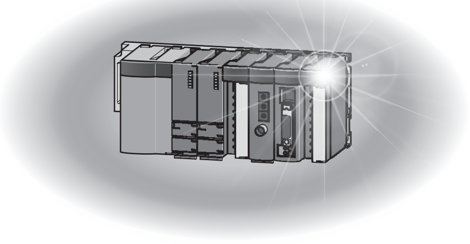
MITSUBISHI
ELECTRIC

Mitsubishi Programmable Controller

MELSEC Q series

Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)

-QJ71LP21
-QJ71LP21-25
-QJ71LP21S-25
-QJ71LP21G
-QJ71LP21GE
-QJ71BR11
-QJ71NT11B



• 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 instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the CPU module user's manual.
In this manual, the safety precautions are classified into to 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

- For operating status of each communication failure, refer to this manual. Incorrect output or malfunction due to a communication failure may result in an accident.
- If a coaxial cable is disconnected, this may destabilize the line, and a network communication error may occur in multiple stations. Provide an interlock circuit in the sequence program so that the system will operate safely even if the above error occurs. Failure to do so may result in an accident due to incorrect output or malfunction.
- When changing data of the running programmable controller from a peripheral connected to the CPU module or from a personal computer connected to an intelligent function module or special function module, configure an interlock circuit in the sequence program to ensure that the entire system will always operate safely.
  For program modification and operating status change, read relevant manuals carefully and ensure the safety before operation.
  Especially, in the case of a control from an external device to a remote programmable controller, immediate action cannot be taken for a problem on the programmable controller due to a communication failure.
  To prevent this, configure an interlock circuit in the sequence program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.

[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.

[Installation Precautions]

⚠ CAUTION

- Use the programmable controller in the operating an environment that meets the general specifications given in the user's manual for the CPU module used.
  Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount the module, while pressing the module mounting lever located in the lower part of module, fully insert the module fixing projection(s) into the hole(s) in the base unit press the module until it snaps into place.
  Incorrect mounting may cause malfunction, failure or drop of the module.
  When using the programmable controller in an environment of frequent vibrations, fix the module a screw.
  Tighten the screw within the specified torque range.
  Undertightening can cause drop of the screw, short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Shut off the external power supply for the system in all phases before mounting or removing the module. Failure to do so may result in damage to the product.
- Do not directly touch any conductive part of the module.
  Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

⚠ WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring.
  Failure to do so may result in electric shock or damage to the product.

⚠ CAUTION

- Individually ground the FG terminal of the programmable controller with a ground resistance of 100Ω or less.
  Failure to do so may result in electric shock malfunction.
- Check the rated voltage and terminal layout before wiring to the terminal block for the external power supply, and connect the cable correctly.
  Connecting a cable to power supply with a different voltage rating or incorrect wiring may cause a fire or failure.
- Tighten the terminal screw within the specified torque range.
  Undertightening can cause drop of the screw, short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Properly solder the parts of a soldering-type coaxial cable connector. Incomplete soldering may result in malfunction.
- Crimp the parts of a crimping-type coaxial cable connector with proper force at a proper position.
  Failure to do so may cause drop of the cable or malfunction.
- Prevent foreign matter such as dust or wire chips from entering the module.
  Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring.
  Do not remove this film during wiring.
  Remove it for heat dissipation before system operation.
- Place the cables in a duct or clamp them.
  Failure to do so may cause damage of the module or the cables due to accidental pull or unintentional shifting of the cables, or malfunctions due to poor contact of the cable.
- Do not install the control lines or communication cables together with the main circuit lines or power cables.
  Keep a distance of 100mm or more between them.
  Failure to do so may result in malfunction due to noise.
- When disconnecting the communication and power cables from the module, do not pull the cable by the cable part. Loosen the screws of connector before disconnecting the cable. When disconnecting a cable connected to a terminal block, loosen the screws on the terminal block first before removing the cable.
  Failure to do so may result in damage to the module or cable or malfunction due to poor contact.

[Setup and Maintenance Precautions]

⚠ CAUTION

- Before performing online operations (especially, program modification, forced output, and operation status change) for the running CPU module in other station from GX Developer via MELSECNET/H, read relevant manuals carefully and ensure the safety.
- Do not disassemble or modify the module. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or a PHS (Personal Handy-phone System) more than 25cm (9.85 inches) away in all directions from the programmable controller. Failure to do so may cause malfunction.
- Shut off the external power supply for the system in all phases before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
- Do not touch any terminals while power is on. Doing so will cause electric shock.
- Shut external power supply for the system before cleaning the module or retightening the terminal screws or module fixing screws.
  Failure to do so may cause the module to fail or malfunction.
  Undertightening can cause drop of the screw, short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- After the firs use of the product, do not mount/remove the module to/from the base unit more than 50 times (IEC 61131-2 compliant) respectively.
  Exceeding the limit of 50 times may cause malfunction.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

⚠ CAUTION

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

• CONDITIONS OF USE FOR THE PRODUCT •

(1) Mitsubishi 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 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'S USER, 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 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 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 representative in your region.

REVISIONS

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

Print Date	＊ Manual Number	Revision
Dec., 1999	SH(NA)-080049-A	First printing
Oct., 2000	SH(NA)-080049-B	Correction Safety Precautions, Contents, About Manuals, About the Generic Terms and Abbreviations, Chapter 1, Section 1.1, 1.2, Chapter 2, Section 2.1.3, 2.1.4, 2.2.2, 3.1.1, 3.1.2, 3.2, 3.2.1, 3.2.2, 3.3, 3.3.1, 3.3.2, 3.3.3, 4.1, 4.2, 4.3.1, 4.3.2, 4.5, 4.5.1, 4.5.2, 4.5.3, 4.6.1, 4.6.2, 4.7, 4.7.1, 4.7.2, 4.8, 4.8.1, 4.8.2, 4.8.3, 4.8.4, Chapter 5, Section 5.1, 5.2, 5.2.3, 5.2.4, 5.2.5, 5.2.6, 5.5, 5.7, 5.7.1, 5.10, 6.1.2, 6.2, 6.2.1, 6.2.2, 6.2.3, 6.3, Chapter 7, Section 7.2, 7.3.1, 7.4, 7.4.1, 7.4.3, 7.4.5, 7.5, 7.5.3, 7.5.4, 7.5.5, 7.6, 7.7, 7.8, Chapter 8, Section 8.1, 8.1.1, 8.2, 8.2.1, 8.2.2, 8.2.3, 8.2.4, 8.2.5, 8.3, 8.4, Appendix 2.2, 3, 4 Addition Product Configuration, Section 2.4, 2.5, 2.6, Appendix 1.2, Index Deletion Section 2.4
May, 2001	SH(NA)-080049-C	Module addition QJ71LP21G, QJ71LP21GE Correction Safety Precautions, Contents, About the Generic Terms and Abbreviations, Section 1.1, 1.2, 2.4, 2.13, 2.1.4, 2.2, 2.2.1, 2.3, 3.1.1, 3.1.3, 3.2, 3.2.2, 3.3.2, 3.3.3, 3.3.4, 4.3.2, 4.4.2, 4.5.1, 4.5.2, 4.5.3, 4.6.2, 4.7.1, 4.7.2, Chapter 5, Section 5.1, 5.2.5, 5.2.6, 5.4, 5.6, 5.7.1, 5.7.2, 5.8, 5.9, 6.1.2, 6.2.1, 6.3, Chapter 7, Section 7.2, 7.3, 7.3.1, 7.4.1, 7.4.2, 7.4.5, 7.5, 7.9, 8.1.1, 8.1.4, 8.3, Appendix 2.1 Addition Section 2.5 Section number changed Section 2.5 → 2.6, 2.6 → 2.7
June, 2002	SH(NA)-080049-D	Module addition QJ71LP21S-25 Correction Safety Precautions, Contents, About Manuals, Product Configuration, Section 1.1, 1.2, 2.2, 3.1.1, 3.2.2, 3.3.2, 4.2, 5.2.1, 5.6, 6.2.1, 6.2.2, Chapter 7, Section 7.3, 7.3.2, 7.4.5, 8.3, Appendix 3, 4, Index
Apr., 2003	SH(NA)-080049-E	Correction Safety Precautions, Contents, About Manuals, Section 1.2, 2.1.3, 2.2.2, 2.5, 3.1.1, 3.2.1, 3.2.2, 3.3.1, 3.3.3, Chapter 5, Section 5.2.1, 5.7, 5.7.1, 5.7.2, 5.8, 5.9, 6.1.2, 6.2, 6.4, 7.1, 7.4.2, 7.4.3, 7.4.4, 7.4.5, 7.5, 7.5.4, 7.8, 7.9, 8.1, 8.2, 8.2.1, 8.2.5, 8.3

