. value

When the parameter "Process alarm comp.value" is set to "Enabled", the comparison match is detected when Counter value matches the comparison condition.

The comparison condition is set with the parameter "Comparison function".

Parameters	Setting value	Description
Comparison function	Higher equal comparison value	The comparison match is detected when Counter value is equal to or larger than Comparison value of Process data output.
	Lower equal comparison value	The comparison match is detected when Counter value is equal to or smaller than Comparison value of Process data output.
	Equal comparison value	The comparison match is detected when Counter value matches Comparison value of Process data output.

The comparison value is enabled by setting it as "Comparison value" of Process data outputs and turning on Release comparison bit of Process data outputs.

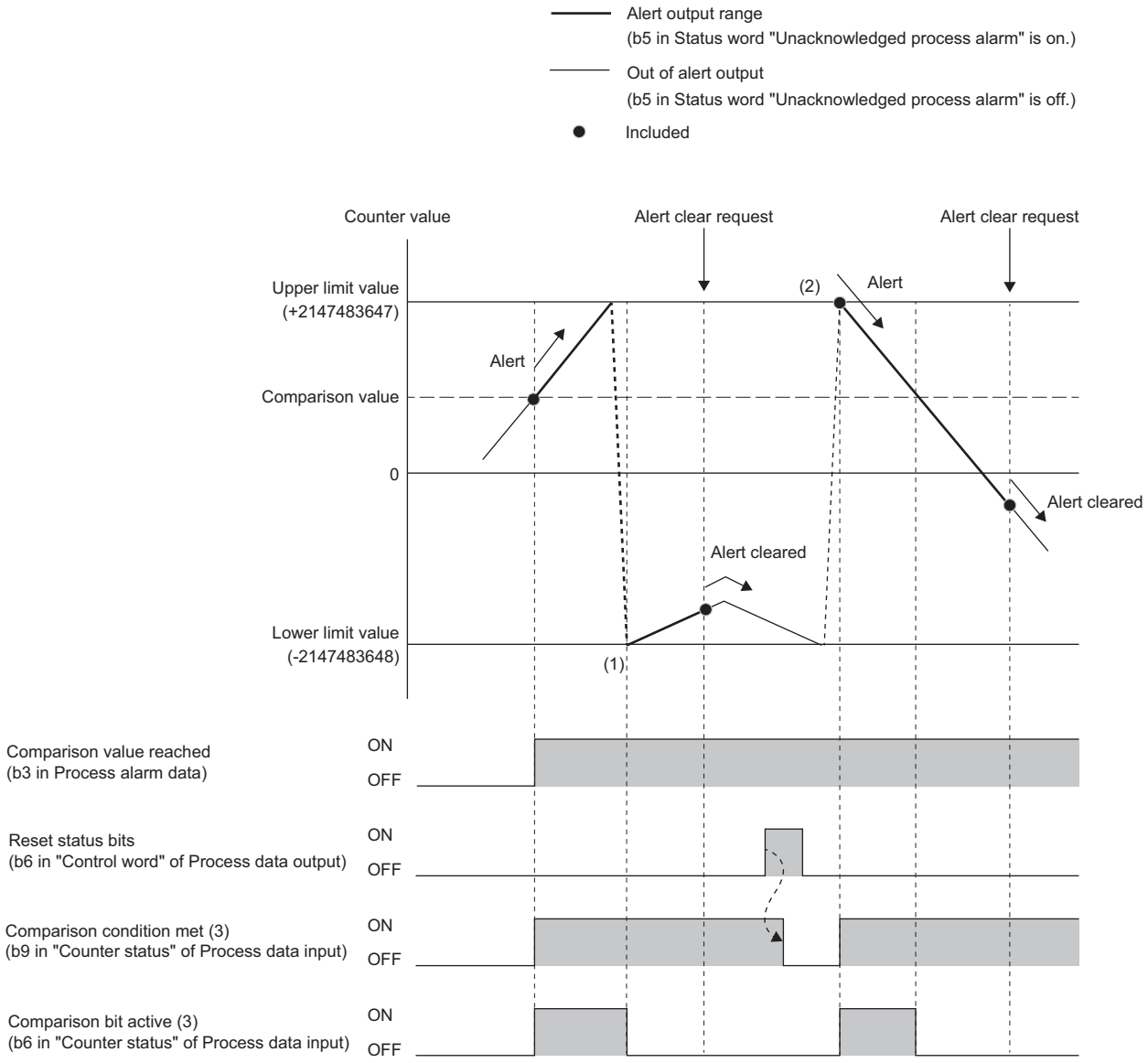
When "Comparison function" is set to other than "Disabled", the setting of the parameter "Hysteresis" is also enabled.

The following shows an operation example when the parameter "Counting mode" is set to "Count endless" using NZ2FT-EIP.

Ex.

When Higher equal comparison value is set (when "Hysteresis" is 0 or 1)

The comparison match is detected when Counter value is equal to or larger than Comparison value of Process data output.



(1) The lower limit value is stored as Counter value because up counting is performed when Counter value is the upper limit value.

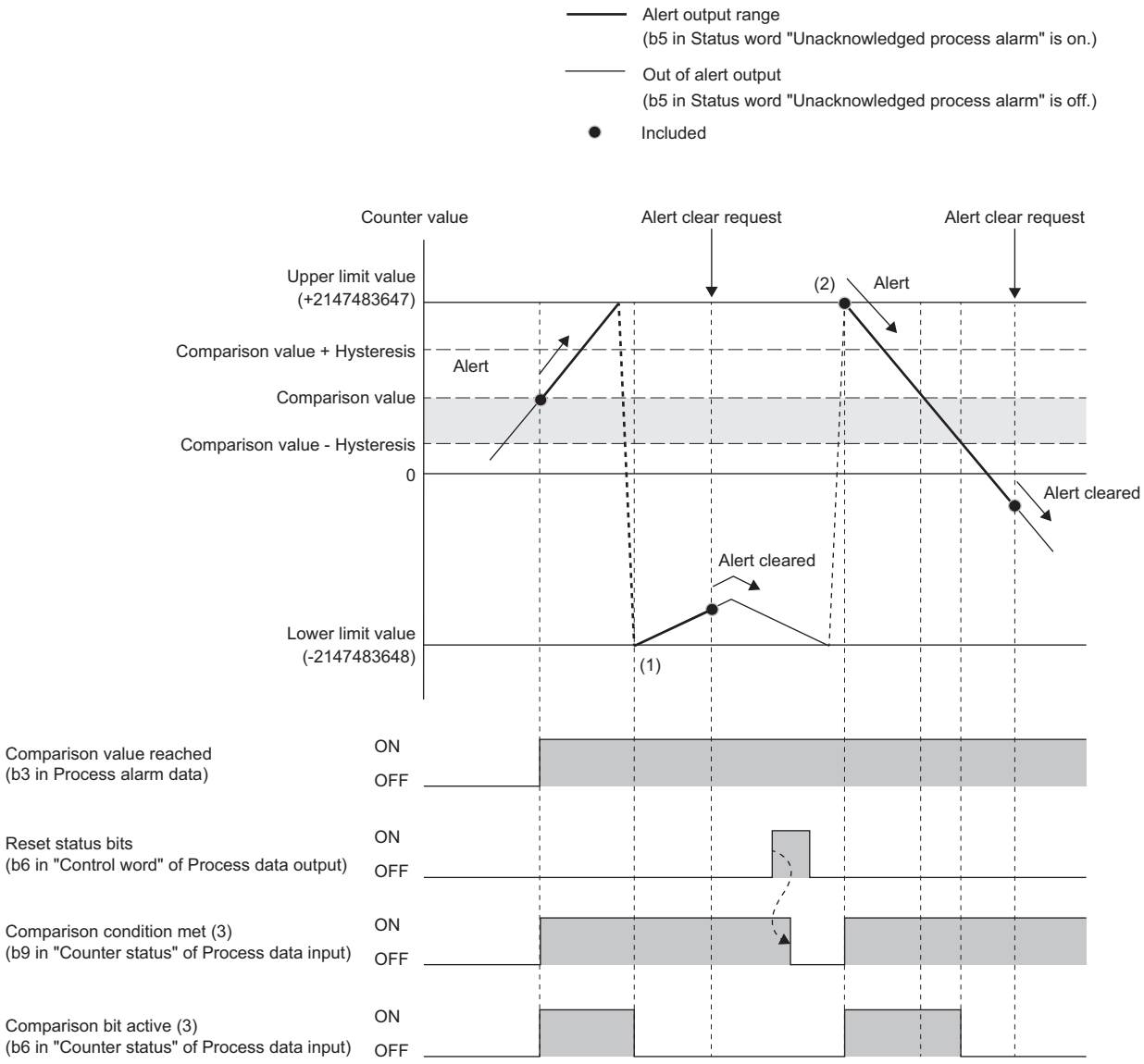
(2) The upper limit value is stored as Counter value because down counting is performed when Counter value is the lower limit value.

(3) Comparison condition met and Comparison bit active operate regardless of the parameter setting.

Ex.

When Higher equal comparison value is set (when "Hysteresis" is 2 or more)

The comparison match is detected when Counter value is equal to or larger than Comparison value of Process data output.



(1) The lower limit value is stored as Counter value because up counting is performed when Counter value is the upper limit value.

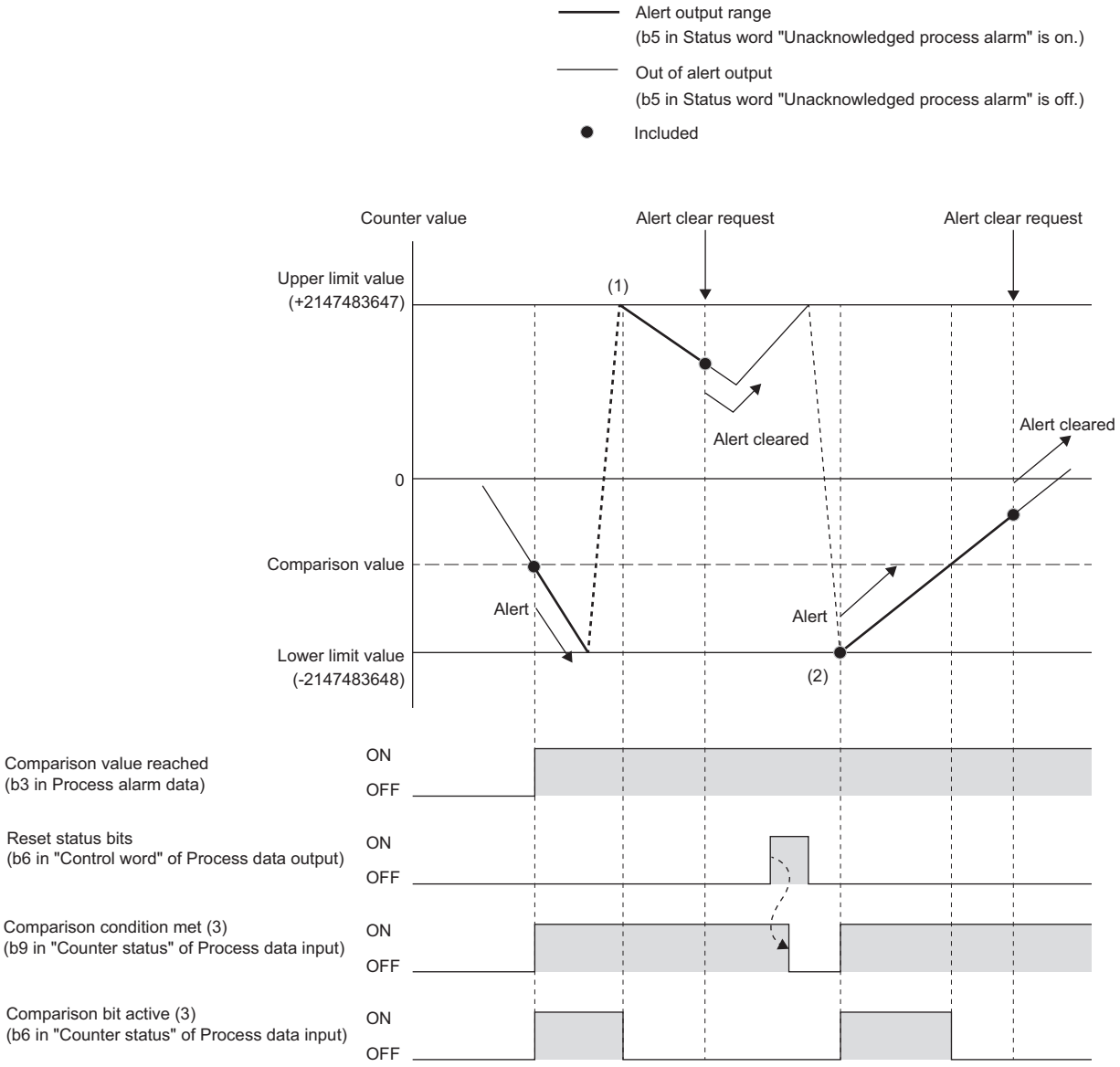
(2) The upper limit value is stored as Counter value because down counting is performed when Counter value is the lower limit value.

(3) Comparison condition met and Comparison bit active operate regardless of the parameter setting.

Ex.

When Lower equal comparison value is set (when "Hysteresis" is 0 or 1)

The comparison match is detected when Counter value is equal to or smaller than Comparison value of Process data output.



(1) The upper limit value is stored as Counter value because down counting is performed when Counter value is the lower limit value.

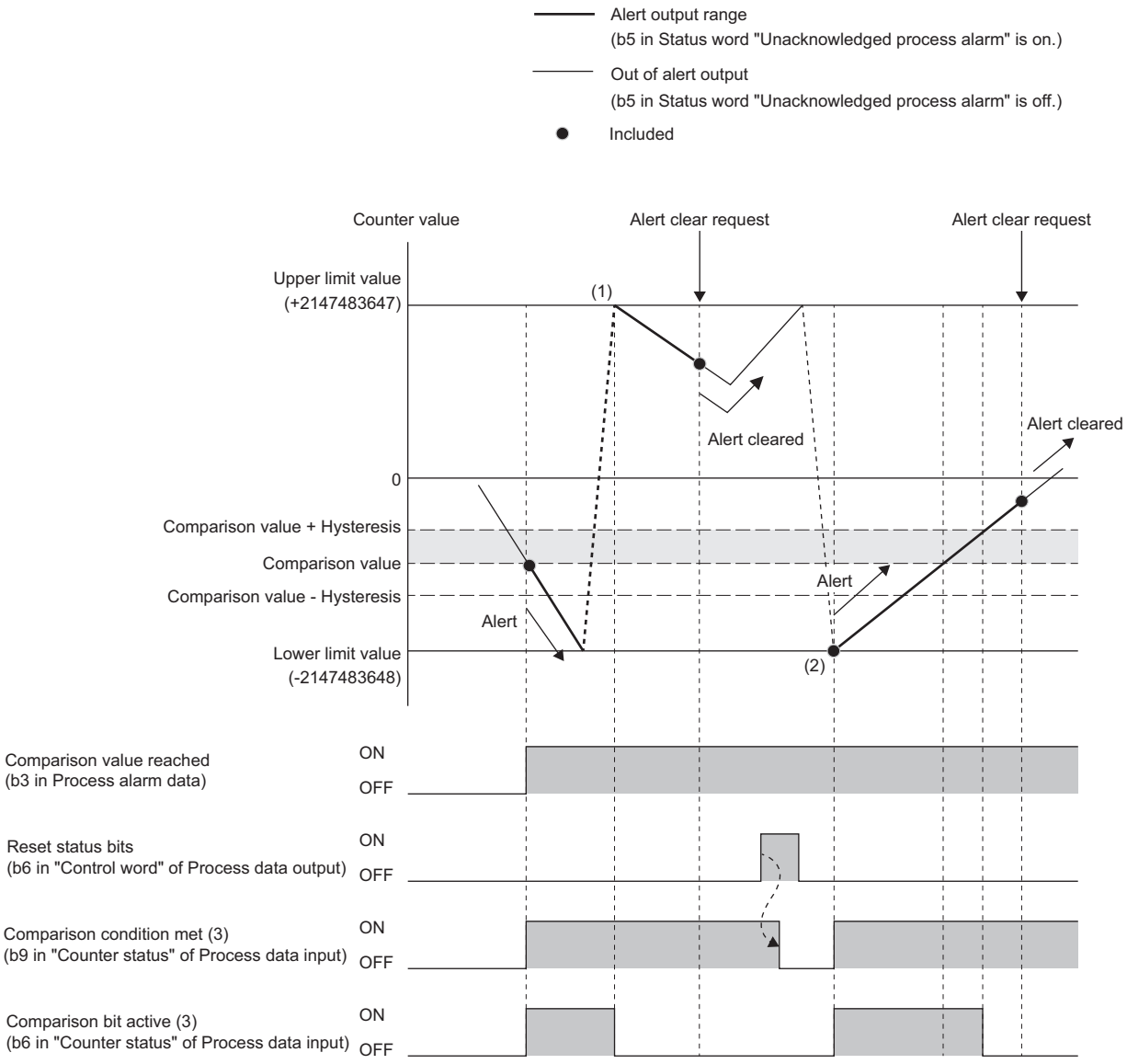
(2) The lower limit value is stored as Counter value because up counting is performed when Counter value is the upper limit value.

(3) Comparison condition met and Comparison bit active operate regardless of the parameter setting.

Ex.

When Lower equal comparison value is set (when "Hysteresis" is 2 or more)

The comparison match is detected when Counter value is equal to or smaller than Comparison value of Process data output.



(1) The upper limit value is stored as Counter value because down counting is performed when Counter value is the lower limit value.

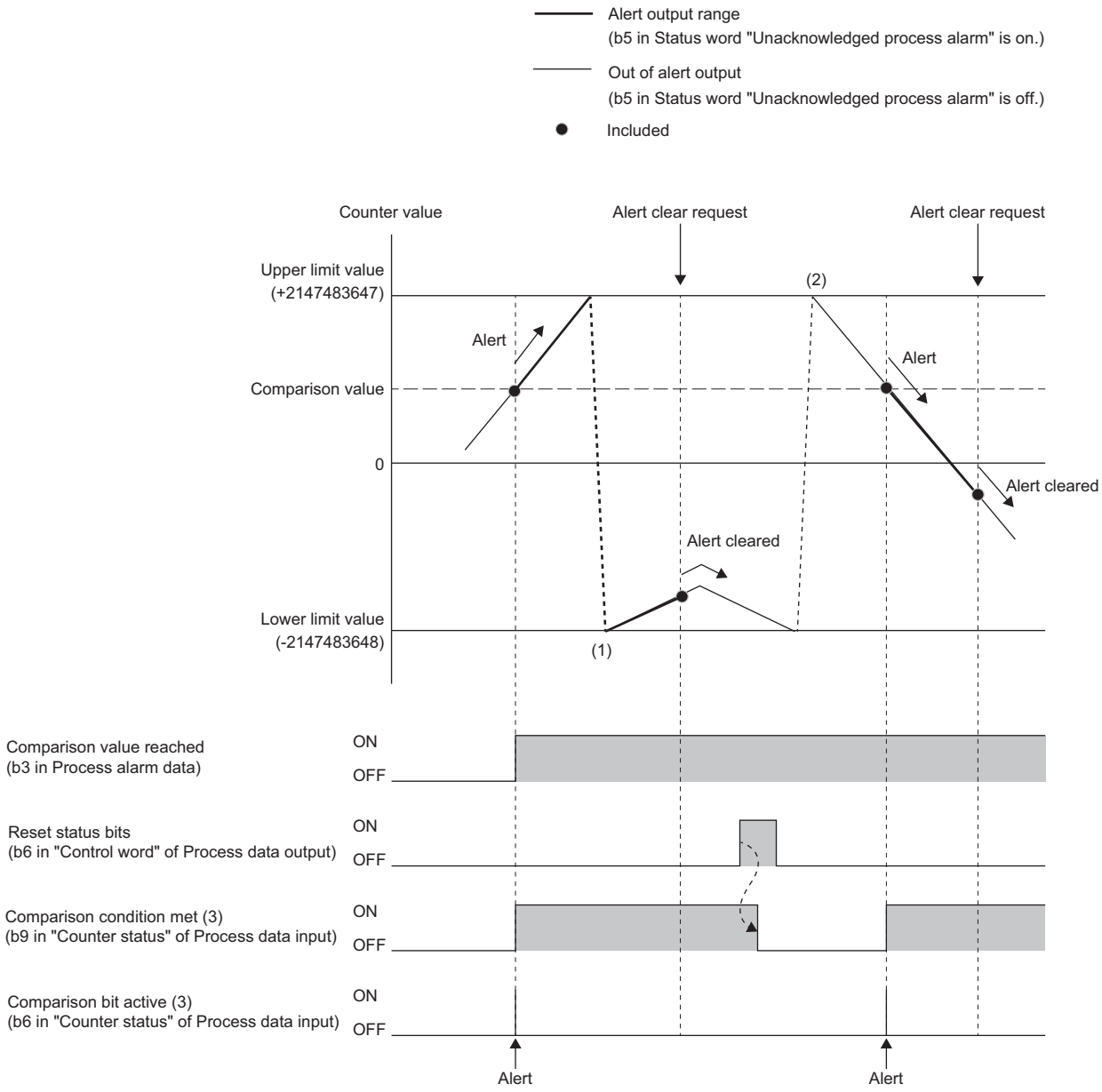
(2) The lower limit value is stored as Counter value because up counting is performed when Counter value is the upper limit value.

(3) Comparison condition met and Comparison bit active operate regardless of the parameter setting.

Ex.

When Equal comparison value is set (when "Hysteresis" is 0 or 1)

The comparison match is detected when Counter value matches Comparison value of Process data output.



(1) The lower limit value is stored as Counter value because up counting is performed when Counter value is the upper limit value.

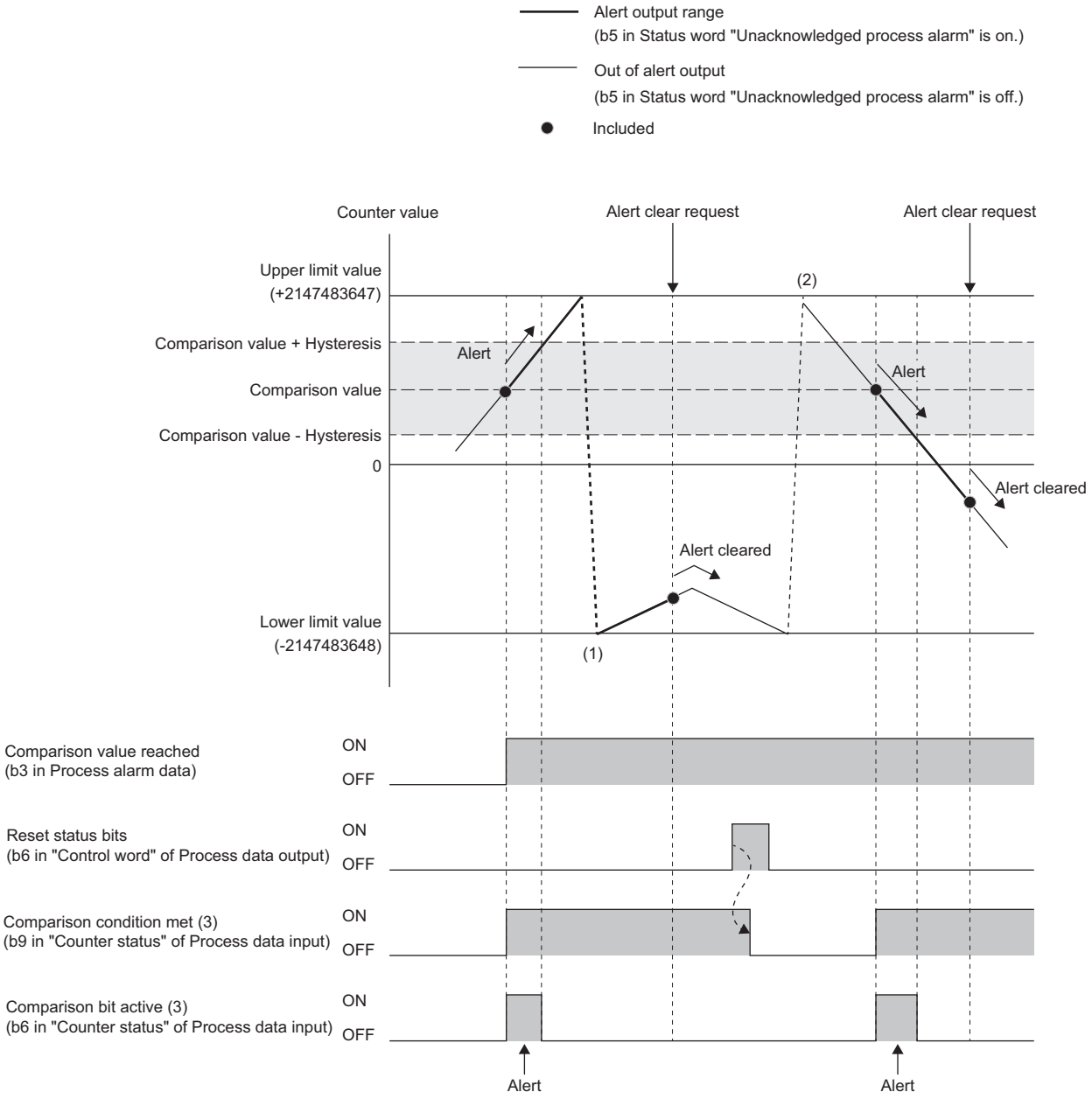
(2) The upper limit value is stored as Counter value because down counting is performed when Counter value is the lower limit value.

(3) Comparison condition met and Comparison bit active operate regardless of the parameter setting.

Ex.

When Equal comparison value is set (when "Hysteresis" is 2 or more)

The comparison match is detected when Counter value matches Comparison value of Process data output.



(1) The lower limit value is stored as Counter value because up counting is performed when Counter value is the upper limit value.

(2) The upper limit value is stored as Counter value because down counting is performed when Counter value is the lower limit value.

(3) Comparison condition met and Comparison bit active operate regardless of the parameter setting.

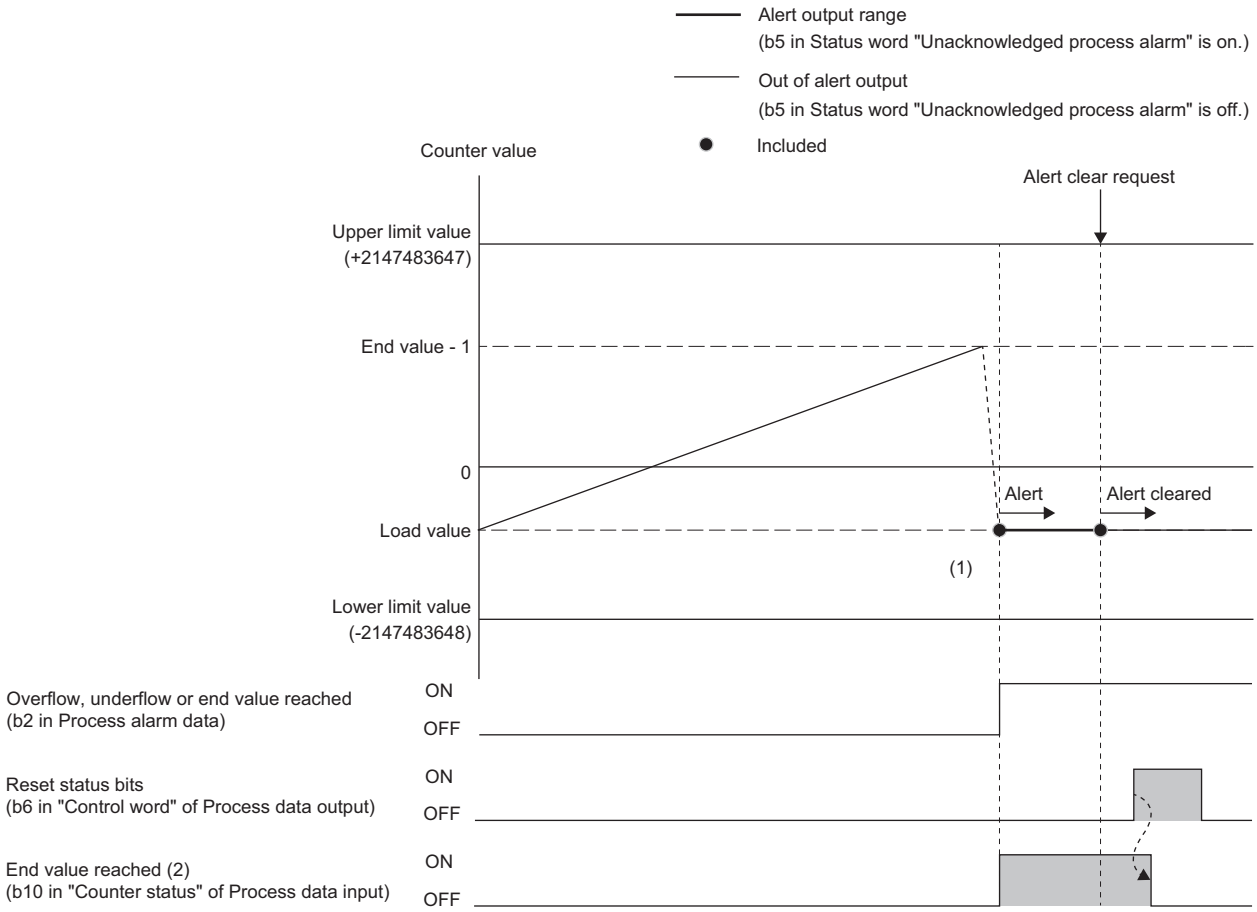
■Process alarm end value

Setting the parameter "Process alarm end value" to "Enabled" allows detection when Counter value reaches the value of the parameter End value.

The following shows an operation example when the parameter "Counting mode" is set to "Once - forward" using NZ2FT-EIP.

Ex.

When Process alarm end value is set



(1) "Load value" is stored as Counter value because up counting is performed when Counter value is "End value - 1".

(2) End value reached operates regardless of the parameter setting.

Parameter settings

The following table lists the parameters that can be set for the NZ2FTS-D62P2.

Item		Description	Setting range*1
General	Diagnostic alarm	Sets Disabled (default).	• Disabled (0) • Enabled (1) (Default: Disabled)
CH0 (Channel 0) to CH1 (Channel 1)	Filter time signal A	Sets the filter time for signal A.	• 0.010ms (100kHz) (0) • 0.020ms (50kHz) (1) • 0.033ms (30kHz) (2) • 0.1ms (10kHz) (3) • 0.2ms (5kHz) (4) • 0.5ms (2kHz) (5) • 1ms (1kHz) (6) (Default: 0.010ms (100kHz))
	Filter time signal B	Sets the filter time for signal B.	
	Process alarm overflow	Sets whether to enable or disable the overflow detection of the warning output (Process alarm). (☞ Page 535 Process alarm overflow)	• Disabled (0) • Enabled (1) (Default: Disabled)
	Process alarm underflow	Sets whether to enable or disable the underflow detection of the warning output (Process alarm). (☞ Page 536 Process alarm underflow)	
	Process alarm comp. value	Sets whether to enable or disable the comparison match detection of the warning output (Process alarm). (☞ Page 537 Process alarm comp. value)	
	Process alarm end value	Sets whether to enable or disable the end value detection of the warning output (Process alarm). (☞ Page 543 Process alarm end value)	
	Counting mode	Selects the counter type. (☞ Page 525 Counter function)	• Count endless (0) • Once - forward (1) • Once - backwards (2) • Once - no main direction (3) • Periodic - forward (4) • Periodic - backwards (5) • Periodic - no main direction (6) (Default: Count endless)
	Comparison function	Sets the comparison condition of the counter. Set an arbitrary comparison value ("Comparison value" of Process data outputs) in advance and compare it with the current counter value to set whether it matches with the comparison condition. (☞ Page 537 Process alarm comp. value)	• Disabled (0) • Higher equal comparison value (1) • Lower equal comparison value (2) • Equal comparison value (3) (Default: Disabled)
	Counter dir.signal B inv.	Specifies the counter direction (positive direction/negative direction). Inverts the counter input (on/off) of signal B.	• Disabled (0) • Enabled (1) (Default: Disabled)
	Signal mode	Sets the input method of the counter. (☞ Page 524 Pulse input mode setting function)	• Rotary transducer - single (0) • Rotary transducer - double (1) • Rotary transducer - quadruple (2) • Pulse and Direction (3) • Counter disabled (4) (Default: Counter disabled)
	Counter behaviour internal gate	Sets the operation when the internal gate (SW gate) starts. (☞ Page 525 Counter function)	• Interrupt counting (0) • Cancel counting (1) (Default: Cancel counting)
	Set value	Sets the preset value. The preset function can be used to overwrite the current value of the counter with an arbitrary numerical value (the preset value). (☞ Page 534 Preset function)	• -2147483648 to 2147483647 (32-bit signed binary value) (Default: 0)
	End value	Sets the end value of the counter.	• -2147483648 to 2147483647 (32-bit signed binary value) (Default: 2147483647)
	Load value	Sets the start value of the counter.	• -2147483648 to 2147483647 (32-bit signed binary value) (Default: 0)
	Hysteresis	Sets the hysteresis value for the comparison function of the warning output (Process alarm). (☞ Page 537 Process alarm comp. value)	• 0 to 255 (Default: 0)

*1 (0) to (6) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

Counter value depends on the parameter setting of the coupler.

Parameter of the coupler	Setting value	Description
Output behaviour on fieldbus error	Hold last value	The counter continues to count during the error. After the error recovery, the counter continues to count at the previous value.
	Enable substitute values	Counter value stops. After the error recovery, it is reset to the value of the parameter Load value.
	All outputs off	The counter continues to count during the error. After the error recovery, the counter continues to count at the previous value.

Process data

The following table lists the Process data of the NZ2FTS-D62P2.

Input/ Output	Address (byte)	Item	Bit	Description	Data format
Input	0 to 3	Counter 0: Counter value	—	Counter 0: current count value	Double Word
	4 to 7	Counter 1: Counter value	—	Counter 1: current count value	Double Word
	8 to 9	Counter 0: Counter status	b0	System area	Word
			b1	Comparison bit released	
			b2	SW gate active	
			b3 to b4	System area	
			b5	Internal gate active	
			b6	Comparison bit active	
			b7	Counter direction down	
			b8	Counter direction up	
			b9	Comparison condition met	
			b10	End value reached	
			b11	Overflow performed	
			b12	Underflow performed	
			b13	Zero crossing performed	
			b14 to b15	System area	
	10 to 11	Counter 1: Counter status	b0	System area	Word
			b1	Comparison bit released	
			b2	SW gate active	
			b3 to b4	System area	
			b5	Internal gate active	
			b6	Comparison bit active	
			b7	Counter direction down	
			b8	Counter direction up	
			b9	Comparison condition met	
			b10	End value reached	
			b11	Overflow performed	
			b12	Underflow performed	
			b13	Zero crossing performed	
			b14 to b15	System area	

Input/ Output	Address (byte)	Item	Bit	Description	Data format
Output	0 to 3	Counter 0: Comparison value	—	☞ Page 537 Process alarm comp. value	Double Word
	4 to 7	Counter 1: Comparison value	—	☞ Page 537 Process alarm comp. value	Double Word
	8 to 9	Counter 0: Control word	b0	System area	Word
			b1	Release comparison bit	
			b2	Set SW gate	
			b3 to b4	System area	
			b5	Load set value (Store Set value in Counter value)	
			b6	Reset status bits (Counter 0: Reset b9 to b13 of Counter status)	
			b7 to b8	System area	
			b9	Deactivate comparison bit	
			b10	Reset SW gate	
			b11 to b15	System area	
	10 to 11	Counter 1: Control word	b0	System area	Word
			b1	Release comparison bit	
			b2	Set SW gate	
			b3 to b4	System area	
			b5	Load set value (Store Set value in Counter value)	
			b6	Reset status bits (Counter 1: Reset b9 to b13 of Counter status)	
			b7 to b8	System area	
			b9	Deactivate comparison bit	
			b10	Reset SW gate	
			b11 to b15	System area	

Warning data (Process alarm data)

The following table lists the Process alarm data for the NZ2FTS-D62P2.

Address (byte)	Description	
0	b0 to b1	System area
	b2	Counter 0: Overflow, underflow, or end value reached
	b3	Counter 0: Comparison value reached
	b4 to b5	System area
	b6	Counter 1: Overflow, underflow, or end value reached
	b7	Counter 1: Comparison value reached
1	b0	Status Counter 0: Input channel 0 A (track A)
	b1	Status Counter 0: Input channel 0 B (track B)
	b2	Status Counter 1: Input channel 0 A (track A)
	b3	Status Counter 1: Input channel 0 B (track B)
	b4 to b7	System area
2 to 3	16 Bit Time stamp	

Troubleshooting

If problems occur on the NZ2FTS-D62P2, perform the following.

Checking with LEDs

■When the module status LED turns on in red

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.
Is the I/O module mounted properly?	Mount the I/O module again by pressing it to the coupler until it clicks.

If the problem persists after checking the above, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

Troubleshooting by symptom

■The counter operation does not start

Check the following items in order from the top.

Item	Action
Is Internal gate active (b5 of Process data input "Counter status") on?	If it is not on, check SW gate active (b2 of Process data input "Counter status"). ■When SW gate active is on Turn on Reset SW gate (b10 of Process data output "Control word"), change the SW gate to non-active, and then turn on Set SW gate (b2 of Process data output "control word"). ■When SW gate active is off Turn on Set SW gate (b2 of Process data output "Control word").
Is the pulse input method the same as the parameter setting of Signal mode?	Set the pulse input method and the parameter setting of Signal mode to the same setting.
Is the CPU module in the STOP state?	Change the CPU module to the RUN state.
Is the external wiring for signal A and signal B correct?	Change the external wiring if necessary.
When a voltage is applied to the pulse input terminals of signal A and signal B from a stabilized power supply, do the channel status LEDs of signal A and signal B turn on?	If they turn on, check the external wiring and the wiring on the encoder side. If they remain off, the module may fail. Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

■The count cannot be performed normally

Check the following items in order from the top.

Item	Action
When the count value is read with a sequence program, is the value read in units of 2 words (32 bits)?	Perform batch reading of these values in units of 2 words.
Is the value preset outside of the count range?	Preset the value within the count range.
Is a shielded twisted pair cable used for the pulse input wiring?	Use a shielded twisted pair cable for the pulse input wiring.
Have measures to reduce noise been taken in the control panel and on adjacent devices?	Take measures to reduce noise such as attaching surge suppressors to magnet switches or similar devices.
Is the distance between high voltage devices and the pulse input cable sufficient?	Connect the pulse input cable alone, and even when wiring in the control panel, keep the power cable sufficiently separate.
Is noise intruding from the grounding part of the NZ2FTS-D62P2?	Disconnect the ground cable of the NZ2FTS-D62P2. If the case of the NZ2FTS-D62P2 is in contact with the grounding part, separate the NZ2FTS-D62P2 from the grounding part.
Does the input pulse waveform meet the performance specifications?	Observe and check the pulse waveform with a synchroscope. If the input pulse does not meet the performance specifications, apply a pulse that meets the performance specifications.
Is the same count value obtained when the same count input is applied to other channels?	If the count values are different, the module may fail. Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

■Preset cannot be performed

Check the following items in order from the top.