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

Print Date	＊ Manual Number	Revision
Jun., 2004	SH(NA)-080049-F	· The contents of function version D were added. · The entire manual was reviewed.
Oct., 2004	SH(NA)-080049-G	Mode addition MELSECNET/H Extended Mode Correction Safety Precautions, Product Configuration, Section 1.1, 1.2, 2.1.2, 2.2, 2.2.2, 2.2.3, 3.1.1, 3.2.1, 3.3.2, 4.2, 4.3.3, 4.6.1, 4.6.2, 4.8.1, Chapter 5, Section 5.1, 5.4, 6.2.2, 6.2.3, 7.4.5, 7.6, 7.10.2, 8.1, 8.1.1, 8.1.2, 8.1.3, 8.2, 8.2.1, 8.2.7, 8.3, Appendix 1.1, 1.2, 3, 4, 5, INDEX Addition Section 8.2.5, 8.2.9, 8.2.10 Section number changed Section 8.2.5 → 8.2.6, 8.2.6 → 8.2.7, 8.2.7 → 8.2.8
Oct., 2005	SH(NA)-080049-H	Correction Safety Precautions, Conformation to the EMC Directive and Low Voltage Instruction, Section 1.1, 1.2, 2.1.2, 2.2, 2.2.1, 2.2.3, 3.1.3, 3.3.2, 4.2, 4.6.1, 4.7.1, 4.7.2, 4.8.1, Chapter 5, Section 5.1, 5.4, Chapter 6, 7, Section 7.3.1, 7.7, 7.10.2, 8.1.2, 8.1.3, 8.2, 8.2.5, 8.3, Appendix 1.1, 1.2, 3, 4, 5
Apr., 2006	SH(NA)-080049-I	Correction Section 2.3, 3.1.2, 4.2, 6.3, 7.4.5, Appendix 4
Oct., 2007	SH(NA)-080049-J	Change of a term "PLC" was changed to "programmable controller". Correction About the Generic Terms and Abbreviations, 1.2, 2.1.3, 2.1.4, 2.2, 2.3, 3.2.1, 3.3.2, 3.3.3, 4.2, 4.5.1, 4.5.2, 4.5.3, 4.6.1, 4.7.1, 4.7.2, Chapter 5, 5.1, 5.6, 5.7, 5.7.1, 5.7.2, 6.1.1, 6.2.2, 6.3, 6.4, 7.2, 7.4.5, 7.5.5, 7.10.2, 8.1, 8.2.1, 8.2.4, 8.3, Appendix 3, 4, 5 Addition DEFINITIONS OF TERMINOLOGY
Jul., 2008	SH(NA)-080049-K	Correction SAFETY PRECAUTIONS, Compliance with the EMC and Low Voltage Directives, About the Generic Terms and Abbreviations, DEFINITIONS OF TERMINOLOGY, Chapter 1, Section 2.1, 2.2, 3.1.1, 3.1.3, 3.2, 3.3.2 to 3.3.4, 4.2, 4.3.4, 4.6.2, 4.7.1, 4.7.2, Chapter 5, Section 5.1, 5.4, 5.6 to 5.9, 6.1.1, 6.3, Chapter 7, Section 7.2, 7.3, 7.4.1, 7.4.2, 7.4.5, 7.5, 7.5.5, 7.7 to 7.9, 7.10.2, 7.10.5, 7.10.7, 8.1, 8.3, Appendix 1.1, 2.1, 3, 4

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

Print Date	＊ Manual Number	Revision
Jan., 2009	SH(NA)-080049-L	Mode addition QJ71NT11B Correction SAFETY PRECAUTIONS, COMPLIANCE WITH THE EMC AND LOW VOLTAGE DIRECTIVES, GENERIC TERMS AND ABBREVIATIONS, PACKING LIST, Section 1.1 to 1.3, 2.1.1, 2.1.2, 2.1.4, 2.2, 2.2.3, 3.1.1 to 3.1.3, 3.2.2, 3.3.2, 3.3.3, 4.1 to 4.3, 4.5, 4.5.1 to 4.5.3, 4.7.1, 4.7.2, 4.8, 4.8.2, Chapter 5, Section 5.1, 5.2.5, 5.4, 5.7.1, 6.1.1, 6.4, 7.1 to 7.3, 7.4.1, 7.4.2, 7.4.5, 7.5.5, 7.9, 7.10.2, 8.2, 8.2.1 to 8.2.4, 8.3, 8.4, Appendix 1.1, 1.2, 3, 4, INDEX Addition Section 3.1.4, 3.1.5, 4.2.1 to 4.2.3, 4.6.3, 4.6.4, 5.2.6, 8.2.6, Appendix 5 Section number changed Section 4.3.3 → 4.3.2, 4.3.4 → 4.3.3, 4.3.5 → 4.3.4, 5.2.6 → 5.2.7, 8.2.6 → 8.2.7, 8.2.7 → 8.2.8, 8.2.8 → 8.2.9, 8.2.9 → 8.2.10, 8.2.10 → 8.2.11, Appendix 5 → 6
Aug., 2009	SH(NA)-080049-M	Correction Section 1.3, 2.2, 2.3, Chapter 8, Appendix 1.2 Addition Section 8.3.1 Section number changed Section 8.3(4) → 8.3.2
Sep., 2010	SH(NA)-080049-N	Correction GENERIC TERMS AND ABBREVIATIONS, Section 1.3, 2.2.1, 2.3, 4.2.1, 4.2.2, 4.2.3, 4.3.1, 5.8, 6.4, 7.4.5, 7.5.6, 8.2.4, 8.2.8, 8.2.10, 8.3.2, Appendix 4, 6 Addition CONDITIONS OF USE FOR THE PRODUCT
May, 2012	SH(NA)-080049-O	Correction SAFETY PRECAUTIONS, COMPLIANCE WITH THE EMC AND LOW VOLTAGE DIRECTIVES, GENERIC TERMS AND ABBREVIATIONS, Section 2.2, 2.3, 3.1.3, 3.1.4, 3.2.2, 3.3.1, 4.2.1, 4.6.2, 5.7, 6.1.1, 6.3, 7.4.5, 7.10.2, 8.3.2, Appendix 3, 6

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

Print Date	＊ Manual Number	Revision
Sep., 2016	SH(NA)-080049-P	Correction GENERIC TERMS AND ABBREVIATIONS, DEFINITIONS OF TERMINOLOGY, Section 1.3, 2.1.4, 2.2, 2.3, 3.1.1, 3.1.2, 3.1.4, 3.3.1, 3.3.2, 4.2.1, 4.2.3, 4.3.1, 4.6.3, Chapter 5, Section 5.1, 5.4, 6.1.1, 6.3, 6.4, 7.4.2, 7.4.5, 8.2, Appendix 1.1, 2.1, 3, 4, 5, 6

Japanese Manual Version SH-080026-V

INTRODUCTION

Thank you for purchasing the MELSEC-Q series programmable controller.
Before using the product, please read this manual carefully to develop full familiarity with the functions and performance of the Q series programmable controller to handle the product correctly.
Please forward a copy of this manual to the end user.

CONTENTS

SAFETY PRECAUTIONS..........A- 1
CONDITIONS OF USE FOR THE PRODUCT..........A- 5
REVISIONS..........A- 6
CONTENTS..........A- 10
MANUALS..........A- 15
COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES..........A- 15
GENERIC TERMS AND ABBREVIATIONS..........A- 16
DEFINITIONS OF TERMINOLOGY..........A- 18
PACKING LIST..........A- 19

1 OVERVIEW 1- 1 to 1-14

1.1 Overview..........1- 1
1.2 Features..........1- 4
1.3 Symbols Used in This Manual..........1- 14

2 SYSTEM CONFIGURATION 2- 1 to 2-19

2.1 MELSECNET/H Network Configurations..........2- 1
  2.1.1 Single network system..........2- 1
  2.1.2 Redundant system (Redundant CPU)..........2- 3
  2.1.3 Simple dual-structured system (High Performance model QCPU and Process CPU)..........2- 4
  2.1.4 Multiple network system (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU)..........2- 5
2.2 Applicable Systems..........2- 6
  2.2.1 Precautions when using link dedicated instructions..........2- 9
  2.2.2 Precautions when using network modules in the multiple CPU system..........2- 11
  2.2.3 List of functions for each CPU module..........2- 17
2.3 Checking Serial Number and Function Version..........2- 18

3 SPECIFICATIONS 3- 1 to 3-52

3.1 Performance Specifications..........3- 1
  3.1.1 Performance specifications..........3- 1
  3.1.2 Optical fiber cable specifications..........3- 5
  3.1.3 Coaxial cable specifications..........3- 6
  3.1.4 Shielded twisted pair cable specifications..........3- 11
  3.1.5 CC-Link Ver. 1.10-compatible cable specifications..........3- 13
3.2 Function Specifications..........3- 14
  3.2.1 Cyclic transmission function (periodical communication)..........3- 15
  3.2.2 RAS function..........3- 18
3.3 Specifications of the Link Data Sending/Receiving Processing Time..........3- 29
  3.3.1 Link data sending/receiving processing..........3- 29

3.3.2 How to calculate the transmission delay time 3- 33
3.3.3 Reducing the link refresh time 3- 47
3.3.4 Reduction of the link scan time 3- 52
3.3.5 Control station shift time........ 3- 52

4 SETUP AND PROCEDURES BEFORE STARTING THE OPERATION 4- 1 to 4-45

4.1 Procedures Before Starting the Operation 4- 1
4.2 Part Names and Settings 4- 2
4.2.1 QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21G, QJ71LP21GE 4- 2
4.2.2 QJ71BR11 .... 4- 5
4.2.3 QJ71NT11B 4- 7
4.3 Loading and Installation 4- 8
4.3.1 Handling precautions 4- 8
4.3.2 Installing and uninstalling the module 4- 10
4.3.3 Stopping the CPU module (unintentional output prevention) 4- 11
4.3.4 Checking the input power supply voltage 4- 11
4.4 Powering On 4- 11
4.4.1 Checking the on status of the POWER LED of the power supply module 4- 11
4.4.2 Checking the on status of the RUN LED of the network module 4- 11
4.5 Standalone Check of the Network Module (Offline Tests) 4- 12
4.5.1 Self-loopback test 4- 13
4.5.2 Internal self-loopback test 4- 15
4.5.3 Hardware test 4- 17
4.6 Cable Connection 4- 19
4.6.1 Optical loop system 4- 19
4.6.2 Coaxial bus system 4- 22
4.6.3 Twisted bus system (when using a shielded twisted pair cable) 4- 27
4.6.4 Twisted bus system (when using CC-Link Ver. 1.10-compatible cable) 4- 29
4.7 Offline Tests from GX Developer 4- 30
4.7.1 Station-to-station test 4- 30
4.7.2 Forward loop/reverse loop test (optical loop system only) 4- 36
4.8 Network Diagnostics from GX Developer (Online Tests) 4- 41
4.8.1 Loop test (optical loop system only) 4- 42
4.8.2 Setup confirmation test (optical loop, coaxial bus system only) 4- 43
4.8.3 Station order check test (optical loop system only) 4- 44
4.8.4 Communication test 4- 45

5 PARAMETER SETTINGS 5- 1 to 5-42

5.1 Setting the Number of Modules (Network Type) 5- 7
5.2 Network Settings 5- 9
5.2.1 Starting I/O No. 5- 9
5.2.2 Network No. 5- 9
5.2.3 Total stations 5- 10
5.2.4 Group No. 5- 10
5.2.5 Mode 5- 11
5.2.6 Communication speed setting (twisted bus system only) 5- 12

5.2.7 Example of parameter settings 5- 13
5.3 Common Parameters (Network Range Assignment Screen) 5- 14
5.3.1 Send range for each station (LB/LW settings) 5- 14
5.3.2 Send range for each station (LX/LY settings) 5- 15
5.3.3 Specification of the I/O master station 5- 16
5.3.4 Specification of the reserved station 5- 16
5.3.5 Pairing setting 5- 16
5.4 Supplementary Settings 5- 17
5.5 Control Station Return Setting 5- 20
5.6 Station Inherent Parameters (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU) 5- 21
5.7 Refresh Parameters 5- 25
5.7.1 Concept of the link refreshing 5- 28
5.7.2 How to set the refresh parameters 5- 30
5.8 Valid Module During Other Station Access 5- 39
5.9 Standby Station Compatible Module (High Performance model QCPU and Process CPU) 5- 40
5.10 Writing Parameters to the CPU 5- 42

6 PROGRAMMING 6- 1 to 6-31

6.1 Programming Precautions 6- 1
6.1.1 Interlock related signals 6- 1
6.1.2 Program example 6- 4
6.2 Cyclic Transmission 6- 5
6.2.1 32-bit data assurance 6- 5
6.2.2 Station-based block data assurance for cyclic data 6- 7
6.2.3 Interlock program example 6- 8
6.3 Link Dedicated Instruction List 6- 9
6.4 Using the Link Special Relays (SB)/Link Special Registers (SW) 6- 13

7 APPLICATION FUNCTIONS 7- 1 to 7-160

7.1 Direct Access to the Link Devices 7- 2
7.2 Inter-Link Data Transfer Function (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU) 7- 6
7.3 Low-Speed Cyclic Transmission Function (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU) 7- 9
7.3.1 Send range settings 7- 10
7.3.2 Send timing 7- 11
7.3.3 Startup 7- 14
7.4 Transient Transmission Function (Non-Periodical Communication) 7- 16
7.4.1 Communication function 7- 17
7.4.2 Routing function 7- 20
7.4.3 Group function 7- 27
7.4.4 Message sending function using the logical channel numbers 7- 28
7.4.5 Programming 7- 30
7.4.5 (1) Data sending/receiving (JP/GP.SEND, JP/GP.RECV) 7- 36
7.4.5 (2) Reading from/writing to word devices of other stations (JP/GP.READ, JP/GP.SREAD, JP/GP.WRITE, JP/GP.SWRITE) 7- 53

7.4.5 (3) Requesting transient transmission to other stations (J(P)/G(P).REQ) 7- 72
7.4.5 (4) Reading/writing word devices of other stations (J(P).ZNRD, J(P).ZNWR).............................. 7- 82
7.4.5 (5) Remote RUN/Remote STOP (Z(P).RRUN, Z(P).RSTOP).. 7- 91
7.4.5 (6) Reading and writing clock data of other station CPU modules (Z(P).RTMRD, Z(P).RTMWR) 7-100
7.4.6 Setting the clock to stations on a network with GX Developer 7-109
7.5 Starting the Interrupt Sequence Program 7-110
7.5.1 Interrupt setting parameters.. 7-111
7.5.2 Interrupts using the RECVS instruction 7-113
7.5.3 Interrupts by the link devices (LB/LW/LX) for cyclic transmission 7-114
7.5.4 Interrupts by the link special device (SB/SW) 7-116
7.5.5 Message reception "one scan completion" instruction (Z.RECVS)... 7-117
7.5.6 Application example 7-121
7.6 Multiplex Transmission Function (Optical Loop System) 7-123
7.7 Simple Dual-Structured Network (High Performance model QCPU and Process CPU) 7-124
7.8 Stopping/Restarting the Cyclic Transmission and Stopping Link Refreshing (Network Test) 7-129
7.9 Increasing the Number of Send Points by Installing Multiple Modules with the Same Network (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU) ... 7-132
7.10 Configuring a Network with a Redundant System.. 7-134
7.10.1 Outline of the redundant system operation 7-134
7.10.2 Precautions for network configuration including a redundant system.. 7-137
7.10.3 Pairing setting in a redundant system 7-145
7.10.4 Redundant settings in a redundant system... 7-149
7.10.5 System switching request to the control system CPU 7-150
7.10.6 Function for returning to control station in a redundant system 7-152
7.10.7 Data retention time for system switching.. 7-153
7.10.8 Routing via a redundant system 7-159

8 TROUBLESHOOTING 8- 1 to 8-53

8.1 Network Diagnostics (Network Monitor).. 8- 2
8.1.1 Host information 8- 5
8.1.2 Other station information... 8- 7
8.1.3 Network monitor details... 8- 11
8.1.4 Error history monitor.. 8- 15
8.2 Troubleshooting 8- 18
8.2.1 Items to be checked first 8- 23
8.2.2 Data link failure on the entire system 8- 24
8.2.3 Data link failure caused by reset or power-off of each station... 8- 24
8.2.4 Data link failure of a specific station 8- 25
8.2.5 Data link failure in MELSECNET/H Extended mode 8- 25
8.2.6 Data link failure in MELSECNET/H twisted bus system 8- 26
8.2.7 Data link in a redundant system 8- 26
8.2.8 Send/received data failure 8- 27
8.2.9 Link dedicated instruction not complete 8- 28
8.2.10 Checking online for reverse optical fiber cable connection 8- 29
8.2.11 When different network types exist in the same network 8- 31
8.3 Error Codes.. 8- 32
8.3.1 How to check error codes 8- 32

8.3.2 Error code list...8- 37
8.4 H/W Information 8- 47

APPENDICES App- 1 to App-42

Appendix 1 Comparison of Network Module Specifications, and Compatibility .... App- 1
Appendix 1.1 List of comparison between MELSECNET/H and MELSECNET/H Extended mode and MELSECNET/10 mode specifications .... App- 1
Appendix 1.2 Upgraded functions of the network module .... App- 3
Appendix 2 Differences between the AJ71QLP21/AJ71QLP21G/AJ71QBR11, the A1SJ71QLP21/ A1SJ71QBR11, and the QJ71LP21/QJ71LP21-25/QJ71LP21G/ QJ71BR11 .... App- 4
Appendix 2.1 Differences in LED displays and switch settings .... App- 4
Appendix 2.2 Precautions when replacing the AJ71QLP21/AJ71QLP21G/AJ71QBR11 and the A1SJ71QLP21/A1SJ71QBR11 with the QJ71LP21/QJ71LP21-25/ QJ71LP21G/ QJ71BR11.. App- 5
Appendix 3 Link Special Relay (SB) List.. App- 6
Appendix 4 Link Special Register (SW) List... App- 18
Appendix 5 Screwdriver .... App- 37
Appendix 6 External Dimensions.. App- 38

INDEX Index- 1 to Index- 3

MANUALS

The following manuals are also relevant to this product.
Order each manual as needed, referring to the following list.