Item	Action
Is the CPU module in the STOP state?	Change the CPU module to the RUN state.
Is Load set value (b5 of Process data output "Control word") turned on after setting the preset value in the parameter Set value?	If not, turn on Load set value (b5 of Process data output "Control word").

20 ABSOLUTE ENCODER MODULE

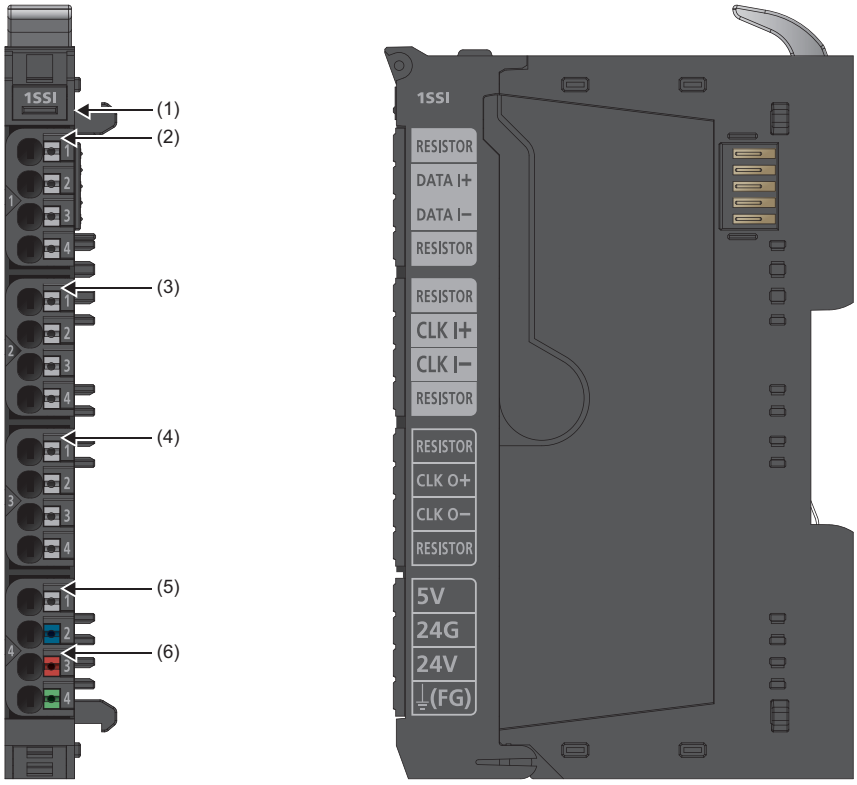
This chapter describes the details of the absolute encoder module.

20.1 NZ2FTS-D66D1

This is a 1ch absolute encoder module

Part names

This section describes the name of each LED of the NZ2FTS-D66D1. (☞ Page 414 I/O Module Common Part Names)

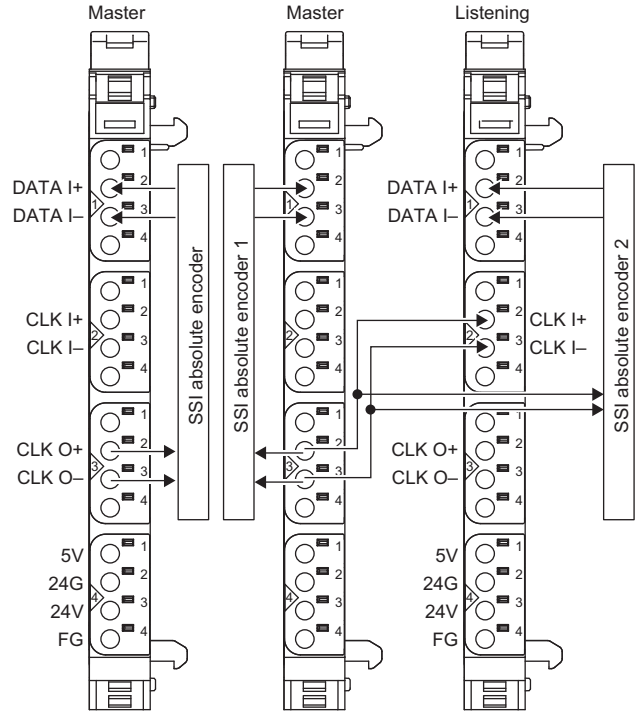


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 557 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED 1.1	Indicates the operating status. On in yellow: Data input operating Off: Data input not operating
(3)	Channel status LED 2.1	Indicates the operating status. On in yellow: Clock input operating Off: Clock input not operating
(4)	Channel status LED 3.1	Indicates the operating status. On in yellow: Clock output operating Off: Clock output not operating
(5)	Channel status LED 4.1	Indicates the operating status. On in green: Supply voltage to external device DC + 5V Off: No supply voltage to external device
(6)	Channel status LED 4.3	Indicates the operating status. On in green: Supply voltage to external device DC + 24V Off: No supply voltage to external device

Connection diagram

The following figure shows the connection diagram between the NZ2FTS-D66D1 and external devices.

Ex.



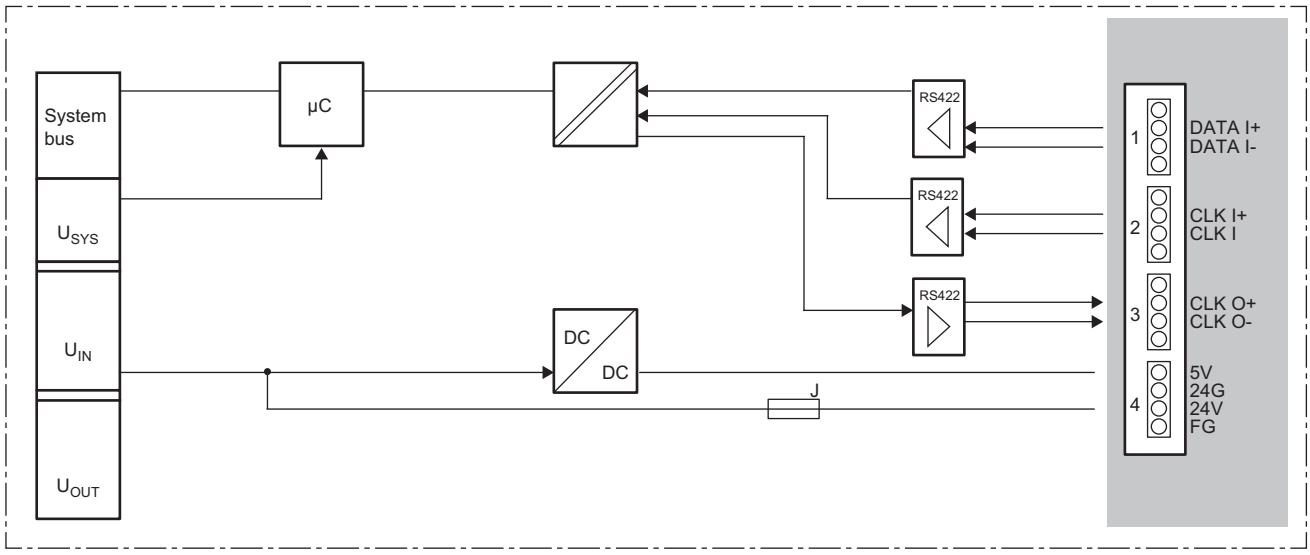
Performance specifications

This section describes the performance specifications of the NZ2FTS-D66D1. (☞ Page 30 General Specifications)

Item	NZ2FTS-D66D1
System bus transfer speed	48Mbps
Number of channels	1
Type	SSI (differential RS422)
SSI transfer speed	125kHz to 2MHz
Delay time	1μs to 64μs
Data length	8 to 32 bits
Data format	Binary/Gray code
Supply to external device	500mA (24VDC)/400mA (5VDC)
Reverse polarity protection	Provided
Module diagnostics	Provided
Cable length	320m maximum at 125kHz (Cable must be shielded.)
External power supply voltage	24VDC + 20%/-15%
Module current consumption	50mA
Current consumption of external power supply for output part	25mA + supply to external device
Weight	87g

Block diagram

The following figure shows the internal block diagram of the NZ2FTS-D66D1.



Functions

This section describes the functions of the NZ2FTS-D66D1.

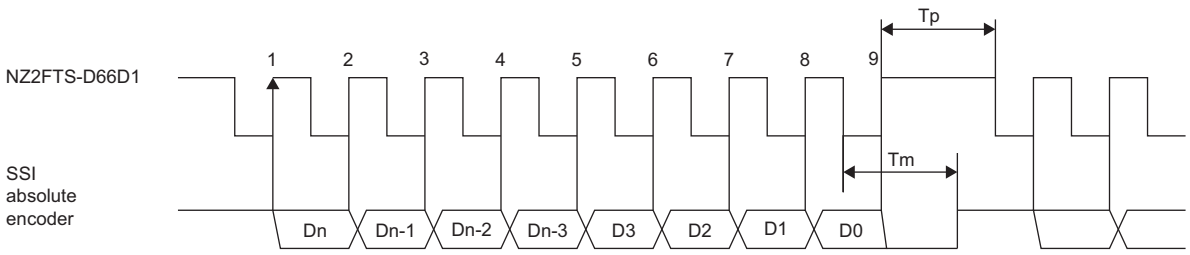
Function list

Item	Description	Reference
SSI monoflop time setting function	Sets the period of time required for synchronization with the data refreshing cycle of the SSI absolute encoder to be connected (SSI monoflop time).	Page 553 SSI monoflop time setting function
SSI transmission speed setting function	Sets the speed of the SSI transmission with the SSI absolute encoder. The SSI transmission speed is set with the parameter "SSI transfer rate".	Page 555 Parameter settings
SSI trailing bit setting function	Sets the number of trailing bits when the SSI absolute encoder to be connected has trailing bits. The number of trailing bits is set with the parameter "Number of indicator bits".	Page 555 Parameter settings
SSI code length setting function	Sets the SSI code length to the number of bits that is the sum of the resolution of the connected SSI absolute encoder and the trailing bits. The SSI code length is set with the parameter "Number of frame data bits".	Page 555 Parameter settings
SSI mode setting function	Sets the start mode (Listening/Master). The SSI mode is set with the parameter "SSI mode".	Page 555 Parameter settings
Clock signal bit order setting function	Sets the bit order of the clock signal (MSB/LSB).	Page 554 Clock signal bit order setting function
Clock signal edge setting function	Sets the edge of the clock signal (rising or falling).	Page 554 Clock signal edge setting function
SSI code setting function	Sets the SSI code to "Gray code" or "Binary code" according to the SSI absolute encoder to be connected. The SSI code is set with the parameter "Data format".	Page 555 Parameter settings
Encoder input enable/disable setting function	Sets whether to enable or disable the encoder input. Whether to enable or disable the encoder input is set with the parameter "SSI interface".	Page 555 Parameter settings

SSI monoflop time setting function

SSI monoflop time (Tp) refers to the period of time required for synchronization with the data refreshing cycle of an SSI absolute encoder.

To establish communications with an SSI absolute encoder, ensure the time period until the data transmission of the SSI absolute encoder is reset (Tm) and set the parameter "Delay time" so that Tp is longer than Tm. (☞ Page 555 Parameter settings)



The SSI monoflop time setting ("Delay time") is restricted according to the setting of the parameter "SSI transfer rate".

SSI transfer rate	Delay time							
	1μs	2μs	4μs	8μs	16μs	32μs	48μs	64μs
125kHz	Not settable			Settable				
250kHz	Not settable		Settable					
500kHz	Not settable	Settable						
1MHz	Settable							
1.5MHz	Settable*1	Settable						
2MHz	Settable							

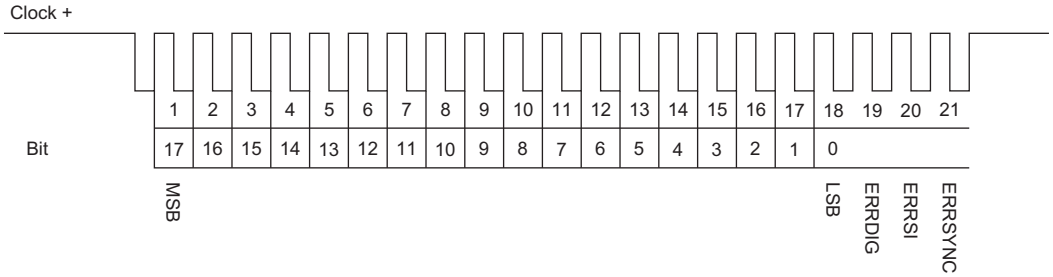
*1 The SSI monoflop time (Tp) to be actually enabled is 666ns.

Clock signal bit order setting function

Set the clock signal bit order in accordance with the specifications of the SSI absolute encoder to be connected.

The clock signal bit order is set with the parameter "Bit order". (☞ Page 555 Parameter settings)

When the specifications of the SSI absolute encoder are the same as the following, set "MSB first".

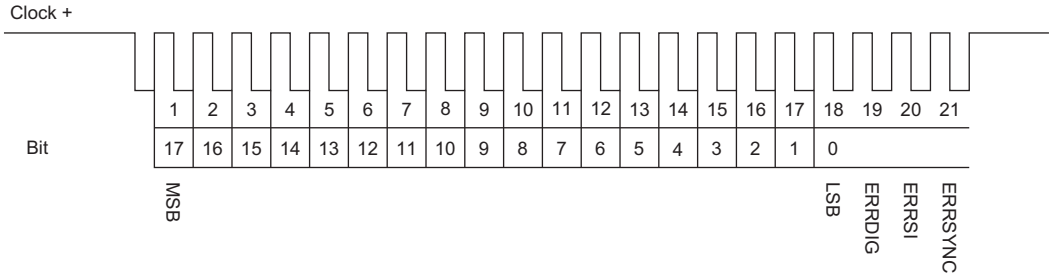


Clock signal edge setting function

Set the clock signal edge (rising/falling) in accordance with the specifications of the SSI absolute encoder to be connected.

The clock signal edge is set with the parameter "Data evaluation at edge". (☞ Page 555 Parameter settings)

When the specifications of the SSI absolute encoder are the same as the following, set "0 to 1".



Parameter settings

The following table lists the parameters that can be set for the NZ2FTS-D66D1.

Item		Description	Setting range*1
Channel 0	Delay time	Sets the period of time required for synchronization with the data refreshing cycle of the SSI absolute encoder to be connected (SSI monoflop time). (☞ Page 553 SSI monoflop time setting function)	• 1μs (0) • 2μs (1) • 4μs (2) • 8μs (3) • 16μs (4) • 32μs (5) • 48μs (6) • 64μs (7) (Default: 64μs)
	SSI transfer rate	Sets the speed of the SSI transmission with the SSI absolute encoder.	• 2.0 MHz (0) • 1.5 MHz (1) • 1.0 MHz (2) • 500 kHz (3) • 250 kHz (4) • 125 kHz (5) (Default: 125kHz)
	Number of indicator bits	Sets the number of trailing bits when the SSI absolute encoder to be connected has trailing bits.	• 0 to 15 (Default: 0)
	Number of frame data bits	Sets the SSI code length to the number of bits that is the sum of the resolution of the connected SSI absolute encoder and the trailing bits.	• 8 bit (0) • 9 bit (1) • 10 bit (2) • 11 bit (3) • 12 bit (4) • 13 bit (5) • 14 bit (6) • 15 bit (7) • 16 bit (8) • 17 bit (9) • 18 bit (10) • 19 bit (11) • 20 bit (12) • 21 bit (13) • 22 bit (14) • 23 bit (15) • 24 bit (16) • 25 bit (17) • 26 bit (18) • 27 bit (19) • 28 bit (20) • 29 bit (21) • 30 bit (22) • 31 bit (23) • 32 bit (24) (Default: 25bit)
	SSI mode	Sets the start mode (Listening/Master).	• Listening (0) • Master (1) (Default: Master)
	Bit order	Sets the bit order (MSB/LSB) of the data to be input. Set this function in accordance with the specifications of the absolute encoder to be connected. (☞ Page 554 Clock signal bit order setting function)	• LSB first (0) • MSB first (1) (Default: MSB first)
	Data evaluation at edge	Sets the edge of the clock signal (rising or falling). (☞ Page 554 Clock signal edge setting function)	• 1 to 0(0) • 0 to 1(1) (Default: 1 to 0)
	Data format	Sets the SSI code to "Gray code" or "Binary code" according to the SSI absolute encoder to be connected.	• Binary code (0) • Gray code (1) (Default: Gray code)
	SSI interface	Sets whether to enable or disable the encoder input.	• Disabled (0) • Enabled (1) (Default: Disabled)

*1 (0) to (24) are the values set in the register when the digital I/O module is connected to the NZ2FT-MT or the NZ2FT-EIP.

Process data

The following table lists the Process data of the NZ2FTS-D66D1.

Input/ Output	Address (byte)	Description	Data format
Input	0 to 3	Encoder value	Double Word
	4 to 5	16 Bit time stamp	Word

Troubleshooting

If problems occur on the NZ2FTS-D66D1, check the following.

Checking with LEDs

■When the module status LED turns on in red

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.
Is the I/O module mounted properly?	Mount the I/O module again by pressing it to the coupler until it clicks.

If the problem persists even after checking the above, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Point

The LED status can also be checked on the Web server. (☞ Page 70 "Overview")

Troubleshooting by symptom

■Counter operation is not performed

Check the following items in order from the top.

Item	Action
Does the externally supplied voltage of the input power supply (24VDC) reach the voltage of the performance specifications?	Check whether the voltage of the input power supply (24VDC) is within the range of the performance specifications.
Is there any problem with the wiring, such as looseness or disconnection of external wiring?	Check the faulty area by checking the external wiring visually or conductively.
Is the parameter Data evaluation at edge set correctly?	Set the parameter Data evaluation at edge in accordance with the SSI absolute encoder to be connected.
Has the parameter SSI interface been set to valid?	Set the parameter SSI interface to valid.

■The encoder value is not normal

Check the following items in order from the top.

Item	Action
Is the parameter Data format set correctly?	Select Gray code or binary code in accordance with the SSI absolute encoder to be connected.
Is the cable length within the range of the maximum cable length?	Check the cable length or the cable thickness. Alternatively, decrease the parameter SSI transfer rate.
Is the parameter Number of frame data bits set correctly?	Set the parameter Number of frame data bits in accordance with the resolution of the SSI absolute encoder to be connected.
Is the parameter Bit order set correctly?	Set the parameter Bit order in accordance with the bit order (MSB/LSB) of the SSI absolute encoder to be connected.
Is a shielded twisted pair cable used?	Use a shielded twisted pair cable.
Is there any noise affecting the system?	Take measures to reduce noise such as attaching surge suppressors to magnet switches or similar devices.
Is the distance between high voltage devices and the signal line sufficient?	Connect the signal line alone, and keep cables such as the power cable sufficiently separate.