Relevant manuals

Manual name	Manual number (Model code)
Q corresponding MELSECNET/H Network System Reference Manual (Remote I/O network) Specifications, setup and procedures before starting the operation, parameter setting, programming and troubleshooting of the remote I/O network of the MELSECNET/H network system. (Sold separately)	SH-080124 (13JF96)
Type MELSECNET/10 Network system (PLC to PLC network) Reference Manual System configuration, performance, specifications and programming of MELSECNET/10 network system (PLC to PLC network). (Sold separately)	IB-66440 (13JE33)
For QnA/Q4AR MELSECNET/10 Network System Reference Manual System configuration, performance, specifications and programming of MELSECNET/10 network system (PLC to PLC network). (Sold separately)	IB-66690 (13JF78)

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

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

- QCPU User's Manual (Hardware Design, Maintenance and Inspection)
- Safety Guidelines
  (This manual is included with the CPU module or base unit.)

The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

(2) Additional measures

(a) When using QJ71LP21 and QJ71NT11B
No additional measures are necessary for the compliance of this product with EMC and Low Voltage Directives.

(b) When using QJ71BR11
To ensure that this product maintains EMC and Low Voltage Directives, please refer to one of the manuals listed under (1).

GENERIC TERMS AND ABBREVIATIONS

Generic term/abbreviation	Description of generic term/abbreviation
QJ71LP21	Abbreviation for the QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21G, and QJ71LP21GE MELSECNET/H network modules. However, QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21G, and QJ71LP21GE are used in this manual to indicate special machine types
QJ71BR11	Abbreviation for the QJ71BR11 MELSECNET/H network module
QJ71NT11B	Abbreviation for the QJ71NT11B MELSECNET/H network module
Network modules	Generic term for the QJ71LP21, QJ71BR11, and QJ71NT11B
CC-Link IE Controller Network module	Abbreviation for the QJ71GP21-SX and QJ71GP21S-SX CC-Link IE Controller Network modules
CC-Link IE Field Network module	Abbreviation for the QJ71GF11-T2 CC-Link IE Field Network master/local modules
MELSECNET/H	Abbreviation for the Q corresponding MELSECNET/H network system
MELSECNET/10	Abbreviation for the AnU and QnA/Q4AR corresponding MELSECNET/10 network system
QCPU	Generic term for the Basic model QCPU, High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU
Basic model QCPU	Generic term for the Q00JCPU, Q00CPU, and Q01CPU
High Performance model QCPU	Generic term for the Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, and Q25HCPU
Process CPU	Generic term for the Q02PHCPU, Q06PHCPU, Q12PHCPU, and Q25PHCPU
Redundant CPU	Generic term for the Q12PRHCPU and Q25PRHCPU
Universal model QCPU	Generic term for the Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q03UDVCPU, Q03UDECPU, Q04UDHCPU, Q04UDVCPU, Q04UDEHCPU, Q06UDHCPU, Q06UDVCPU, Q06UDEHCPU, Q10UDHCPU, Q10UDEHCPU, Q13UDHCPU, Q13UDVCPU, Q13UDEHCPU, Q20UDHCPU, Q20UDEHCPU, Q26UDHCPU, Q26UDVCPU, Q26UDEHCPU, Q50UDEHCPU, and Q100UDEHCPU
Built-in Ethernet port QCPU	Generic term for the Q03UDVCPU, Q03UDECPU, Q04UDVCPU, Q04UDEHCPU, Q06UDVCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDVCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDVCPU, Q26UDEHCPU, Q50UDEHCPU, and Q100UDEHCPU
Safety CPU	Generic term for the QS001CPU
C Controller module	Generic term for the C Controller modules: Q06CCPU-V, Q06CCPU-V-B, Q12DCCPU-V, Q24DHCCPU-V, Q24DHCCPU-VG, Q24DHCCPU-LS, and Q26DHCCPU-LS
Control CPU	A CPU module that controls connected I/O modules and intelligent function modules. In a multiple CPU system, there are multiple CPU modules and each connected module can be controlled by a different CPU module.
System A CPU	A CPU module where the system A connector of a tracking cable is connected in a redundant system
System B CPU	A CPU module where the system B connector of a tracking cable is connected in a redundant system
Control system CPU	A CPU module that controls operations in a redundant system
Standby system CPU	A CPU module that stands by in case the control system fails in a redundant system
GX Developer	Generic product name for SWnD5C-GPPW-E, SWnD5C-GPPW-EA, SWnD5C-GPPW-EV, and SWnD5C-GPPW-EVA ("n" means version 4 or later.) "-A" and "-V" mean "volume license product" and "version-upgrade product" respectively.
GX Works2	Generic product name for SWnDNC-GXW2 (n: version)
CC-Link Ver. 1.10-compatible cable	Abbreviation for the CC-Link Version. 1.10-compatible dedicated cable

Generic term/abbreviation	Description of generic term/abbreviation
SEND	Abbreviation for JP.SEND and GP.SEND
RECV	Abbreviation for JP.RECV and GP.RECV
READ	Abbreviation for JP.READ and GP.READ
SREAD	Abbreviation for JP.SREAD and GP.SREAD
WRITE	Abbreviation for JP.WRITE and GP.WRITE
SWRITE	Abbreviation for JP.SWRITE and GP.SWRITE
REQ	Abbreviation for J.REQ, JP.REQ, G.REQ and GP.REQ
ZNRD	Abbreviation for J.ZNRD and JP.ZNRD
ZNWR	Abbreviation for J.ZNWR and JP.ZNWR
RRUN	Abbreviation for Z.RRUN and ZP.RRUN
RSTOP	Abbreviation for Z.RSTOP and ZP.RSTOP
RTMRD	Abbreviation for Z.RTMRD and ZP.RTMRD
RTMWR	Abbreviation for Z.RTMWR and ZP.RTMWR
RECVS	Abbreviation for Z.RECVS

DEFINITIONS OF TERMINOLOGY

Term	Description
Cyclic transmission	A function by which data are periodically exchanged among stations on the network using link devices
Transient transmission	A function of communication with another station, which is used when requested by a dedicated instruction or GX Developer
Link dedicated instruction	Dedicated instruction used for transient transmission.
RAS	Abbreviation for Reliability, Availability, and Serviceability. This term is used to express the overall usability of automation systems.
Control station	Only one station that controls the network to which it is connected. Each station's send range for cyclic transmission is assigned to the control station.
Normal station	Station that performs cyclic transmission according to the range assignment of the control station.
Reserved station	Station that is not actually connected to the network. It must be included in the total number of stations in the network, since it is to be connected in the future.
Relay station	A station that includes two or more network modules. Data are passed through this station to stations on other networks.
Reconnection	Processing of restarting data link when a faulty station becomes normal.
Disconnection	Processing of stopping data link when a data link error occurs.
Device	Devices (X, Y, M, D, etc.) that are contained in a CPU module.
Link Device	Devices (LB/LW/LX/LY) that are contained in a network module.
Link scan time	Time required for data of each station to be sent in order and to make one rotation in the network. The link scan time changes depending on the data volume or transient transmission request. Link scans are performed "asynchronously" with sequence scans of the CPU module.
Link refresh	Processing of data transfer between link devices of the network module and CPU module devices. Link refresh is performed in "END processing" of the sequence scan of the CPU module.
Buffer memory	Memory area in an intelligent function module, in which data are temporarily stored. The network module does not have any buffer memory area that is offered to the user.
Baton pass	A control mechanism in which transmission right (token) is passed around the network for data transmission.
Control station shift time	Time taken from when the control station went down due to a reason such as power-off until data link is started by the sub-control station.
Group No.	Number that is assigned for transient transmission to any given stations. By specifying a group of stations as transient transmission target, data can be sent to the stations of the same group No.

PACKING LIST

Model name	Part name	Quantity
QJ71LP21	QJ71LP21 MELSECNET/H Network Module (optical loop type)	1
QJ71LP21-25	QJ71LP21-25 MELSECNET/H Network Module (optical loop type)	1
QJ71LP21S-25	QJ71LP21S-25 MELSECNET/H Network Module (optical loop type, with external power supply function)	1
QJ71LP21G	QJ71LP21G MELSECNET/H Network Module (optical loop type)	1
QJ71LP21GE	QJ71LP21GE MELSECNET/H Network Module (optical loop type)	1
QJ71BR11	QJ71BR11 MELSECNET/H Network Module (coaxial bus type)	1
	F-type connector (A6RCON-F)	1
QJ71NT11B	QJ71NT11B MELSECNET/H Network Module (twisted bus type)	1
	Terminating resistor 110 Ω, 1/2W (brown, brown, brown)	1

REMARKS

For the coaxial bus system, terminating resistors (75 Ω) are required in the network terminal stations.
Terminating resistors are not supplied with the QJ71BR11; they must be purchased separately.
For a list of the model names and how to use the terminating resistors, refer to Section 4.6.2.

1 OVERVIEW

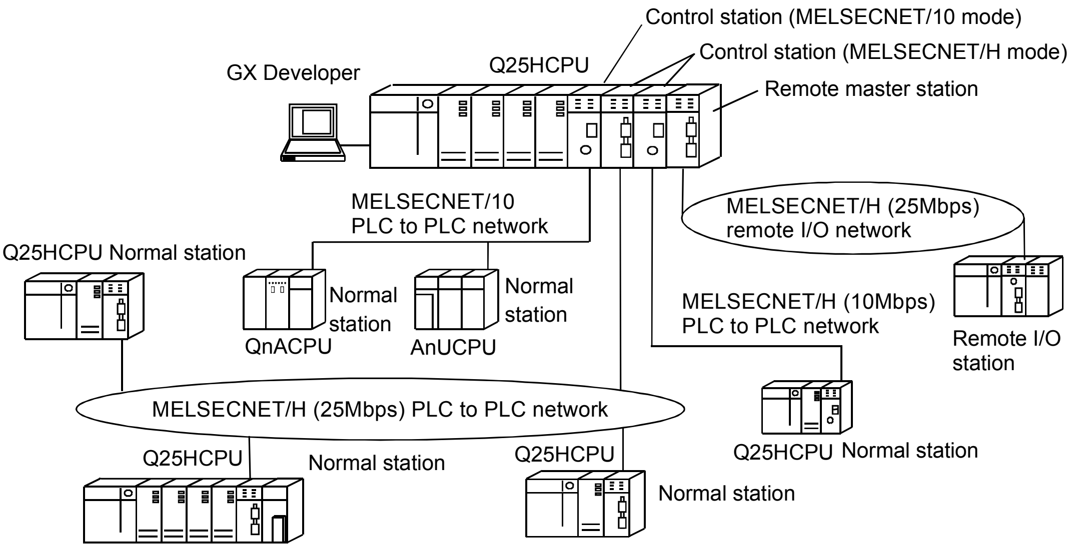
The MELSECNET/H network system includes a PLC to PLC network for communicating between the control station and normal stations, and a remote I/O network for communicating between the remote master station and remote I/O stations.
This manual is used for configuring PLC to PLC networks on MELSECNET/H network systems (hereinafter abbreviated as MESECNET/H.)
When configuring a remote I/O network using MELSECNET/H, refer to Q corresponding MELSECNET/H Network System Reference Manual (Remote I/O network).

REMARKS

Networks known as MELSECNET/10H are hereinafter abbreviated as MELSECNET/H.

1.1 Overview

The PLC to PLC network system of MELSECNET/H provides more functionality, higher processing speed and more capacity than the conventional PLC to PLC network system of MELSECNET/10 network system.
In addition, in pursuit of the maximum ease of use of the MELSECNET/10 network system, the FA system can be networked easily by combining with GX Developer.
The MELSECNET/H system supports the MELSECNET/H and MELSECNET/H Extended modes (high functionality and high-speed mode) and the MELSECNET/10 mode (functional and performance compatibility mode) to achieve the network performance improvement and upward compatibility of MELSECNET/10.
Unless otherwise categorized, this is abbreviated as MELSECNET/H for explanatory purposes in this manual.



REMARKS

This manual is written assuming that MELSECNET/H is used in the MELSECNET/H or MELSECNET/H Extended mode. Thus, if MELSECNET/H is to be used in the MELSECNET/10 mode, please refer to the "For QnA/Q4AR MELSECNET/10 Network System Reference Manual".

POINT

(1) Select a QCPU as a programmable controller of the MELSECNET/H for PLC to PLC network system.

(2) When any of the conventional series QnA, AnU and ACPUs exist in the same network, select the MELSEC NET/10 mode, which is compatible with the MELSECNET/10.

(3) Set the control station and normal stations within the same network to the same network type.
Stations of different network types cannot be used together within the same network.

The table below shows the CPU modules that can be combined for use on each network.

CPU module	Type of networks that can be used with CPU	Network to be connected	
		MELSECNET/10	MELSECNET/H
		PLC to PLC network	PLC to PLC network
QCPU	MELSECNET/H (10 Mbps)	○ (MESLECNET/10 mode)	○ (MESLECNET/H mode, MELSECNET/H Extended mode)
	MELSECNET/H (25 Mbps)	×	
	MELSECNET/H (Twisted bus)		
AnUCPU	MELSECNET/10	○	×
QnACPU	MELSECNET/10		

○: Use possible ×: Use not possible

REMARKS

What is network type?

The network type is a parameter set for specifying the network where the network module is used.

Set the network type of the network module in the Network parameter of GX Developer.

There are the following network types.

Network type	Description
MELSECNET/H mode	Set this mode when all CPUs within the network are QCPUs.
MELSECNET/H Extended mode	The maximum number of link points per station has been increased compared with the MELSECNET/H mode. In excess of 2000 bytes, a maximum of 35840 bytes can be set. Set this mode when the system uses many link points per station.
MELSECNET/10 mode	This mode is used to operate the network module on a MELSECNET/10 network where the QnA/AnU exists.

1.2 Features

The MELSECNET/H is designed to provide higher processing speed, more capacity, and more functionality while maintaining the connectivity with the MELSECNET/10; it is easier to use than ever in combination with GX Developer. Furthermore, the MELSECNET/H has the following features that were not available with the conventional MELSECNET (II) and MELSECNET/B data link systems.

(1) Achievement of a high-speed communication system

(a) The MELSECNET/H enables high-speed communications with 25Mbps and 10Mbps communication speeds.
Communication speeds vary depending on the network system.

Network system	Communication speed
Optical loop	10Mbps or 25Mbps ✻1
Coaxial bus	10Mbps
Twisted bus	156kbps to 10Mbps

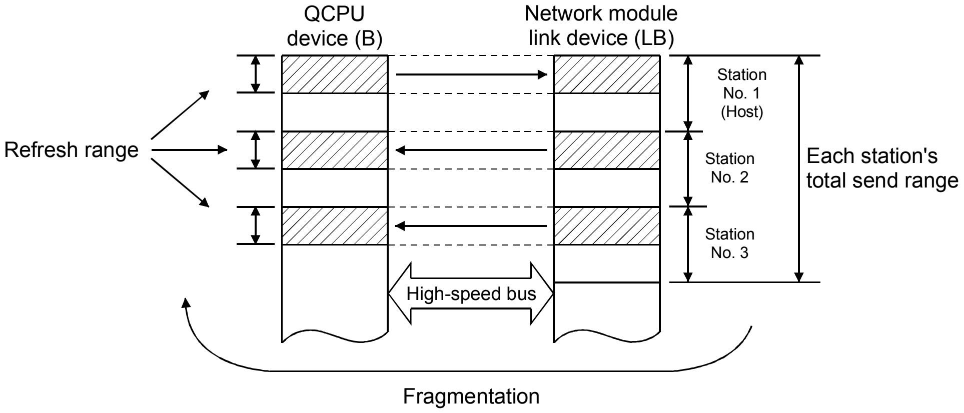
✻1: QJ71LP21-25 and QJ71LP21S-25 only

(b) The link scan time has become even faster through the use of processors specifically designed for linking.

(c) Refresh parameter area can be subdivided
By subdividing ranges refresh parameter ranges, refreshing of the areas not used for the sequence program can be eliminated and the refresh time can be reduced by refreshing only those required. (Refer to Section 5.7 "Refresh Parameters.")
The number of refresh parameter settings per module is shown below.

Item	Number of settings		
	Basic model QCPU Safety CPU	Q00UJCPU Q00UCPU Q01UCPU	High Performance model QCPU Process CPU Redundant CPU Universal model QCPU other than listed in the left column.
Link device transfer	8	16	64
SB/SW transfer	1 for each		

Also, because the bus speed between a QCPU and a network module has been improved, the refresh time has been reduced.