21 SERIAL COMMUNICATION MODULE

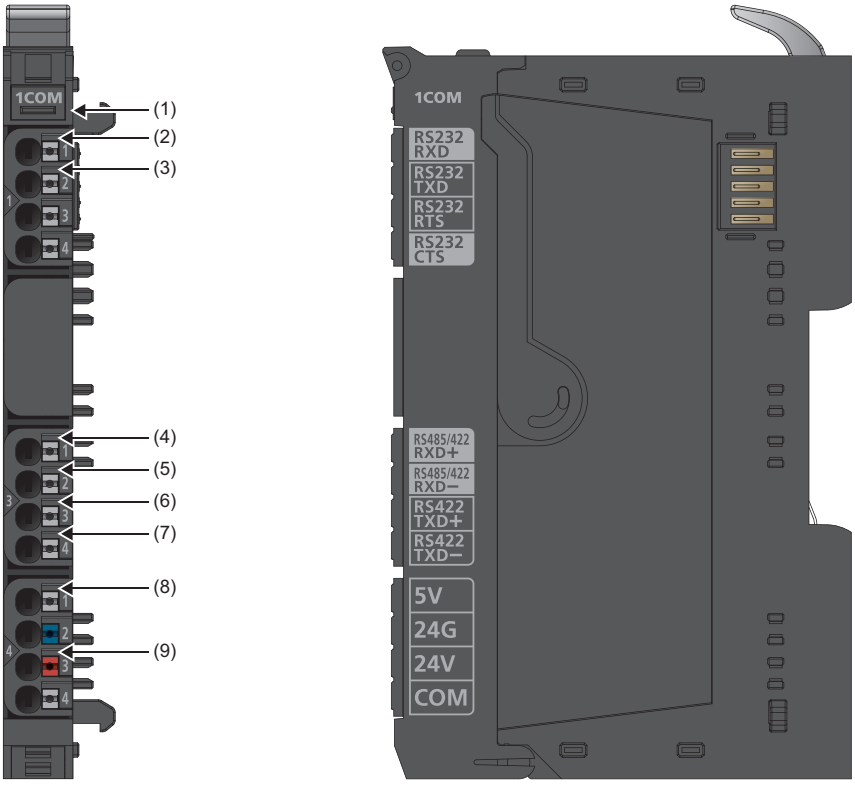
This chapter describes the details of the serial communication module.

21.1 NZ2FT-C24

This is the NZ2FT-C24 type serial communication module.

Part names

This section describes the name of each LED of the NZ2FT-C24. (☞ Page 414 I/O Module Common Part Names)



No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error (☞ Page 576 When the module status LED turns on in red) Off: No external power supply (power-off)
(2)	Channel status LED 1.1*1	Indicates the operating status. On in yellow: RS232 is selected with the parameter "Operating mode". Flashing in yellow: Data communications in progress (RS-232)
(3)	Channel status LED 1.2*1	
(4)	Channel status LED 3.1*1	Indicates the operating status. On in yellow: RS422 or RS485 is selected with the parameter "Operating mode".*2 Flashing in yellow: Data communications in progress (RS-422 or RS-485)
(5)	Channel status LED 3.2*1	
(6)	Channel status LED 3.3*1	Indicates the operating status. On in yellow: RS422 is selected with the parameter "Operating mode". Flashing in yellow: Data communications in progress (RS-422)
(7)	Channel status LED 3.4*1	
(8)	Channel status LED 4.1	Indicates the power supply status to external devices. On in green: Supply voltage to external device DC + 5V Off: No supply voltage to external device (☞ Page 576 When the channel status LEDs 4.1 and 4.3 turn off)
(9)	Channel status LED 4.3	Indicates the power supply status to external devices. On in green: Supply voltage to external device DC + 24V Off: No supply voltage to external device (☞ Page 576 When the channel status LEDs 4.1 and 4.3 turn off)

*1 On the Web server, the channel status LEDs do not turn on/flash.

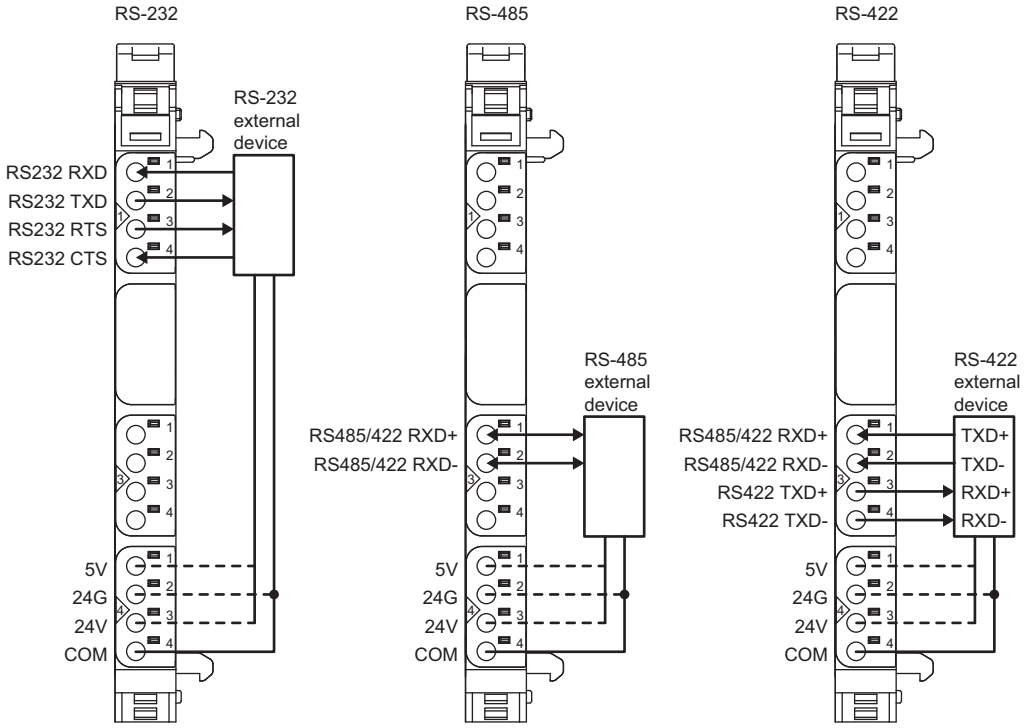
*2 When the parameter "Operating mode" is set to "RS422" or "RS485", it will not turn off even when the parameter is changed to "Disabled" or "RS232" afterward. When the module power supply is turned on, they turn off.

Connection diagram

The following figure shows the connection diagram between the NZ2FT-C24 and external devices.

Ex.

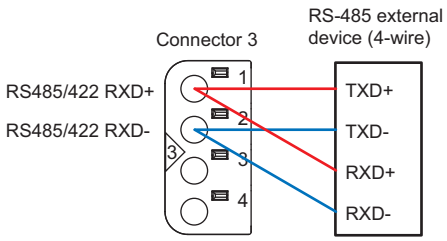
Wiring with external devices for standard serial communications



- For RS-232, the NZ2FT-C24 supports full-duplex communications. However, it does not support half-duplex communications.
- For RS-485/RS-422, 120Ω terminating resistors are required for the external devices at both ends. If the NZ2FT-C24 is the end module, set the parameter "Terminating resistor RS485/422" to "ON". (☞ Page 574 Parameter settings)
- For RS-485, NZ2FT-C24 is a 2-wire system, so half-duplex communications are used. Use half-duplex communications regardless of whether the external device is a 2-wire system or a 4-wire system.
- The NZ2FT-C24 cannot detect disconnection of TXD and RXD wiring. Implement the software protocol between the NZ2FT-C24 and external devices to detect such errors.

Ex.

Wiring with 4-wire external devices with RS-485



When performing serial communications between the 2-wire NZ2FT-C24 and 4-wire external devices, wire the RS485/422 RXD+ and RS485/422 RXD- of connector 3 to both TXD and RXD of the external device. Also, because the send data of the external device is echoed back to the external device itself, set the external device to not allow echo back.

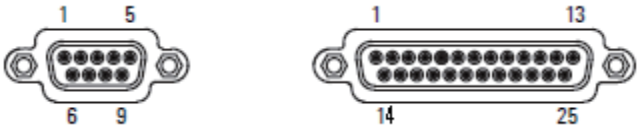
■Connection type

The NZ2FT-C24 can be connected to multiple external devices.

Connection type	RS-232	RS-485	RS-422	Description
Point-to-point connection	Available	Available	Available	—
Multipoint connection	Not available	Available	Not available	Compliant with EIA-RS485 standard. A maximum of 32 drivers and receivers can be connected in total.
Multidrop connection	Not available	Not available	Available	Compliant with EIA-RS422 standard. One driver and a maximum of 10 receivers can be connected. The NZ2FT-C24 can be used as a driver or as a receiver.

■Connecting the RS-232 interface to a connector

This section shows the pin assignment when connecting the RS-232 interface of the NZ2FT-C24 to the 9-pin/25-pin D-Sub connectors.

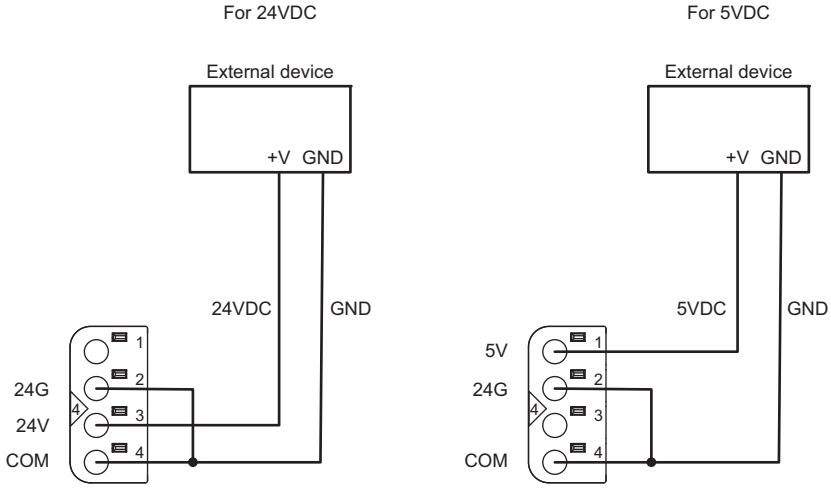


NZ2FT-C24 connector	Name	Signal	Transmission direction	9-pin D-Sub connector	25-pin D-Sub connector
1.1	RS232 RXD	Receive data	in	2	3
1.2	RS232 TXD	Send data	out	3	2
1.3	RS232 RTS	Send request	out	7	4
1.4	RS232 CTS	Send permission	in	8	5
4.4	COM	Grounding for signals	—	5	7

■Power wires

The following figure shows examples of the power supply when connecting external devices to the NZ2FT-C24.

Ex.



When supplying power using 24VDC for the NZ2FT-C24, connect to 24V of connector 4. When supplying power using 5VDC for the NZ2FT-C24, connect to 5V of connector 4.

24VDC and 5VDC for NZ2FT-C24 are protected from overcurrent.

■Wiring products and precautions

For wiring products and wiring precautions, refer to the following.

☞ Page 42 Wiring products for NZ2FT-C24

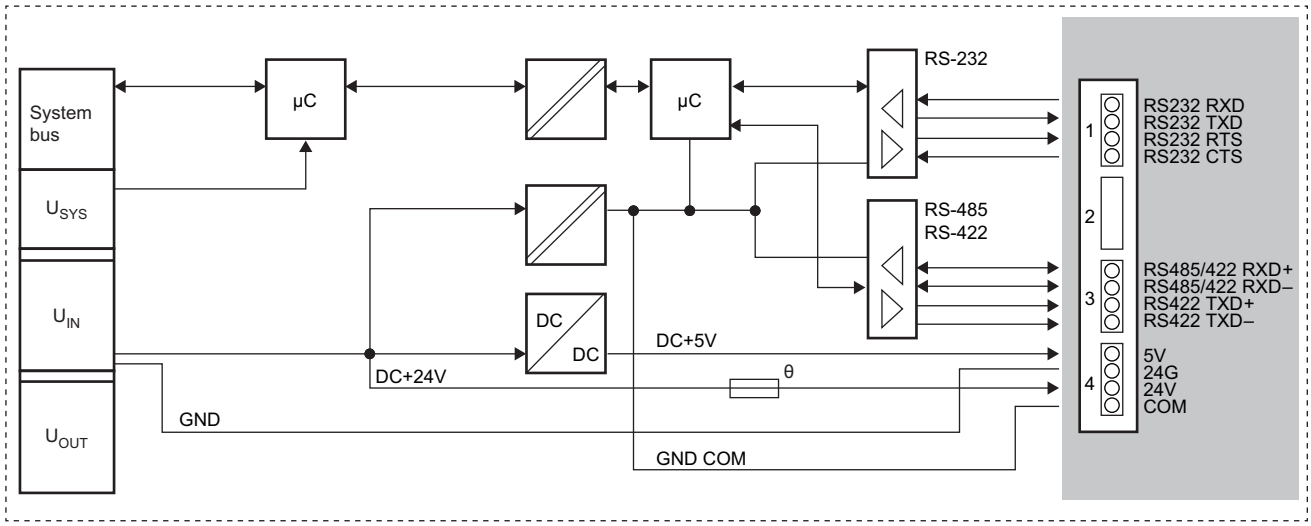
Performance specifications

This section describes the performance specifications of the NZ2FT-C24. (☞ Page 30 General Specifications)

Item	NZ2FT-C24
System bus transfer speed	48Mbps
Number of channels	1
Type	RS-232, RS-485, RS-422
Transmission speed	300bps, 600bps, 1200bps, 2400bps, 4800bps, 9600bps, 14400bps, 19200bps, 28800bps, 38400bps, 57600bps, 115200bps
Supply voltage	5VDC or 24VDC
Power supply output current	500mA maximum
RS-232 standard	DIN66020, DIN66259, EIA-RS232C, CCITT V.24/V.28
RS-485/RS-422 standard	DIN66259 part 1, 3, EIA-RS422, EIA-RS485, CCITT V.11
Terminating resistor RS-485/RS-422	120Ω
Short circuit protection	Available
Module diagnostics	Available
External power supply voltage	24VDC +20%/-15%
Input power supply current consumption	50mA
Current consumption of external power supply for output part	16mA + load
Weight	98g

Block diagram

The following figure shows the internal block diagram of the NZ2FT-C24.



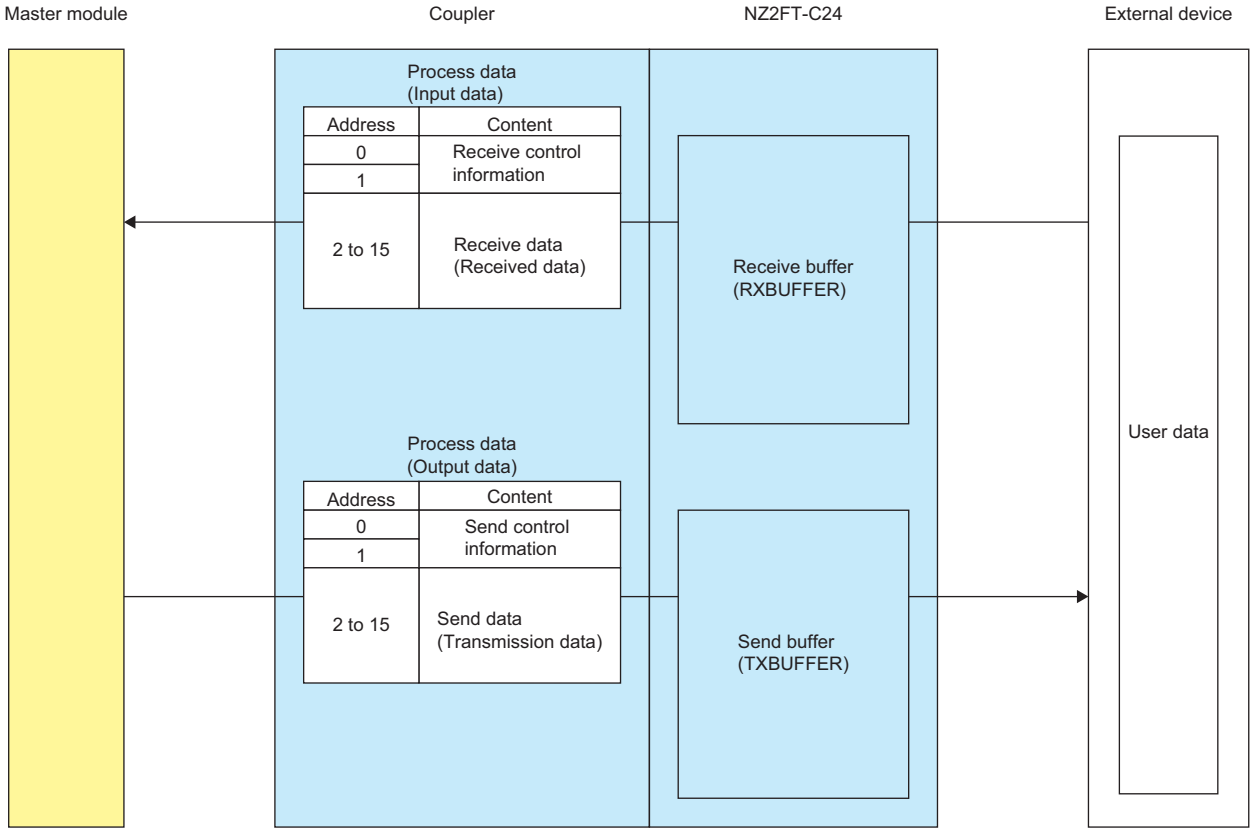
Functions

The following table lists the functions of the NZ2FT-C24.

Item	Description	Reference
Data communication	Sets any data format and transmission control procedure, and performs data communication with external devices.	Page 562 Data communication
Flow control	Performs CTS/RTS flow control. Flow control is set with the parameter "Flow control".	Page 573 Flow control

Data communication

With the NZ2FT-C24, any data format and transmission control procedure can be set to perform data communication with external devices.



The capacity of the receive buffer (RXBUFFER) of NZ2FT-C24 is 4090 bytes, and the capacity of the send buffer (TXBUFFER) is 240 bytes.

Precautions

- If there is not enough free space in RXBUFFER, RXBUFFER overflow (RX buffer overflow = 1) will occur. Adjust the communication speed with the external device, data size, and communication cycle so that enough free space can be secured in RXBUFFER.
- If RXBUFFER overflow (RX buffer overflow = 1) occurs, clear the RXBUFFER overflow. (☞ Page 572 RXBUFFER Overflow occurrence and clearing).

■Receive control information (sending data to the master station)

This section describes the receive control information when sending data that was received from an external device to the master station.

The receive control information is assigned to the first 2 bytes of Input data in Process data.

○: Used, —: Not used

Input data															
Address 1 (Length and diagnosis data)								Address 0 (Status and diagnosis)							
b7	b6	b5	b4	b3	b2	b1	b0	b7	b6	b5	b4	b3	b2	b1	b0
○	○	—	—	○	○	○	○	○	○	○	○	○	—	○	○

The following table lists the details of receive control information.

Address	Bit	Name	Description
0 (Status and diagnosis)	b0	Data in the receive buffer	0: No data to send to the master station (RXBUFFER is empty) 1: There is data to send to the master station
	b1	Receive buffer nearly full	0: Normal 1: Notification content differs depending on the set value of the parameter "Flow control". • None: No notifications • CTS/RTS: CTS row was detected. When a CTS row is detected, data stops being sent, and the send data is discarded. To store the send data in TXBUFFER, set TX_HWBUFFER in the send control information to 1. • XON/XOFF: Do not select.
	b2	Not used	
	b3	RX_CNT	When sending new data to the master station, stores the values in increments in the order 00 → 01 → 10 → 11 → 00
	b4		
	b5	TX_CNT_ACK	Stores the TX_CNT value of the last data received from the master station
	b6		
	b7	STAT	0: There is one of the following problems in communication with an external device. • RXBUFFER overflow • Serial communication flow control error • Serial communication frame error/parity error 1: Normal
1 (Length and diagnosis data)	b0	Length of the data	Byte length of data to send to the master station (The data length of receive control information is not included.)
	b1		
	b2		
	b3		
	b4	Not used	
	b5		
	b6	Frame error	0: Normal 1: Parameters "Data bits", "Baud rate", "Stop bit", and/or "Parity" do not match the external device
	b7	RX buffer overflow	0: Normal 1: Receive buffer (RXBUFFER) overflow occurs in the receive data from the external device

■Send control information (sending data to external devices)

This section describes the send control information when sending data from the master station to an external device.

The send control information is assigned to the first 2 bytes of Output data in Process data.