(d) The optical loop system enables even faster levels of data communication with multiplex transmission (refer to Multiplex Transmission Function in section 7.6.)

(2) Large-scale and flexible system configuration

(a) The link device has a larger capacity: 16384 points for the link relay (LB) and 16384 points for the link register (LW). (Refer to Section 3.1.1)

(b) The maximum number of link points per station has been increased.
By selecting the network type, the maximum number of link points per station can be increased.

1) MELSECNET/H Extended mode ＊1
By selecting the MELSECNET/H Extended mode as the network type, the maximum number of link points per station can be set up to 35840 bytes in excess of 2000 bytes.
It is not necessary to install multiple network modules for a single CPU module to increase the number of transmission points.

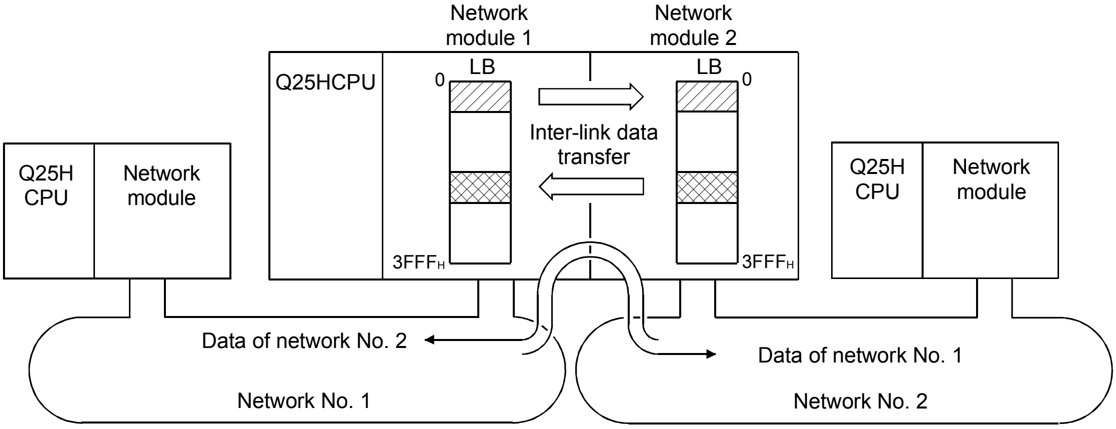
2) MELSECNET/H mode ＊1
By selecting the MELSECNET/H mode as the network type, the maximum number of link points per station can be set up to 2000 bytes. Furthermore, by installing multiple network modules with the same network number for the same CPU module, the link points of "number of modules × maximum number of link points per station" can be sent. (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU) (Refer to Section 7.9 "Increasing the Number of Send Points by Installing Multiple Modules Having the Same Network Number.")

＊1: The link scan time varies depending on the network type.
Refer to Section 3.3.2 for details.

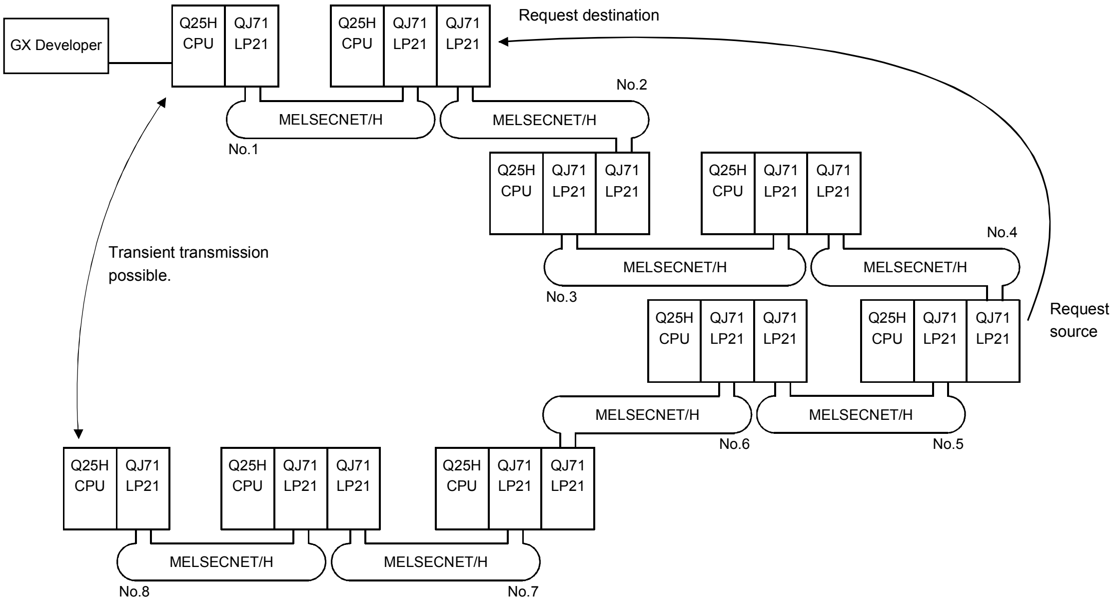
(c) The commands for transmitting and receiving data with other stations on the MELSECNET/H network system (SEND, RECV, RECVS, READ, SREAD, WRITE, SWRITE) enable a maximum of 960 words of data to be transmitted and received (refer to Programming in section 7.4.5.)

(d) A system can be expanded to contain a maximum of 239 networks. (Refer to Section 2.1.4, "A Network System Containing Multiple Networks.")

(e) By using the inter-link data transfer function, data (LB/LW) can be transferred to another network without creating a sequence program. (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU) (Refer to Section 7.2, "Inter-link Data Transfer Function.")



(f) By installing multiple network modules, N:N communication (transient transmission) with destination stations on eight network systems that use the programmable controllers as relay stations can be performed using the routing function.
(Refer to Section 7.4.2, "Routing Function.")
Transient transmission using the routing function can be performed not only in a system composed of MELSECNET/H networks but also in a system that contains CC-Link IE Controller Network, CC-Link IE Field Network and/or MELSECNET/10 networks.



＊: Only the High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU accept multiple network modules.

(g) The following three types of network systems can be configured according to applications of each user.

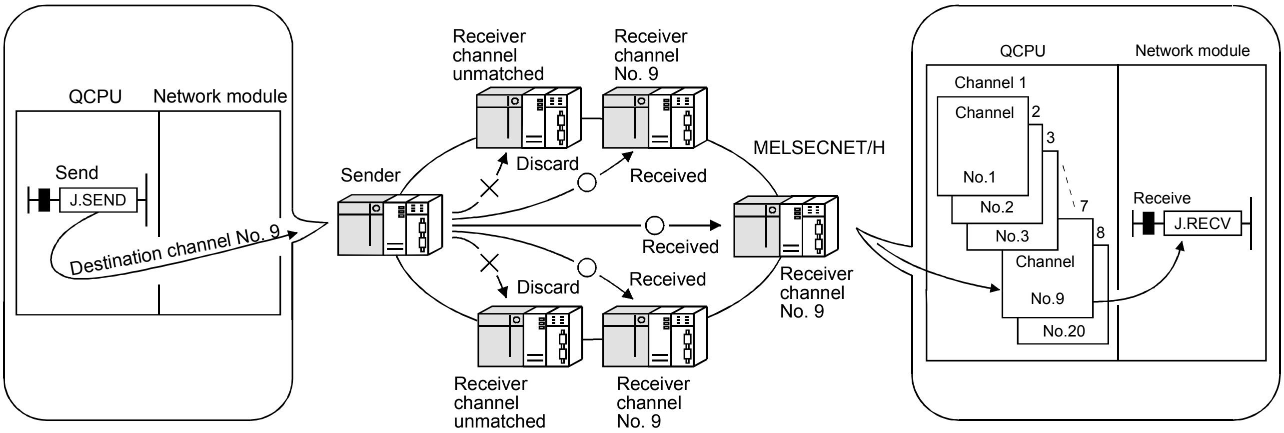
1) Loop system that is more resistant to noise and provides longer distance in total and between stations. (Up to 30km in total length)
2) Coaxial bus system that allows easier wiring (Up to 500m in total length)
3) Twisted bus system that allows the use of general-purpose cables (Up to 1200m in total length)
(Refer to Section 3.1, "Performance Specifications.")

(h) The following functions facilitate network connection:

1) Any station to be connected in the future can be specified as a reserved station.
Specifying a station not actually connected as a reserved station prevents a communication error. (Refer to Section 5.3.4 "Specification of the reserved station.")
2) It is not necessary to connect stations in order of the station Nos. in the network. (Refer to Section 4.2 "Part Names and Settings.")