○: Used, —: Not used

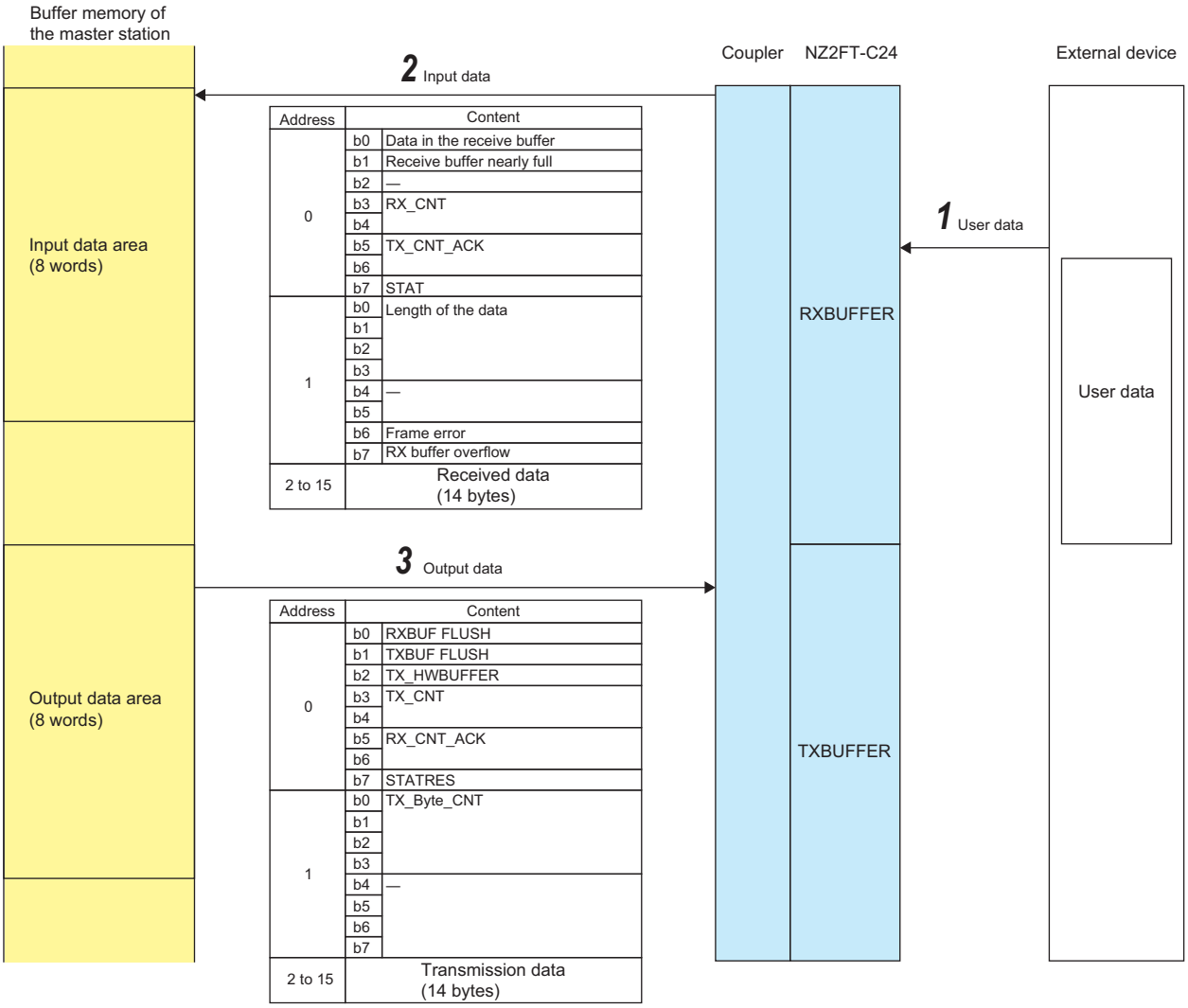
Output data															
Address 1 (Length)								Address 0 (Status and diagnosis)							
b7	b6	b5	b4	b3	b2	b1	b0	b7	b6	b5	b4	b3	b2	b1	b0
—	—	—	—	○	○	○	○	○	○	○	○	○	○	○	○

The following table lists the details of send control information.

Address	Bit	Name	Description
0 (Status and diagnosis)	b0	RXBUF FLUSH	0: Do not clear RXBUFFER. 1: RXBUFFER is cleared when STATRES = 0 and this bit is set to 1. When the following conditions occur, clear RXBUFFER because data cannot be assured. • When a fieldbus error occurs • When an overflow occurs in RXBUFFER • When RX_CNT of Input data receives discontinuous data For details, refer to the following. ☞ Page 572 RXBUFFER Overflow occurrence and clearing
	b1	TXBUF FLUSH	0: Do not clear TXBUFFER. 1: TXBUFFER is cleared when STATRES = 0 and this bit is set to 1. When the following conditions occur, clear TXBUFFER because data cannot be assured. • When STAT of Input data becomes 0 • When intentionally discarding data
	b2	TX_HWBUFFER	0: User data can be sent Once Transmission data has accumulated in TXBUFFER, it is sent to an external device at any time. 1: Stop sending User data Transmission data accumulates in TXBUFFER, but sending of the data accumulated in TXBUFFER is stopped while this bit is 1. If TXBUFFER is out of free space, Transmission data is not accumulated.
	b3 b4	TX_CNT	When the updated TX_CNT is received, Transmission data is accumulated in TXBUFFER. Use it in increments that follow the order 00 → 01 → 10 → 11 → 00. Update after setting Transmission data of Output data. Using TX_CNT in increments is recommended, but even if TX_CNT is discontinuous, NZ2FT-C24 has no error and sets TX_CNT_ACK of Input data to the last received TX_CNT.
	b5 b6	RX_CNT_ACK	Sets the RX_CNT value of the last received Input data.
	b7	STATRES	0: RXBUFFER and TXBUFFER can be cleared. The updated values of TX_Byte_CNT and TX_CNT of Output data set to STATRES = 0 are not accepted, and send requests to an external device become invalid. 1: Do not clear RXBUFFER and TXBUFFER. To clear RXBUFFER or TXBUFFER, set STATRES to "0" and then set RXBUF FLUSH or TXBUF FLUSH to "1".
1 (Length)	b0 b1 b2 b3	TX_Byte_CNT	Byte length of data (Transmission data) to send to an external device
	b4 b5 b6 b7	Not used	

■Method for sending data to the master station

This section describes the procedure for sending User data that was received from an external device to the master station. The message format of Input data and Output data is the same, regardless of the communication interface (RS-232/RS-485/RS-422) of the external device.



1. User data received from an external device accumulates in RXBUFFER.

2. The User data accumulated in RXBUFFER is put in an Input data message and sent to the master station.

Address	Bit	Input data message	Content
2 to 15	—	Received data	Extracts and stores a maximum of 14 bytes of data from RXBUFFER
0	b0	Data in the receive buffer	If RXBUFFER has unsent User data = 1, Otherwise = 0
0	b3, b4	RX_CNT	Increments the last value of RX_CNT (in order of 00 → 01 → 10 → 11 → 00)
0	b5, b6	TX_CNT_ACK	Sets the TX_CNT value of the received Output data message (00 when not received)
0	b7	STAT	Communication with external device is normal = 1, There is a problem = 0
1	b0 to b3	Length of the data	Byte length of data stored in "Received data"
1	b7	RX buffer overflow*1	RXBUFFER overflow none = 0, Yes = 1

*1 For details on when there is overflow, refer to the following.
☞ Page 572 RXBUFFER Overflow occurrence and clearing

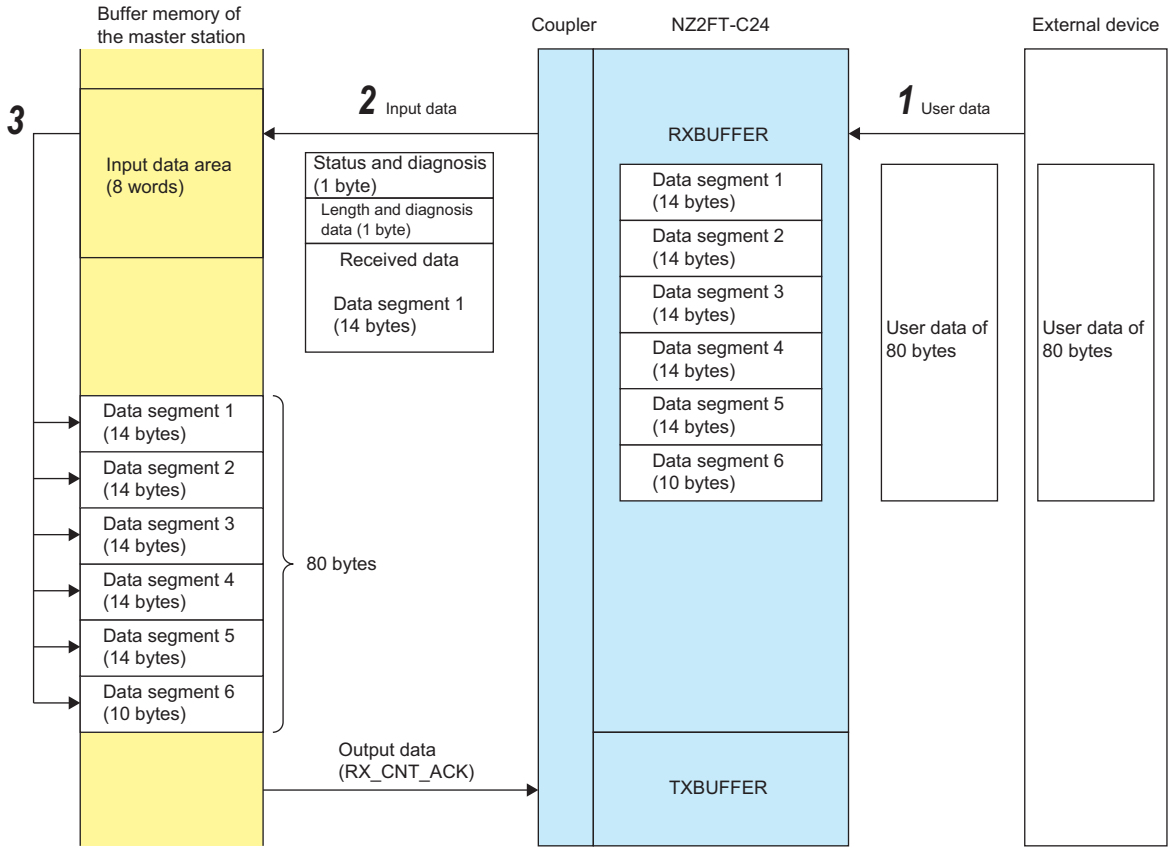
3. If RX_CNT_ACK in the Output data message is the same value as RX_CNT in the Input data message that was sent (reception complete), it is determined that the sent data has arrived at the master station, and the data sent from RXBUFFER is deleted. If unsent data remains in RXBUFFER even after erasing the sent data, data is sent to the master station until RXBUFFER becomes empty. When RXBUFFER becomes empty, only the Data in the receive buffer of the Input data message that was last sent is changed to 0, and the message is sent to the master station. This Input data message continues to be sent until User data is received.

■Merging User data

For User data received from an external device, the Received data in the Input data message received by the master station is analyzed via program and is merged with any data.

Ex.

When merging 80 bytes of User data



1. 80 bytes of User data received from an external device accumulates in RXBUFFER.
2. The NZ2FT-C24 divides User data into 14-byte units (Data segment 1 to 6), divides it into six Input data messages, and sends them to the master station.
3. Use the program to copy the Received data of the Input data message received by the program to any location.

Precautions

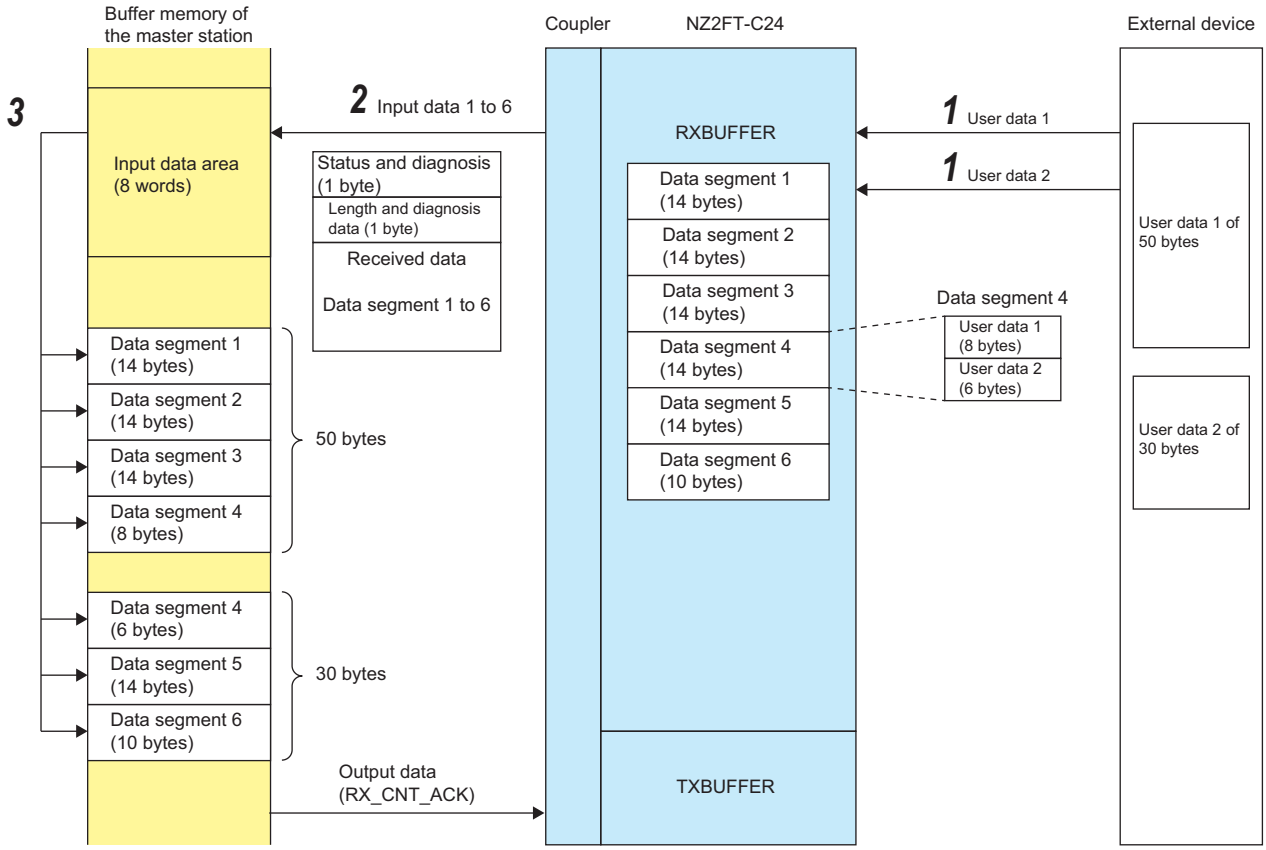
If the next Input data message (Data segment 2) is received without copying the Received data, Data segment 1 is overwritten. Repeat the reception with the program, and merge any 80 bytes of data.

■Merging two different User data

If two different User data are sent from an external device, the different User data may be sent in the same Data segment. Even in that case, the User data in the Received data in the Input data message that is received by the master station must be merged independently by the program.

Ex.

When 50 bytes of User data and 30 bytes of User data are received



1. The 50-byte User data 1 received from the external device and 30-byte User data 2 are accumulated together in RXBUFFER.

2. The NZ2FT-C24 divides the accumulated data into 14-byte units (Data segment 1 to 6), divides it into six Input data messages, and sends them to the master station. At this time, Data segment 4 contains 8 bytes of User data 1 and 6 bytes of User data 2.

3. Copy the Received data of the Input data message received by the program to any location.

Precautions

If the next Input data message (Data segment 2) is received without copying the Received data, Data segment 1 is overwritten. Repeat the reception with the program, and merge 50-byte User data 1 and 30-byte User data 2 accordingly.

■Method for sending data to an external device

When sending data to an external device, the data is sent in two ways according to the value of TX_HWBUFFER.

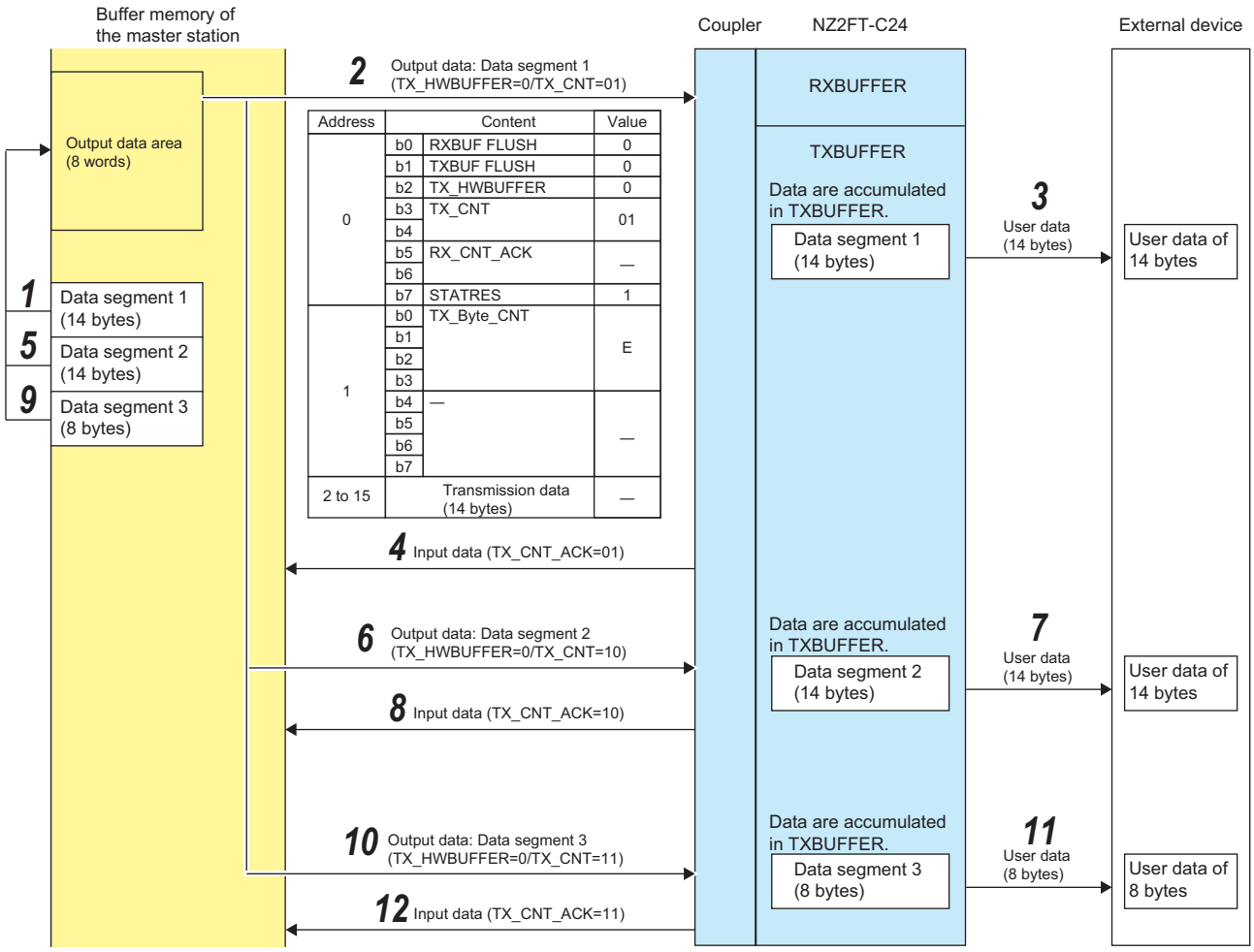
- When TX_HWBUFFER = 0, the data is immediately sent to the external device.
- When TX_HWBUFFER = 1, the data accumulates in TXBUFFER, and when TX_HWBUFFER is changed to 0, the data that accumulated in TXBUFFER is sent together to the external device.

Ex.

When sending data to an external device immediately

The 36-byte data is immediately sent from the master station to the external device as User data.

The message format of Input data and Output data is the same, regardless of the communication interface (RS-232/RS-485/RS-422) of the external device.



1. The program creates an Output data message in the output data area of the buffer memory of the master station. The created Output data message is sent to the NZ2FT-C24 by cyclic transmission.

Address	Bit	Output data message	Content
2 to 15	—	Transmission data	Divides the data into 14-byte units (Data segments 1 to 3) and copies them to the output data area.
1	b0 to b3	Length of the data	Sets the byte length of Transmission data
0	b2	TX_HWBUFFER	Set to 0
0	b7	STATRES	Set to 1
0	b3, b4	TX_CNT	After the above settings, performs increments. (Increments in order of 00 → 01 → 10 → 11 → 00)

2. The NZ2FT-C24 accumulates Transmission data in TXBUFFER if the TX_CNT of the received Output data message is different from the last received value. (NZ2FT-C24 does not detect if TX_CNT is not incremented in order.)

3. Since TX_HWBUFFER of the received Output data message is 0, User data is immediately sent to the external device. (Data is deleted from TXBUFFER when sending is complete.)

4. The NZ2FT-C24 sends reception of the Transmission data in the Output data message to the master station by an Input data message.

Address	Bit	Input data message	Content
0	b5, b6	TX_CNT_ACK	Sets the TX_CNT value of the received Output data message

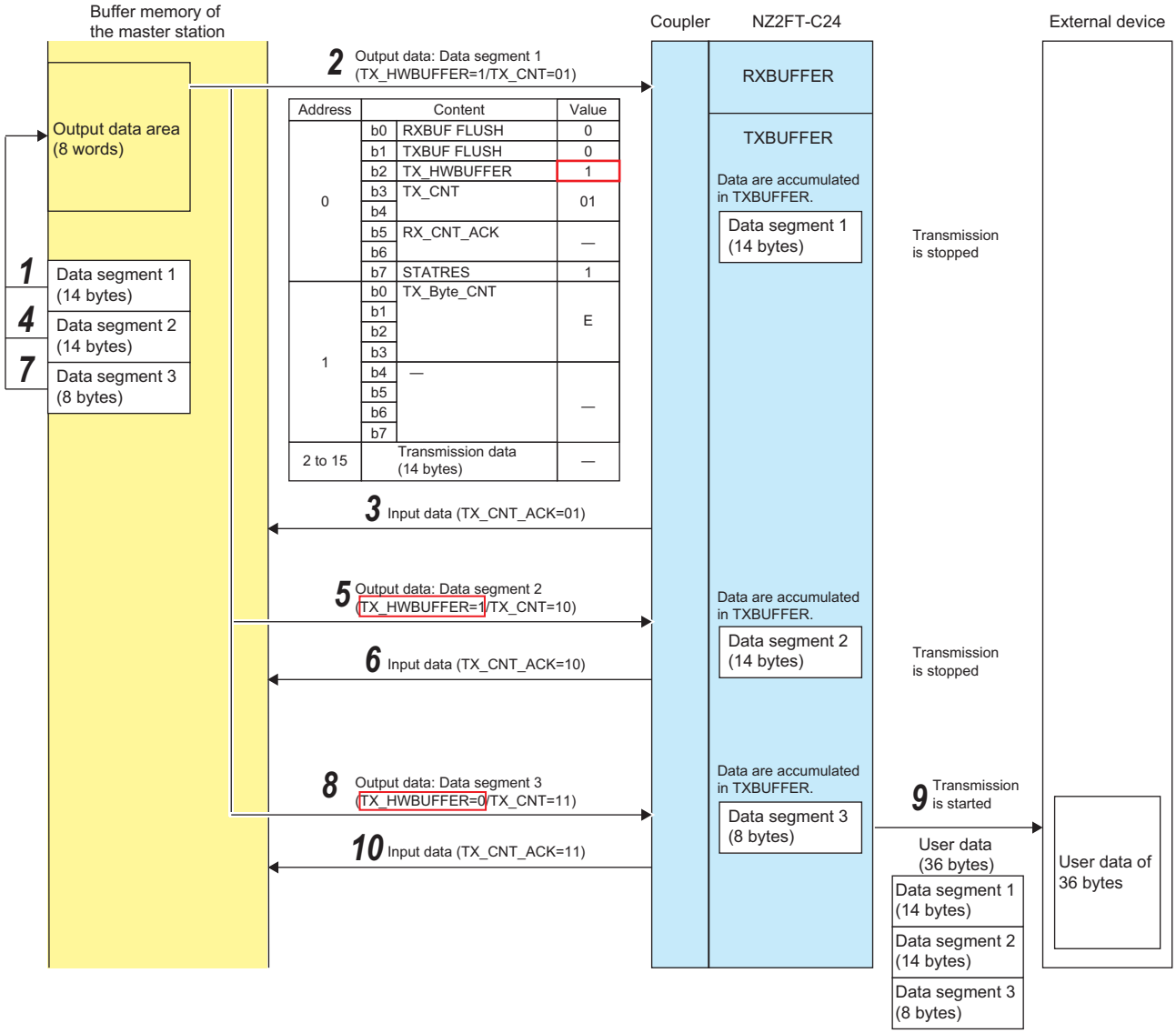
5. After receiving TX_CNT_ACK, which has the same value as TX_CNT of the Output data message sent to NZ2FT-C24, create and send the next message by the program, as in step 1.
6. The NZ2FT-C24 accumulates Transmission data in TXBUFFER if the TX_CNT of the received Output data message is different from the last received value.
7. Since TX_HWBUFFER of the received Output data message is 0, User data is immediately sent to the external device. (Data is deleted from TXBUFFER when sending is complete.)
8. The NZ2FT-C24 sends reception of the Transmission data in the Output data message to the master station by an Input data message.
9. After receiving TX_CNT_ACK, which has the same value as TX_CNT of the Output data message sent to NZ2FT-C24 by the program, create and send the final message by the program, as in step 1. (Transmission data is 8 bytes.)
10. The NZ2FT-C24 accumulates Transmission data in TXBUFFER if the TX_CNT of the received Output data message is different from the last received value.
11. Since TX_HWBUFFER of the received Output data message is 0, User data is immediately sent to the external device. (Data is deleted from TXBUFFER when sending is complete.)
12. The NZ2FT-C24 sends reception of the Transmission data in the Output data message to the master station by an Input data message.

Ex.

When accumulating and then collectively sending data to an external device

The 36-byte data is sent from the master station to the external device in a batch User data that can be any size.

The message format of Input data and Output data is the same, regardless of the communication interface (RS-232/RS-485/RS-422) of the external device.



1. The program creates an Output data message with TX_HWBUFFER set to 1 in the output data area of the buffer memory of the master station. The created Output data message is sent to the NZ2FT-C24 by cyclic transmission.

Address	Bit	Output data message	Content
2 to 15	—	Transmission data	Divides the data into 14-byte units (Data segments 1 to 3) and copies them to the output data area.
1	b0 to b3	Length of the data	Sets the byte length of Transmission data
0	b2	TX_HWBUFFER	Set to 1
0	b7	STATRES	Set to 1
0	b3, b4	TX_CNT	After the above settings, performs increments. (Increments in order of 00 → 01 → 10 → 11 → 00)

2. If the TX_CNT of the received Output data message is different from the last received value, the NZ2FT-C24 accumulates 14 bytes of Transmission data in TXBUFFER. When TX_HWBUFFER receives an Output data message of 1, it the sending User data to the external device is stopped.
3. The NZ2FT-C24 sends reception of the Transmission data in the Output data message to the master station by an Input data message.

Address	Bit	Input data message	Content
0	b5, b6	TX_CNT_ACK	Sets the TX_CNT value of the received Output data message

4. After receiving TX_CNT_ACK, which has the same value as TX_CNT of the Output data message sent to NZ2FT-C24, create and send the next message by the program, as in step 1. Set TX_HWBUFFER to 1.
5. The NZ2FT-C24 continues to accumulate Transmission data in TXBUFFER if the TX_CNT in the received Output data message is different from the last received value. At this point, TXBUFFER has accumulated 28 bytes of data in total. Since TX_HWBUFFER of the received Output data message is 1, User data is not sent to the external device.
6. The NZ2FT-C24 sends reception of the Transmission data in the Output data message to the master station by an Input data message.
7. After receiving TX_CNT_ACK, which has the same value as TX_CNT of the Output data message sent to NZ2FT-C24, create and send the final message (Transmission data is 8 bytes) by the program, as in step 1. Set TX_HWBUFFER to 0 to send data to the external device.
8. If the TX_CNT of the received Output data message is different from the last received value, the NZ2FT-C24 continues to accumulate Transmission data in TXBUFFER (36 bytes in total). Since TX_HWBUFFER of the received Output data message is 0, User data starts being sent to the external device.
9. At any time, the NZ2FT-C24 merges the 36-byte data in TXBUFFER and sends it to the external device. The data is deleted from TXBUFFER when sending is complete.
10. The NZ2FT-C24 sends reception of the Transmission data in the Output data message to the master station by an Input data message.

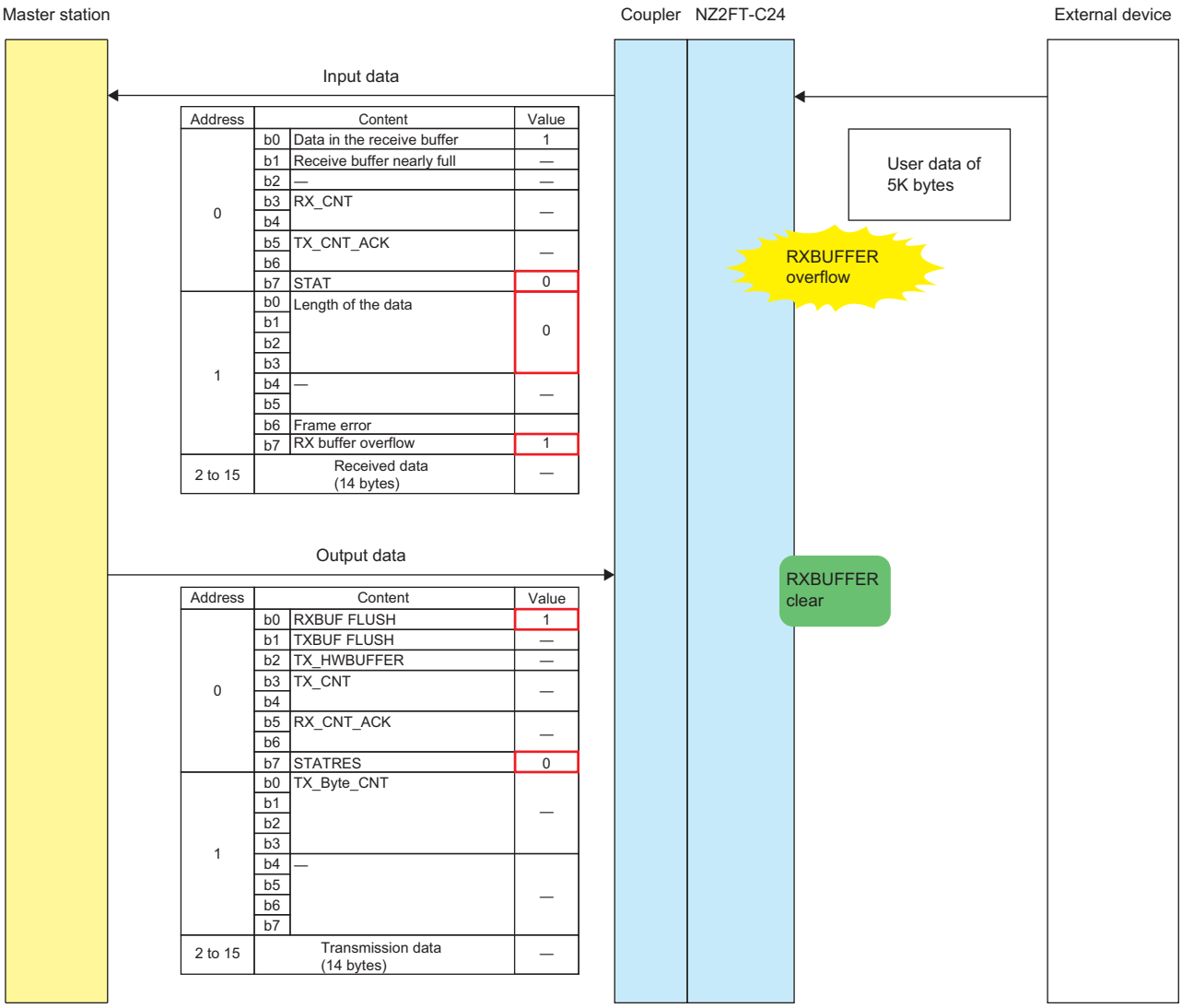
Point

The NZ2FT-C24 stops data from being sent when it detects that an external device cannot receive data, such as when a CTS row is detected. In such cases, the send data is discarded. Set TX_HWBUFFER to 1 when the external device cannot receive data, and set TX_HWBUFFER to 0 when the external device becomes able to receive data.

■RXBUFFER Overflow occurrence and clearing

User data received from an external device accumulates in RXBUFFER, but if the free space is insufficient, RXBUFFER overflow occurs, and the User data does not accumulate.

If RXBUFFER overflow occurs, use the following procedure to clear the RXBUFFER overflow.



1. Use the program to check the Input data message, and check that RXBUFFER overflow has occurred (RX buffer overflow = 1, STAT = 0, Length of the data = 0).
2. Use the program to request that RXBUFFER be cleared. Create an Output data message in the order where STATRES = 0 is set and then RXBUF FLUSH = 1 is set. (If RXBUF FLUSH = 1 is set before STATRES = 0, RXBUFFER may not be cleared.)
3. Use the program to check the Input data message, and ensure that RXBUFFER is cleared (Data in the receive buffer = 0, STAT = 1).
4. After checking the RXBUFFER clear, set STATRES = 1 and RXBUF FLUSH = 0 to cancel the RXBUFFER clear instruction. When canceling the RXBUFFER clear instruction, the settings STATRES and RXBUF FLUSH can be in either order.

Flow control

If communications between the NZ2FT-C24 and the external device are faster than communications between the master station and the slave station (NZ2FT-C24), set flow control on the NZ2FT-C24. To enable flow control, select "CTS/RTS" for the parameter "Flow control".

Precautions

- If there is not enough free space in RXBUFFER, RXBUFFER overflow (RX buffer overflow = 1) will occur. Adjust the communication speed with the external device, data size, and communication cycle so that enough free space can be secured in RXBUFFER.
- If RXBUFFER overflow (RX buffer overflow = 1) occurs, clear the RXBUFFER overflow. (☞ Page 572 RXBUFFER Overflow occurrence and clearing).

Parameter settings

The following table lists the parameters that can be set for the NZ2FT-C24.

Item		Description	Setting range[*1]
General	Process data length[*2]	Setting is not required.	• 8 Byte (0) • 16 Byte (1) (Default: 16 Byte)
Channel 0	Operating mode	Sets the operation mode of the NZ2FT-C24.	• Disabled (0) • RS232 (1) • RS485 (2) • RS422 (3) (Default: Disabled)
	Baud rate	Sets the transmission speed.	• 300 (0) • 600 (1) • 1200 (2) • 2400 (3) • 4800 (4) • 9600 (5) • 14400 (6) • 19200 (7) • 28800 (8) • 38400 (9) • 57600 (10) • 115200 (11) (Default: 9600)
	Stop bit	Sets the stop bit length for the data of one character being received/sent from/to an external device.	• 1 bit (0) • 2 bit (1) (Default: 1 bit)
	Parity	Adds a parity bit to the data. When the parameter "Data bits" = 7 bits is selected, be sure to set this parameter to Even or Odd.[*3] • None: No parity bit • Even: Add even parity • Odd: Add odd parity	• None (0) • Even (1) • Odd (2) (Default: None)
	Flow control	Controls the flow of data. • None: No flow control • CTS/RTS: CTS/RTS flow control • XON/XOFF: Do not select.	• None (0) • CTS/RTS (1) • XON/XOFF (2) (Default: None)
	Data bits	Sets the bit length for one character of data being received/sent from/to external device. When set to 7 bit, the most significant bit (8th bit) is ignored for communications. In such cases, set the parameter "Parity" to Even or Odd.[*3]	• 7 bit (0) • 8 bit (1) (Default: 8 bit)
	Terminating resistor RS485/422	• Off: Does not use the terminating resistor inside the module. • On: Uses the terminating resistor inside the module.	• Off (0) • On (1) (Default: Off)
	XON character	Setting is not required.	0 to 255 (Default: 17)
	XOFF character	Setting is not required.	0 to 255 (Default: 19)

*1 (0) to (11) are the values set in the register when the NZ2FT-C24 is connected to the NZ2FT-MT or the NZ2FT-EIP.

*2 In the NZ2FT-PBV or NZ2FT-PN, it is not displayed on the setting window of the engineering tool. (It is fixed at 16 bytes.)

*3 When the parameter "Data bits" is set to 7 bit and the parameter "Parity" is set to None, the interface of the NZ2FT-C24 becomes inactive (channel status LEDs 1.1 to 3.4 turn off), and the NZ2FT-C24 becomes unable to communicate with the master station.

Process data

The following table lists the Process data of the NZ2FT-C24.

Input/ Output	Address (byte)	Item	Bit	Description	Data format
Input	0	Status and diagnosis	b0	Data in the receive buffer	Word
			b1	Receive buffer nearly full	
			b2	System area	
			b3	RX_CNT	
			b4		
			b5	TX_CNT_ACK	
			b6		
			b7	STAT	
	1	Length and diagnosis data	b0	Length of the data	
			b1		
			b2		
			b3		
			b4	System area	
			b5		
			b6	Frame error	
			b7	RX buffer overflow	
	2 to 15*1	Received data	—	Message of User data received from an external device	—
Output	0	Status and diagnosis	b0	RXBUF FLUSH	Word
			b1	TXBUF FLUSH	
			b2	TX_HWBUFFER	
			b3	TX_CNT	
			b4		
			b5	RX_CNT_ACK	
			b6		
			b7	STATRES	
	1	Length	b0	TX_Byte_CNT	
			b1		
			b2		
			b3		
			b4	System area	
			b5		
			b6		
			b7		
	2 to 15*1	Transmission data	—	Message of User data being sent to an external device	—

*1 If the parameter "Process data length" is set to 8 Byte, the address becomes 2 to 7.

The first 2 bytes of Input data are the receive control information of the message format, and the first 2 bytes of Output data are the send control information of the message format. For details on receive control information and send control information, refer to the following.

☞ Page 563 Receive control information (sending data to the master station)

☞ Page 564 Send control information (sending data to external devices)

Troubleshooting

If problems occur on the NZ2FT-C24, perform the following.

Checking with LEDs

■When the module status LED turns on in red

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.
Is the I/O module mounted properly?	Mount the I/O module again by pressing it to the coupler until it clicks.

■When the channel status LEDs 1.1, 1.2, and 3.1 to 3.4 turn off

Check the following items.

Check item	Action
Check the setting of the parameter "Operating mode".	Set the parameter "Operating mode" to the same setting as the connected external device.
If the parameter "Data bits" is "7 bit", is the parameter "Parity" set to "None"?	If the parameter "Data bits" is "7 bit", set the parameter "Parity" to "Even" or "Odd".

■When the channel status LEDs 4.1 and 4.3 turn off

Check the following items in order from the top.

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 of the external power supply within the range of performance specifications.

If the problem persists even after checking the above, acquire the service file, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

Troubleshooting by symptom

■Serial communication is not possible

Check the following items in order from the top.