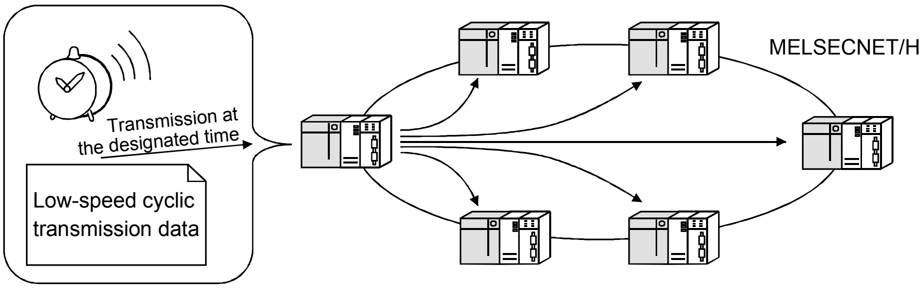
(3) Providing various communication services

(a) Transient transmission can be performed by designating a channel number (1 to 64) of the receiving station. This function allows to set (change) the channel numbers arbitrarily with the sequence programs and to perform transmission to multiple stations with the same channel number at one time.
(Refer to Section 7.4.4, "Message sending function using the logical channel numbers.")

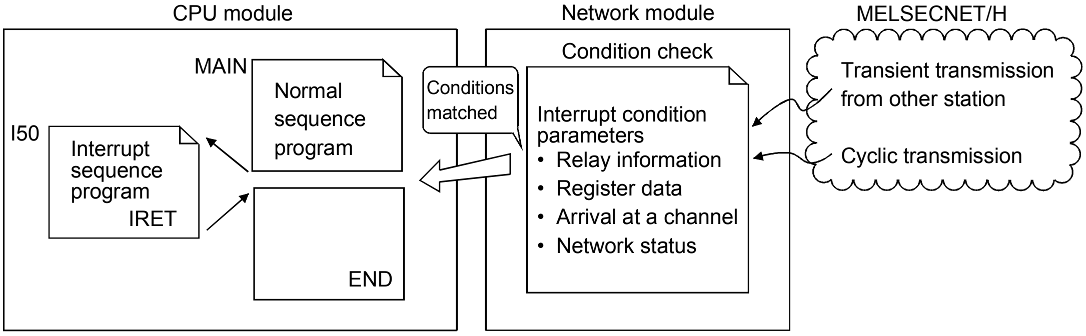


(b) By using the low-speed cyclic transmission function, it is possible to cyclically send data that does not require high-speed transmission in a batch mode, separately from the normal cyclic transmission (LB/LW). High-speed transmission can be achieved by efficiently dividing the data to transmit into data that requires high-speed transmission, which is sent by the normal cyclic transmission, and other data that is sent by low-speed cyclic transmission.
There are three types of transmission method depending on how the transmission is activated.

1) "Transmission of data for one station in one link scan" (default)
2) "Periodical cycle interval" which transmits in a set time cycle (hour/minute/second)
3) "System times" which transmits data at the specified timing (year/month/day/hour/minute/second)
(High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU)
(Refer to Section 7.3, "Low-Speed Cyclic Transmission Function.")



(c) The interrupt sequence program of the host's CPU module can be started up using the event issue function. This function reduces the response time of the system and process real-time data receiving. (Refer to Section 7.5, "Starting Up the Interrupt Sequence Program.")



(4) Enhanced RAS functions (Refer to Section 3.2.2, "RAS function.")

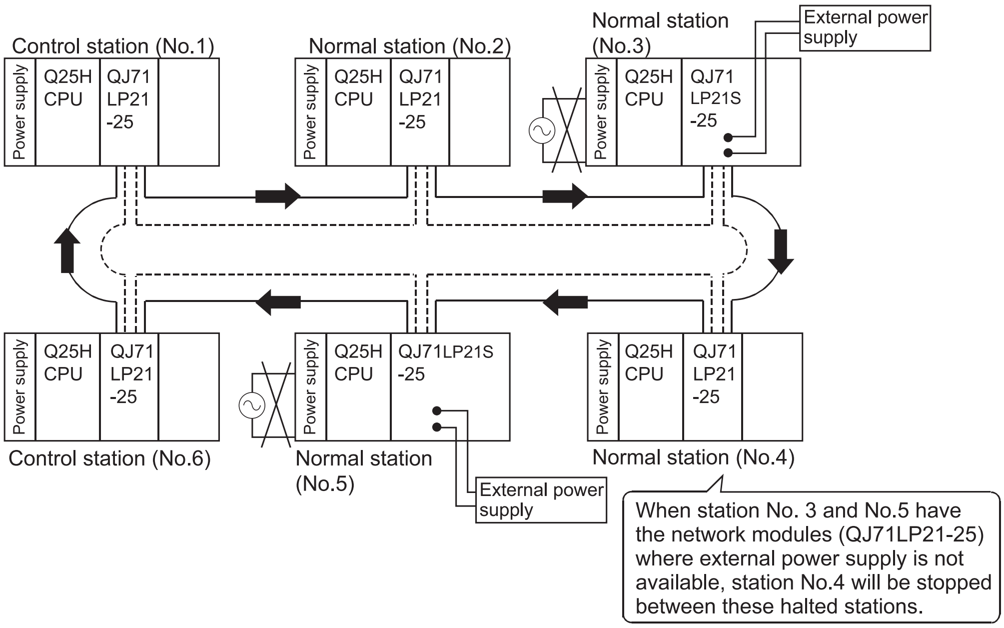
(a) By using the control station switch function, if the control station of the network is down, a normal station is substituted for the control station, enabling to continue the network communication.

(b) When a faulty station recovers and can resume normal operation, it automatically returns to the network to resume the data communication using the automatic return function.

(c) The automatic return control function allows a failed control station to be reconnected to the network as a normal station, reducing network downtime.

(d) The loopback function (in the optical loop system) isolates a faulty part, where a fault such as cable disconnection or a station error has occurred, and enables data communications among operable stations.

(e) Preventing station failure using external power supply
When two or more stations are faulty and halted in the optical loop system, stations between these faulty stations can continue the data link.
Because the loop back is prevented, the link scan time will be stabilized.
(The QJ71LP21S-25 is the network module where external power can be supplied.)



(f) By using the station detach function (coaxial bus system and twisted bus system), even when some of the connected stations are down due to power off, etc., the normal communication can be continued among other operational stations.

(g) When an error occurs in a normal network due to disconnection, etc. the data link can be continued by switching to link data refresh on the standby network if two network modules, a regular module and a standby module, are installed for each programmable controller CPU (High Performance model QCPU and Process CPU)

(h) The network module can continue the transient transmission even if an error that stops the CPU module while the system is operating occurs.

(i) It is possible to check the time when a transient error occurred.

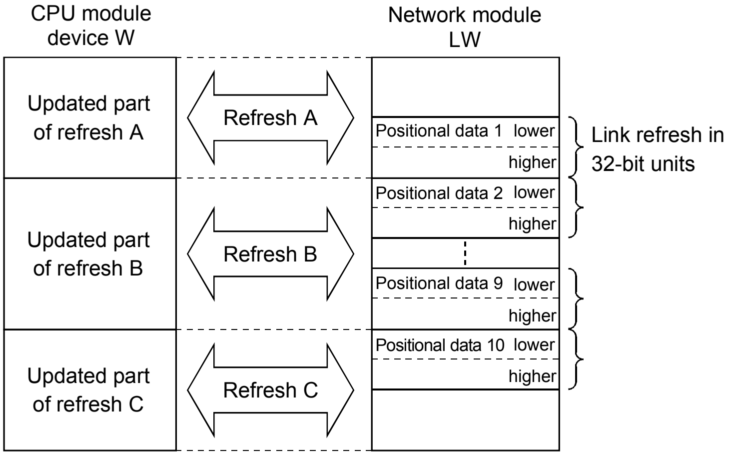
REMARKS

The following faults make the RAS functions valid.
- Break in cable
- Power-off of slave station
- Network setting error
- Fault detectable by self-diagnostics of CPU module

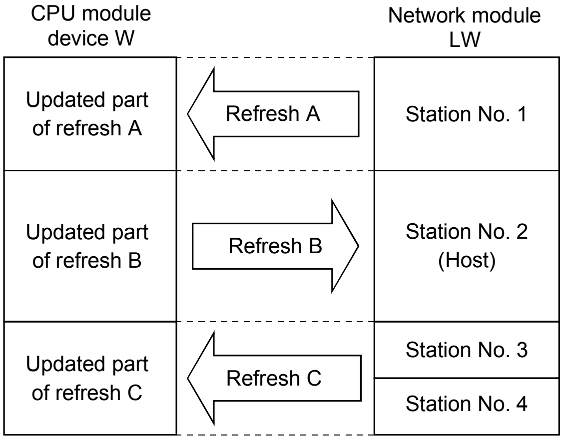
If the network module has become faulty, the RAS functions may not be activated depending on the fault.