Check item	Action
Is the cable wired correctly?	Check that the wiring is not disconnected, that there is no disconnection/short-circuit, that the wiring method is correct, and that the signal voltage is correct. Then, change the wiring if necessary. (☞ Page 559 Connection diagram)
Is the channel status LED of the connector that is connected to the external device flashing?	• Match the setting of the parameter "Operating mode" of the NZ2FT-C24 with that of the connected external device. • The parameter "Data bits" cannot be 7 bit while the parameter "Parity" is None. Set the parameter "Data bits" to 8 bit or set the parameter "Parity" to Even or Odd according to the communication environment.
Is the setting of the parameter "Parity" correct?	Match the settings of the external device and the NZ2FT-C24.
Is the setting of the parameter "Data bits" correct?	
Is the parameter "Terminating resistor RS485/422" turned off?	If the NZ2FT-C24 is the end module, turn on the parameter "Terminating resistor RS485/422".
Is power being supplied to the external device?	Check that power is being supplied to the external device.
Is the cable length within the range of the maximum cable length?	Check the cable length or the cable thickness. Alternatively, decrease the parameter "Baud rate".
Is there any noise affecting the system?	Use a shielded cable, and take measures to reduce noise.

In addition to the above solutions, check the LED of the coupler, the Web server, and so on. If serial communication is still not possible, there is a risk of a hardware failure in the serial communication module.

Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

■Serial communication is sometimes not possible

Check the following items in order from the top.

Check item	Action
Is the channel status LED of the connector that is connected to the external device flashing?	■When the channel status LED is on There is a problem with the wiring. Check that the wiring is not disconnected/short-circuited, that the connected wiring method is correct, and that the signal voltage is correct. Then, change the wiring if necessary. (☞ Page 559 Connection diagram) ■When the channel status LED is off • There is a problem with the setting of the parameter "Operating mode". Match the setting of the parameter "Operating mode" of the NZ2FT-C24 with that of the connected external device. • There is an inconsistency between the parameter "Data bits" and the parameter "Parity". The parameter "Data bits" cannot be 7 bit while the parameter "Parity" is None. Set the parameter "Data bits" to 8 bit or set the parameter "Parity" to Even or Odd according to the communication environment.
Is power being supplied to the external device?	Check that power is being supplied to the external device.
Is the cable length within the range of the maximum cable length?	Check the cable length or the cable thickness. Alternatively, decrease the parameter "Baud rate".
Is there any noise affecting the system?	Use a shielded cable, and take measures to reduce noise.
Is data being sent from multiple external devices at the same time during multidrop connection?	Perform one-on-one loopback tests between each external device and the NZ2FT-C24. If normal communication with all external devices is possible, multiple external devices are sending at the same time during multidrop connection, so establish interlocks to prevent the devices from sending at the same time.

In addition to the above solutions, check the LED of the coupler, the Web server, and so on. If serial communication is still not possible, there is a risk of a hardware failure in the serial communication module.

Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

■Indecipherable data is being sent and received

Check the following items in order from the top.

Check item	Action
Is the setting of the parameter "Parity" correct?	Match the settings of the external device and the NZ2FT-C24. If one data length is 7 bits and has parity, and the other data length is 8 bits and there is no parity, the number of send/receive bits will be the same, so no error will occur.
Is the setting of the parameter "Stop bit" correct?	
Is the setting of the parameter "Data bits" correct?	
Is the transmission speed correct?	Match the settings of the external device and the NZ2FT-C24.
Does the parameter "Operating mode" correspond with the connected external device?	Match the setting of the parameter "Operating mode" of the NZ2FT-C24 with that of the connected external device.
Is the parameter "Terminating resistor RS485/422" turned off?	If the NZ2FT-C24 is the end module, turn on the parameter "Terminating resistor RS485/422".
Is the cable length within the range of the maximum cable length?	Check the cable length or the cable thickness. Alternatively, decrease the parameter "Baud rate".
Is there any noise affecting the system?	Use a shielded cable, and take measures to reduce noise.
Is data being sent from multiple external devices at the same time during multidrop connection?	Perform one-on-one loopback tests between each external device and the NZ2FT-C24. If normal communication with all external devices is possible, multiple external devices are sending at the same time during multidrop connection, so establish interlocks to prevent the devices from sending at the same time.
Is enough data for storage in RXBUFFER being received?	Adjust the size of the data received at a time to 4090 bytes or less.
Is the sending of RX_CNT_ACK from the master station slow?	Review the communication speed with the master station and the program, and adjust them so that the NZ2FT-C24 can receive RX_CNT_ACK properly.
Is the transmission speed between the external device and the NZ2FT-C24 too fast?	If overflow occurs even when the NZ2FT-C24 receives RX_CNT_ACK properly, adjust the transmission speed with the external device.

In addition to the above solutions, check the LED of the coupler, the Web server, and so on. If data that cannot be deciphered is still being sent and received, there is a risk of a hardware failure in the serial communication module.

Acquire the service files, and please consult your local Mitsubishi representative. (☞ Page 88 Acquisition of the service file)

■When an overflow occurs in RXBUFFER

Check the following items in order from the top.

Check item	Action
Is enough data for storage in RXBUFFER being received?	Adjust the size of the data received at a time to 4090 bytes or less.
Is the sending of RX_CNT_ACK from the master station slow?	Review the communication speed with the master station and the program, and adjust them so that the NZ2FT-C24 can receive RX_CNT_ACK properly.
Is the transmission speed between the external device and the NZ2FT-C24 too fast?	If overflow occurs even when the NZ2FT-C24 receives RX_CNT_ACK properly, adjust the transmission speed with the external device.

22 EXTENSION POWER SUPPLY MODULE

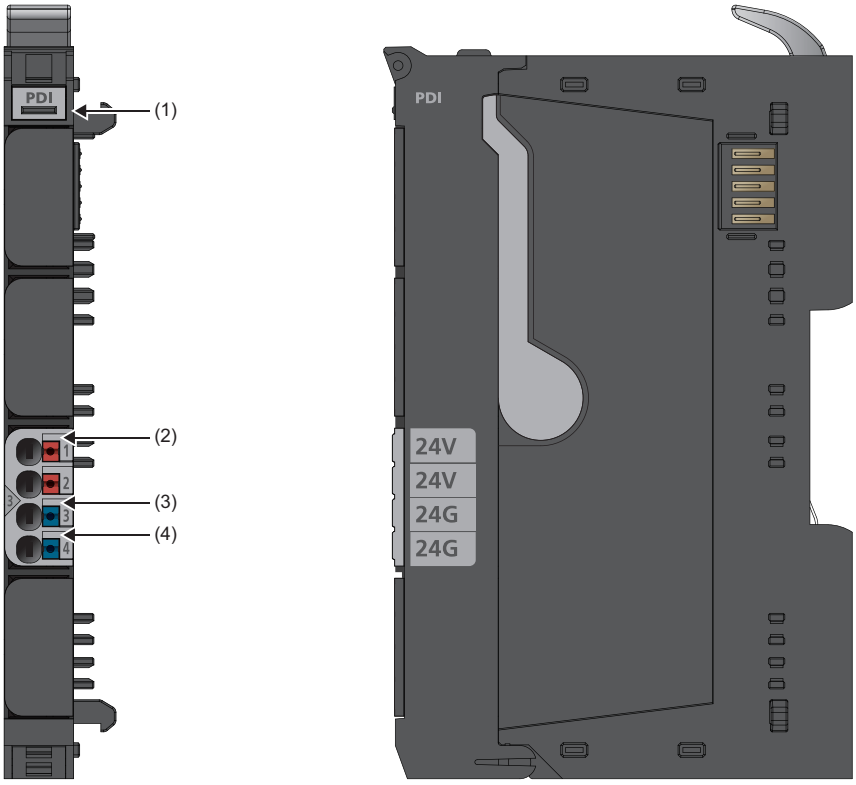
This chapter describes the details of the extension power supply modules.

22.1 NZ2FTPDI

This is an extension power supply input module.

Part names

This section describes the name of each LED of the NZ2FTPDI. (☞ Page 414 I/O Module Common Part Names)

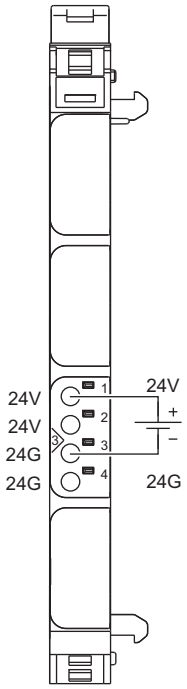


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error Off: No external power supply (power-off)
(2)	Input power supply LED 3.1	Indicates the input circuit status. On in green: No error Off: Input circuit supply voltage < 18V
(3)	Input power supply LED 3.2	Indicates the input circuit status. On in red: Input circuit supply voltage < 18V Off: No error
(4)	Input power supply internal protection circuit LED 3.4	Indicates the input circuit status. On in red: Error (internal fuse failure) Off: No error

Connection diagram

The following figure shows the connection diagram between the NZ2FTPDI and the power supply.

Ex.



■Precautions

When the power supply exceeds 8A and the ambient temperature exceeds 55℃, use a cable of 1.5㎟ for the power cable.
Incorrect wiring may cause failure of the product.

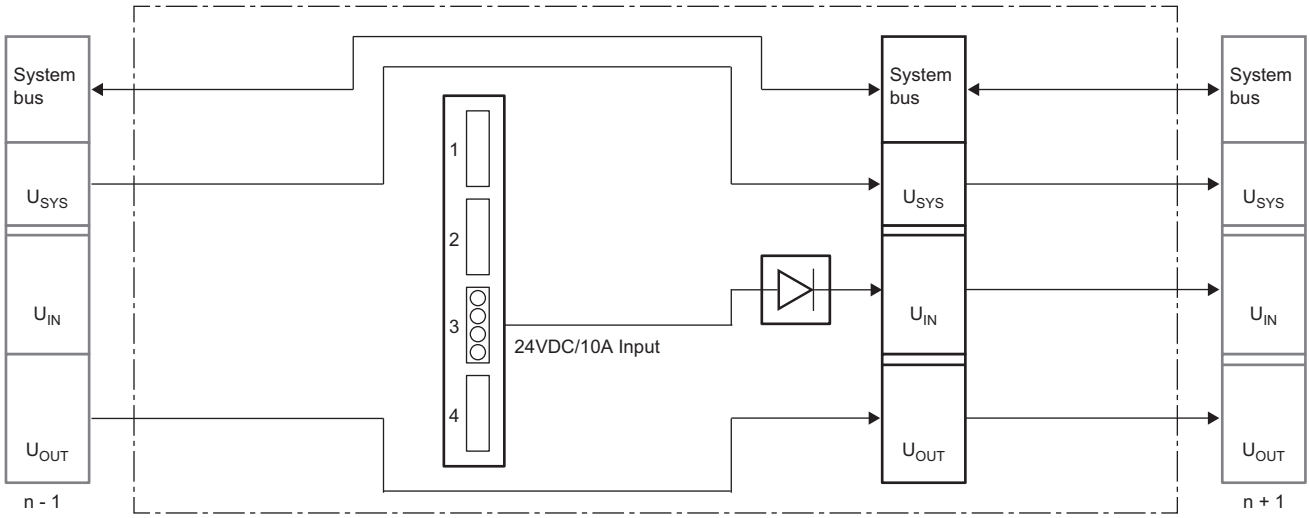
Performance specifications

This section describes the performance specifications of the NZ2FTPDI. (☞ Page 30 General Specifications)

Item	NZ2FTPDI
External power supply voltage	24VDC +20%/-15%
Power supply rated current (input power supply)	10A
Module current consumption	10mA
Weight	83g

Block diagram

The following figure shows the internal block diagram of the NZ2FTPDI.

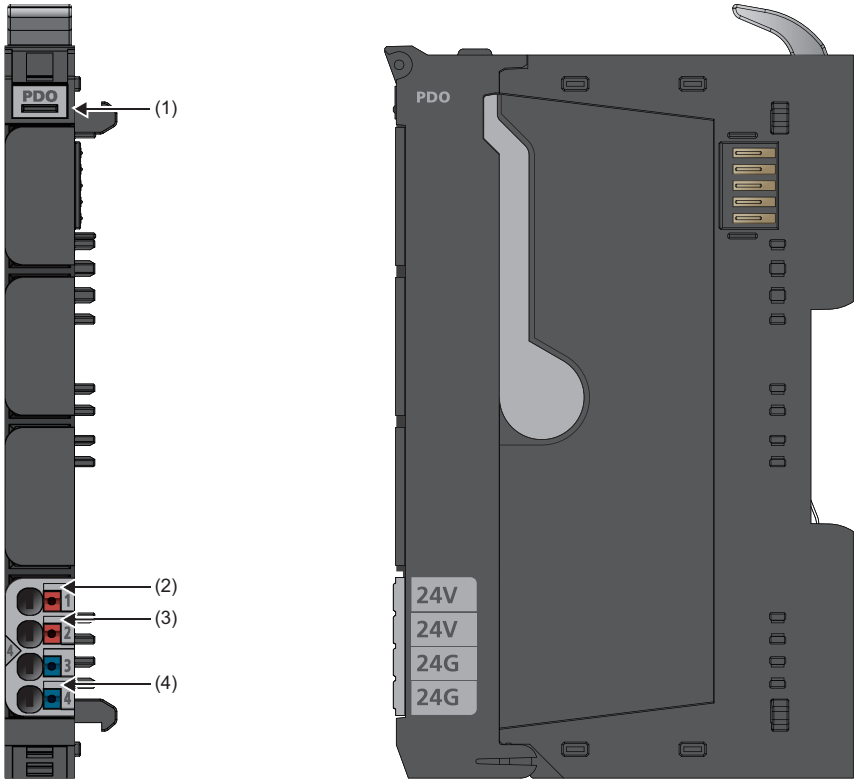


22.2 NZ2FTPDO

This is an extension power supply output module.

Part names

This section describes the name of each LED of the NZ2FTPDO. (☞ Page 414 I/O Module Common Part Names)

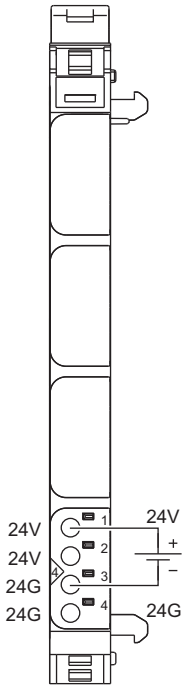


No.	Name	Description
(1)	Module status LED	Indicates the communication and operating status of the I/O module. On in green: No error On in red: Error Off: No external power supply (power-off)
(2)	Output power supply LED 4.1	Indicates the output circuit status. On in green: No error Off: Output circuit supply voltage < 18V
(3)	Output power supply LED 4.2	Indicates the output circuit status. On in red: Output circuit supply voltage < 18V Off: No error
(4)	Output power supply internal protection circuit LED 4.4	Indicates the output circuit status. On in red: Error (internal fuse failure) Off: No error

Connection diagram

The following figure shows the connection diagram between the NZ2FTPDO and the power supply.

Ex.



■Precautions

When the power supply exceeds 8A and the ambient temperature exceeds 55℃, use a cable of 1.5㎟ for the power cable.
Incorrect wiring may cause failure of the product.

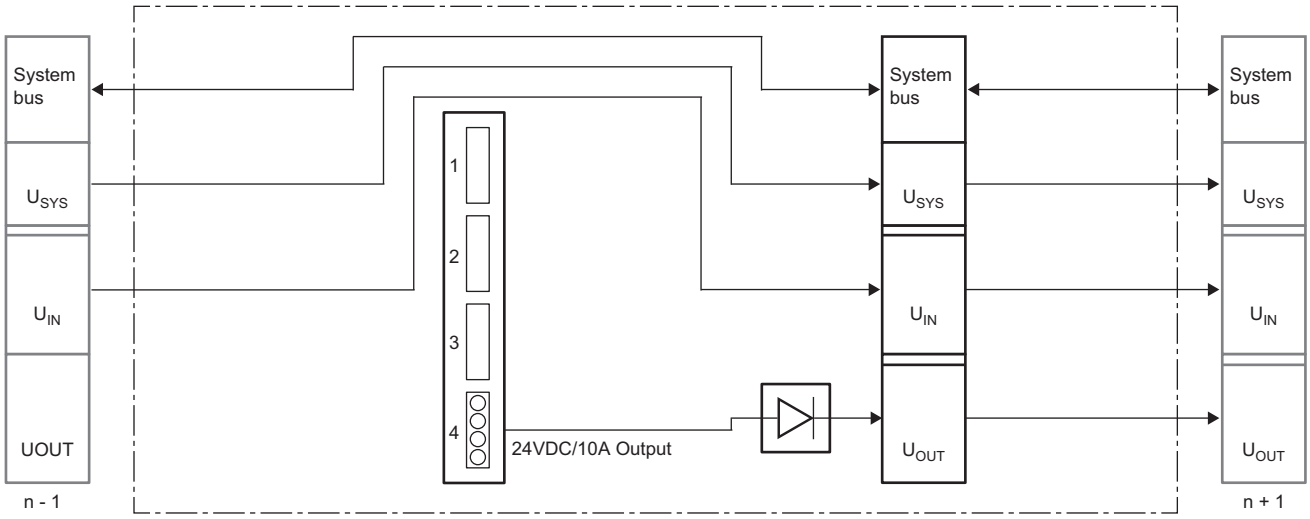
Performance specifications

This section describes the performance specifications of the NZ2FTPDO. (☞ Page 30 General Specifications)

Item	NZ2FTPD0
External power supply voltage	24VDC + 20%/-15%
Power supply rated current (power supply for output)	10A
Module current consumption	15mA
Weight	83g

Block diagram

The following figure shows the internal block diagram of the NZ2FTPDO.



APPENDICES

Appendix 1 EMC and Low Voltage Directives

Compliance with the EMC Directive, which is one of the EU Directives, has been mandatory for the products sold in European countries since 1996 as well as the Low Voltage Directive since 1997.
Manufacturers who recognize their products are compliant with the EMC and Low Voltage Directives are required to declare compliance and affix the "CE marking" on their products.
This products is compliant with CE according to the 2014/30/EU (EMC Directive) and 2014/35/EU (Low Voltage Directive).
As a result of measurement according to CISPR 16-2-3, this product is also compliant with the regulations on radio wave emission defined in the following.
CFR 47 Part 15, Subpart B, §15.109, Class A (2010) and ICES-003, Issue 5, Class A (2012)

Authorized representative in Europe

The authorized representative in Europe is shown below.
Company name: MITSUBISHI ELECTRIC EUROPE B.V.
Address: Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany

Requirements for EMC Directive compliance

The EMC Directive sets requirements on emission (electromagnetic interference) from products and immunity (electromagnetic susceptibility) of products against external electromagnetic wave. Applicable products must meet these requirements.
This section summarizes the precautions for compliance with the EMC Directive of the machinery constructed with this product.
These precautions are based on the requirements and the standards of the regulations acquired by our company, however, they do not guarantee the compliance with the above directive for the entire machinery constructed in accordance with these precautions.
The machinery manufacturer must make a final decision on how to comply with the EMC Directive and its compliance.

A

Outline of EMC Directive compliance

When installing this product, follow the items below to comply with the EMC Directive.

- Proper grounding of metal parts over the widest possible area
- Shielding of proper cables and devices
- Proper installation of wiring/cables
- Creation of common reference potential and grounding of all electrical devices
- Special EMC measures for devices such as a frequency converter and servo drive
- Installation of the proper suppressor on a switch and relay
- Sealing of devices that are likely to interfere if necessary

Grounding of metal parts

To ensure electrical contact with the control panel and all metal parts including the door, frame, inner plate, and DIN rail of the control panel, ensure the conductivity over the widest possible area. As a result, the reference potential common to all control devices is obtained.

■Necessary measures

- Remove insulation coating of the screw connection and protect it from corrosion.
- Connect moving parts such as the door and removable inner mounting plate of the control panel with short and wide grounding straps.
- If possible, avoid using aluminum parts.

Protective ground

Always perform protective grounding.

Precautions

Use a protective grounding conductor to prevent dangerous voltage on ground when an error occurs. Improper grounding can lead to serious accidents.

DIN rail

Follow the items below when using a DIN rail.

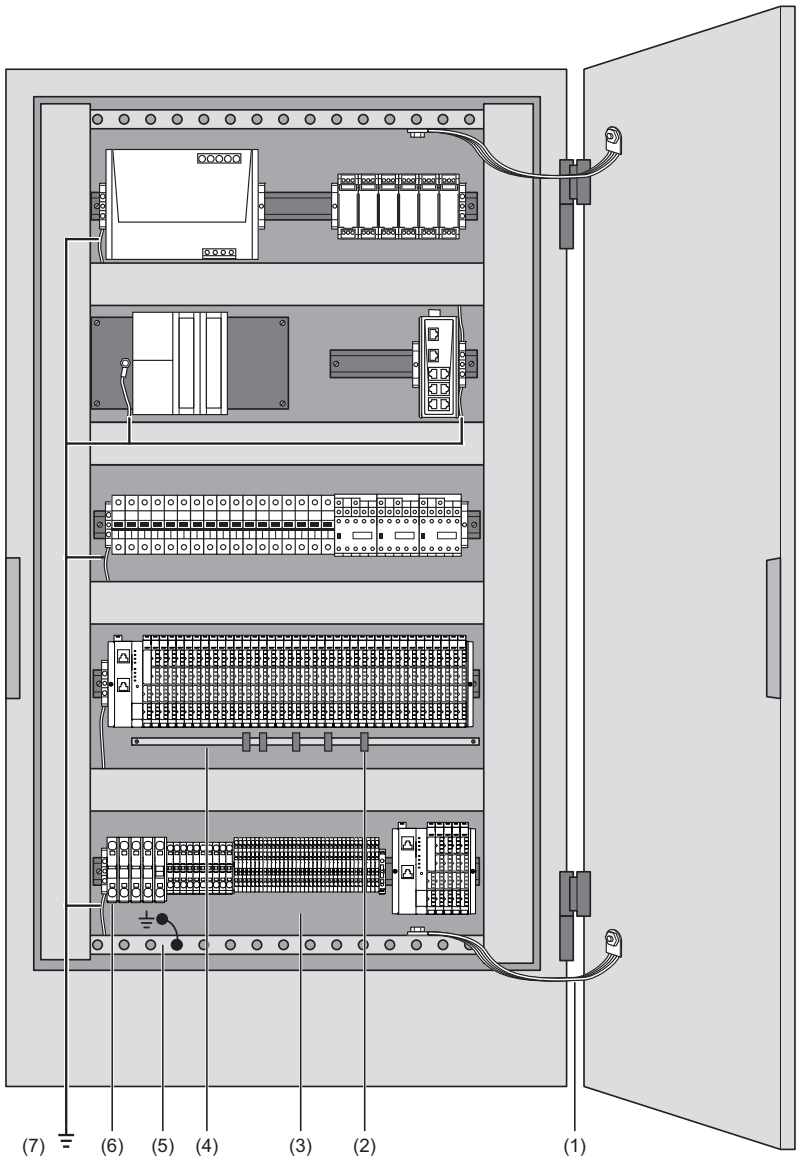
- Mount a DIN rail with screws and rivets compatible with low-impedance attachments even at a high frequency over the widest possible area.
- Perform grounding properly.
- Use the corrosive-resistant DIN rail.
- Remove insulation coating, alumite treatment, or insulated metal parts from connections.
- Protect connections from corrosion. (Only grease that is not easily corroded can be used.)

Wiring to external devices

To prevent looped wiring from functioning as an antenna, bundle all the lines connected to the specific external device.

Control panel compliant with EMC Directive

The following figure shows the control panel compliant with the EMC Directive.



No.	Item	Description
(1)	Grounding strap	When large metal parts and the control panel cannot maintain electric contact, use short and wide grounding straps.
(2)	Signal cable clamp	When using a shielded cable, fix the cable to a grounding bar over a large area with shield clamps. Ensure that the braided shield and shield clamp have a large contact surface to maintain good electric contact.
(3)	Inner mounting plate	The inner mounting plate in the control panel must have a large surface in contact with the control panel.
(4)	Bus bar	Mount the bus bar with mounting brackets. Cable shields are connected to the bus bar.
(5)	Grounding bar for protective ground	Mount a grounding bar so that a large surface is in contact with the inner mounting plate. The grounding bar must be connected with the external protective ground with a ground cable with cross-sectional area 10mm^2 or larger.
(6)	Protective ground terminal strap	The protective ground terminal strap must be connected to the grounding bar for protective ground as neutral grounding.
(7)	Cable for the protective ground conductor (grounding point)	Cables must have a large surface in contact with the protective ground conductor.

Requirements for Low Voltage Directive compliance

This product operates with the 24VDC power supply. Therefore, it is not covered by Low Voltage Directive.

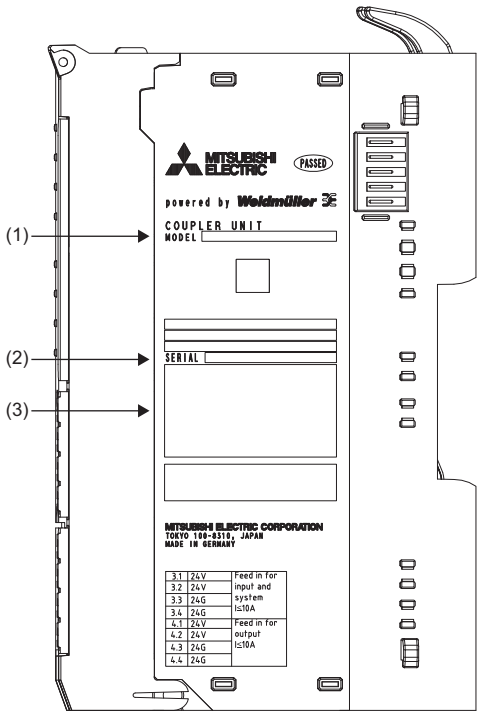
To make the programmable controller system used comply with Low Voltage Directive, refer to "EMC and Low Voltage Directives" in the user's manual of the CPU module used.

Appendix 2 Checking Serial Number and Firmware Version

Checking the rating plate

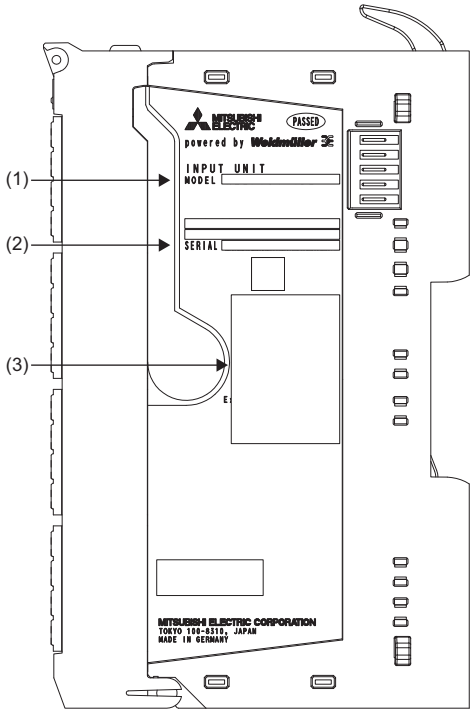
The serial number of the coupler and I/O module can be checked on the rating plate.

Coupler



1) Module type
2) Serial number
3) Compliant standard symbol

I/O module



1) Module type
2) Serial number
3) Compliant standard symbol

Checking with the Web server

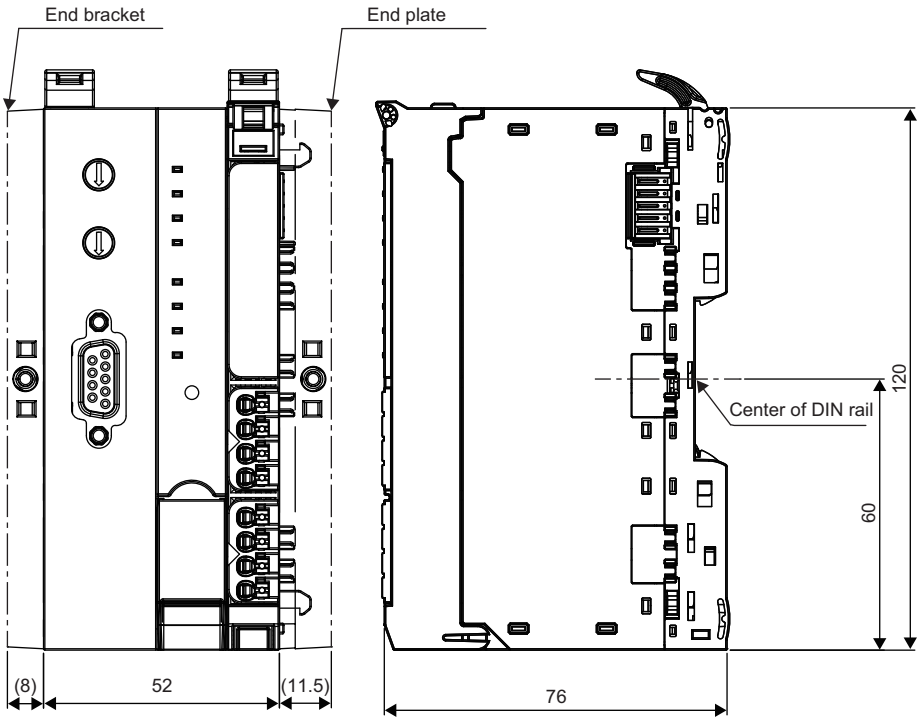
The serial number and firmware version of the coupler and I/O module can be checked with the Web server. (☞ Page 71 "Component view")

A

Appendix 3 External Dimensions

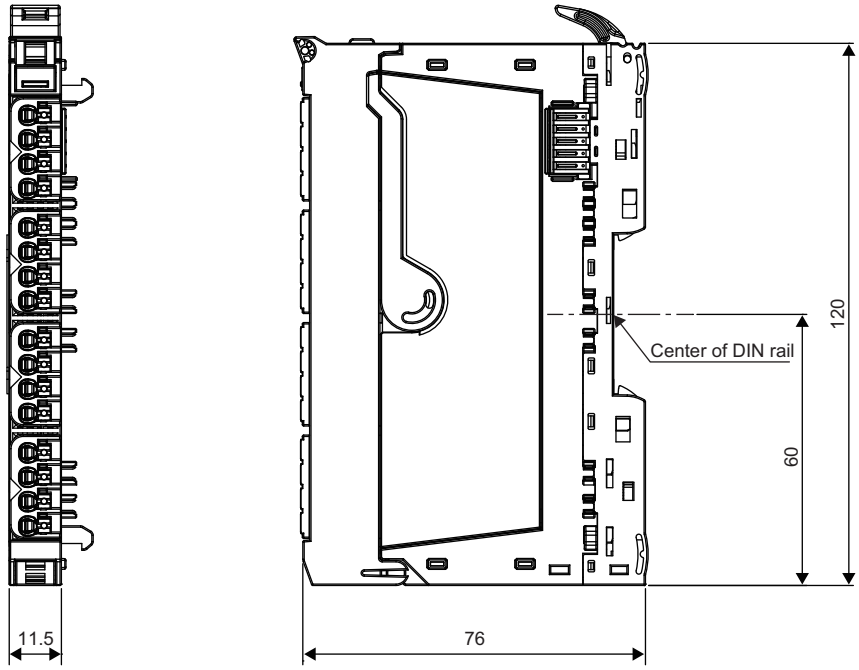
This section shows the external dimensions of the coupler and I/O module.

Coupler



(Unit: mm)

I/O module



(Unit: mm)

Appendix 4 Module ID

Module ID list

Module	Module ID
NZ2FTS4-4DE	00091F84
NZ2FTS3-8DE	000A1FC1
NZ2FTS1-16DE	00049FC2
NZ2FTS4-4D	00011F84
NZ2FTS3-8D	00021FC1
NZ2FTS1-16D	000C9FC2
NZ2FTS2-4A	00169F84
NZ2FTS4-4TE	01012FA0
NZ2FTS2-8TE	01022FC8
NZ2FTS1-16TE	0103AFD0
NZ2FTS4-4T	010A2FA0
NZ2FTS2-8T	010C2FC8
NZ2FTS1-16T	010DAFD0
NZ2FTS3-4R	01062FA0
NZ2FTS-60AD4	040115C4
NZ2FTS-60DA4	050625E0
NZ2FTS-60RD4	04061544
NZ2FTS-60TD4	04071544
NZ2FTS-D62P2	08C3380A
NZ2FTS-D66D1	09C17880
NZ2FT-C24	0E413FED

Appendix 5 Open Source Software License

This section lists the license of the open source software used in the NZ2FT series.

Components	Licence	Link
eCos	modified GPL	http://ecos.sourceware.org/license-overview.html
jQuery	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
jQuery-customSelect	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
jQuery-i18n	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
jQuery-overscroll	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
jQuery-ui	MIT	https://github.com/jquery/jquery/blob/master/LICENSE.txt
JSZip	MIT	https://github.com/Stuk/jszip/blob/master/LICENSE.markdown
mbedTLS	Apache 2.0	https://github.com/ARMmbed/mbedtls/blob/development/LICENSE
md5(as part of CryptoJS)	modified BSD	https://code.google.com/archive/p/crypto-js/wikis/License.wiki
mongoose	WebServer MIT	http://web.archive.org/web/20111015092802/http://code.google.com/p/mongoose/source/browse/LICENSE
mustache	MIT	https://github.com/janl/mustache.js/blob/master/LICENSE
snap-svg	Apache license 2.0	https://github.com/adobe-webplatform/Snap.svg/blob/master/LICENSE
underscore	MIT	https://github.com/jashkenas/underscore/blob/master/LICENSE

MEMO

INDEX

A

ACT1 LED 169
ACT2 LED 169
Additional TCP port 304

B

Bar solderless terminal 41
Base unit 414
Baud rate 574
BC LED 133
BF LED 97,132,169,227,264,364
Bit order 555

C

Channel diagnostics 505,517
Channel status LED 44
Channel-related diagnosis 241
Check reference list before data exchange 305
CIP object 372
Cold junction compensation 517
Comparison function 537,544
Component view 71
Connection type 505
Connector 44
Connector frame 414
Connector frame open button 94,414
Connector number 44
Conversion time 505,517
Counter 0: Comparison value 546
Counter 0: Control word 546
Counter 0: Counter status 545
Counter 0: Counter value 545
Counter 1: Comparison value 546
Counter 1: Control word 546
Counter 1: Counter status 545
Counter 1: Counter value 545
Counter behaviour internal gate 544
Counter dir.signal B inv. 544
Counting mode 525,544

D

D LINK LED 97
Data bits 574
Data evaluation at edge 555
Data format 241,305,391,484,496,555
Delay time 555
Diagnostic alarm 241,305,390,544
DIN rail 38
DIN rail fixing lever 94,414

E

Electronic unit 414
Electronic unit removal lever 414
End bracket 29,35
End plate 29,35
End value 544
ERR. LED 97

F

Factory settings 86
Fieldbus/coupler status LEDs 94
Filter time signal A 544
Filter time signal B 544
Flow control 574
Force mode 76
Frequency suppression 484

G

Gateway 304,390

H

High limit value 505,517
Horizontal installation 36
Hot plug alarm 241
HTTPS setting 67,241,305,390
Hysteresis 544

I

I&M data 85
ID-related diagnosis 241
Input delay 419,424,432,436
Input power supply connector 95
Input power supply internal protection circuit LED 3.4 95
Input power supply LED 3.1 95
Input power supply LED 3.2 95
IP address 304,390
IP address USB port 241,304,390
IP configuration 304,390

L

L ERR LED 132
L RUN LED 132
L/A P1 LED 264,364
L/A P2 LED 264,364
Limit value monitoring 505,517
LINK P1 LED 97
LINK P2 LED 97
LINK1 LED 169
LINK2 LED 169
Load value 544
Lock force mode 305,391
Login 64
Logout 64
Low limit value 505,517

M

Measurement range 484,505,517
Modbus connection timeout 305
Modbus DHCP timeout 304
Modbus Dual LAN Mode 304
MODBUS function 307
Modbus watchdog 305
Module behaviour on hot swap 241,305,391

Module ID 591
Module status 241
Module status LED 414
MS LED 364
MT LED 97,132,169,227,264,364

N

No login 65
NS LED 365
Number of frame data bits 555
Number of indicator bits 555

O

Operating mode 574
Output behaviour on fieldbus error . . . 241,305,391
Output power supply connector 95
Output power supply internal protection circuit LED 4.4 95
Output power supply LED 4.1 95
Output power supply LED 4.2 95
Output range 496
Overview 70

P

Parameter 74
Parity 574
Password 64,66
Plug-in unit 414
Power supply LED 94
Process alarm 241,305,390
Process alarm comp. value 544
Process alarm end value 544
Process alarm overflow 544
Process alarm underflow 544
Profiles 131,168,226,363
Proxy 62
PW LED 97,132,169,227,264,364

R

Received data 575
Register 314
Reset 85
RUN LED 132

S

Save module parameters on coupler 305,390
Save/load configuration 80
Set value 544
SF LED 97,132,169,227,264,364
Signal mode 544
SSI interface 555
SSI mode 555
SSI transfer rate 555
Status and diagnosis 575
Stop bit 574
Subnet mask 304,390
Substitute value 449,453,461,465,473,496

T

Temperature unit 505,517
Terminating resistor RS485/422 574
Transmission data 575
TX_Byte_CNT 575

U

UIN 31
UOUT 31
User name 64,66
USYS 31

V

Vertical installation 37

W

Web browser 59
Webserver via Ethernet 304,390
Wire insertion opening number 44
Writing access in multi-client operation 305

I

REVISIONS

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

Revision date	*Manual number	Description
April 2019	SH(NA)-082115ENG-A	First edition
November 2020	SH(NA)-082115ENG-B	■Added models NZ2FT-GN, NZ2FT-BT, NZ2FT-PN, NZ2FTS4-4D, NZ2FTS3-8D, NZ2FTS1-16D, NZ2FTS2-4A, NZ2FTS4-4T, NZ2FTS2-8T, NZ2FTS1-16T, NZ2FTS3-4R, NZ2FTS-60TD4, NZ2FT-C24 ■Added or modified parts RELEVANT MANUALS, GENERIC TERMS AND ABBREVIATIONS, TERMS, PART 1, PART 2, PART 3

Japanese manual number: SH-082114-B

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

© 2019 MITSUBISHI ELECTRIC CORPORATION

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 replaced at no cost via the sales representative.
However, if on-site service are required 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 two years 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 (12) months, and the longest gratis warranty term after manufacturing shall be eighteen (36) months. The gratis warranty term of replacement shall not exceed the gratis warranty term before product exchange.
[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, replacement 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. Repair and Analysis

Please note that repairs are refused of this product.

3. Discontinuation of production

(1) Mitsubishi shall accept onerous product replacements for seven (7) years after production of the product is discontinued.
(2) Product supply (including repair parts) is not available after production is discontinued.

4. Overseas service

Overseas, please contact Mitsubishi's local overseas FA Center.

5. 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.

6. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

TRADEMARKS

Google Chrome is either a registered trademark or a trademark of Google LLC.
Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
Unicode is either a registered trademark or a trademark of Unicode, Inc. in the United States and other countries.
The company names, system names and product names mentioned in this manual are either registered trademarks or trademarks of their respective companies.
In some cases, trademark symbols such as '™' or '®' are not specified in this manual.

SH(NA)-082115ENG-B(2011)MEE
MODEL: NZ2FT-U-E
MODEL CODE: 13JX0D

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN

When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.