(5) Enhancement and compatibility of the network functions

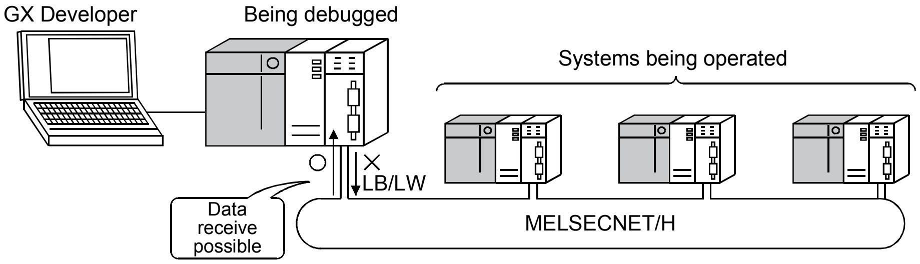
(a) Because of the 32-bit data assurance, data with double word precision (32 bits) can be assured without an interlock.
(Refer to Section 6.2.1, "32-bit data assurance.")



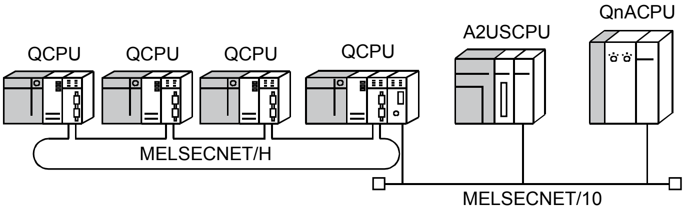
(b) Through the station-based block data assurance for cyclic data, it is possible to manipulate multiple word data without interlocks.
(Refer to Section 6.2.2, "Station-based block data assurance for cyclic data.")



(c) In the network debug mode, the network functions of user programs can be tested in the online environment without affecting systems being operated.
(Refer to Section 5.2.5, "Mode.")



(d) By using the MELSECNET/10 mode (functional compatibility and performance compatibility mode), the MELSECNET/H can be used together with the conventional network modules to easily install a programmable Controller Network system.
To use the MELSECNET/H in the MELSECNET/10 mode (functional compatibility and performance compatibility mode), please refer to the "For QnA/Q4AR MELSECNET/10 Network System Reference Manual".



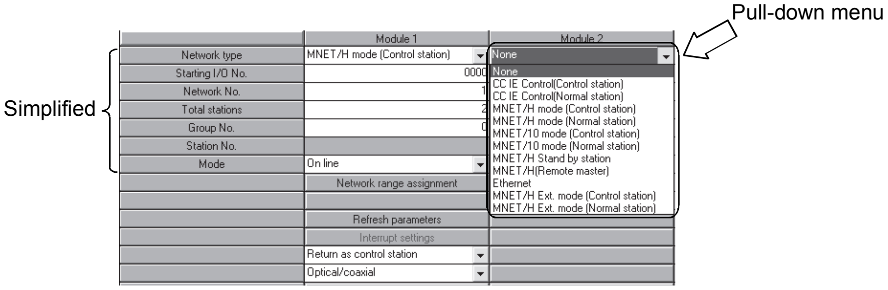
(6) Increased ease of network configuration in combination with GX Developer

(a) The network parameters can easily be set by visualizing pull-down menus, dialogue boxes, etc.

(b) The settings of network Nos., group numbers and operation modes have been simplified so that these values can be specified only through software settings.

(c) On the twisted bus system, the transmission speed setting for the normal station is not required.
The normal station operates with the transmission speed set to the control station.
(Refer to Section 5.2.6, "Communication speed setting.")

(Network parameters)



Pull-down menu

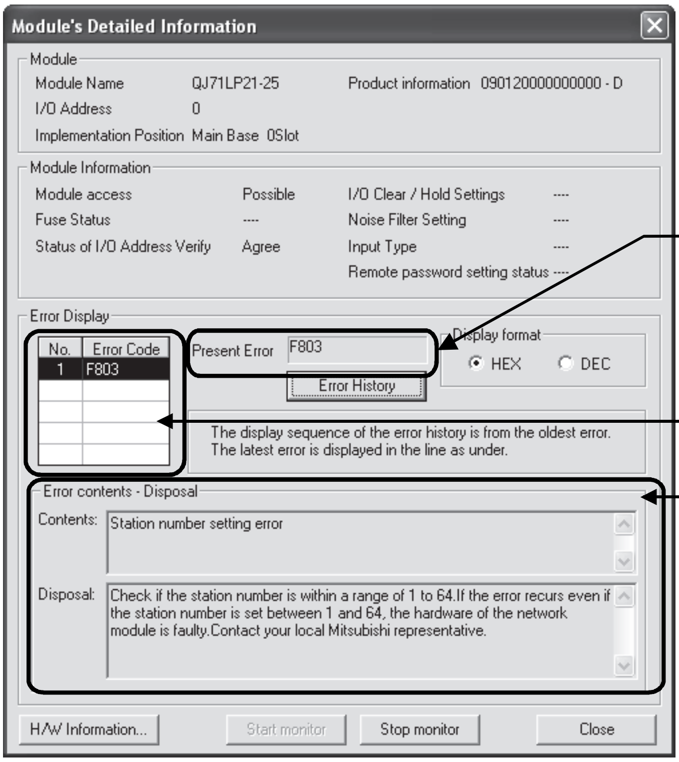
Simplified

	Module 1	Module 2
Network type	MNET/H mode (Control station)	None
Starting I/O No.	0000	
Network No.	1	
Total stations	2	
Group No.	0	
Station No.		
Mode	On line	
	Network range assignment	
	Refresh parameters	
	Interrupt settings	
	Return as control station	
	Optical/coaxial	

None
CC IE Control(Control station)
CC IE Control(Normal station)
MNET/H mode (Control station)
MNET/H mode (Normal station)
MNET/10 mode (Control station)
MNET/10 mode (Normal station)
MNET/H Stand by station
MNET/H(Remote master)
Ethernet
MNET/H Ext. mode (Control station)
MNET/H Ext. mode (Normal station)

(c) Troubleshooting process has been simplified through system monitoring.

(System monitor/error code display)



Module's Detailed Information

Module

Module Name QJ71LP21-25

Product information 090120000000000 - D

I/O Address 0

Implementation Position Main Base 0Slot

Module Information

Module access Possible

I/O Clear / Hold Settings ----

Fuse Status ----

Noise Filter Setting ----

Status of I/O Address Verify Agree

Input Type ----

Remote password setting status ----

Error Display

No.	Error Code
1	F803

Present Error F803

Display format ● HEX ○ DEC

The display sequence of the error history is from the oldest error.
The latest error is displayed in the line as under.

Error contents - Disposal

Contents: Station number setting error

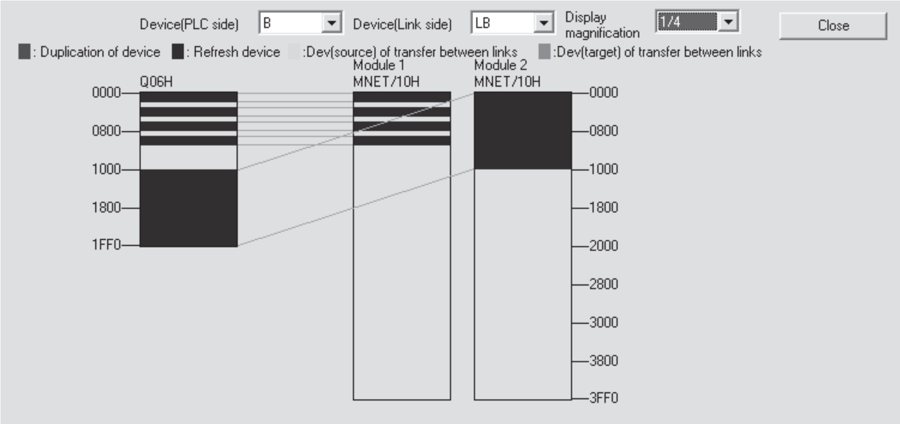
Disposal: Check if the station number is within a range of 1 to 64.If the error recurs even if the station number is set between 1 and 64, the hardware of the network module is faulty.Contact your local Mitsubishi representative.

Displays the latest error code.

Displays error history.

Displays the description and corrective action of the error code selected in error history.

(d) After assigning the refresh parameters and inter-link data transfer devices to a network system in which multiple network modules are installed, duplicate device settings can easily be checked with [Assignment image diagram].



Device(PLC side) B

Device(Link side) LB

Display magnification 1/4

(7) Redundant system configuration

(a) Network modules can be dualized.

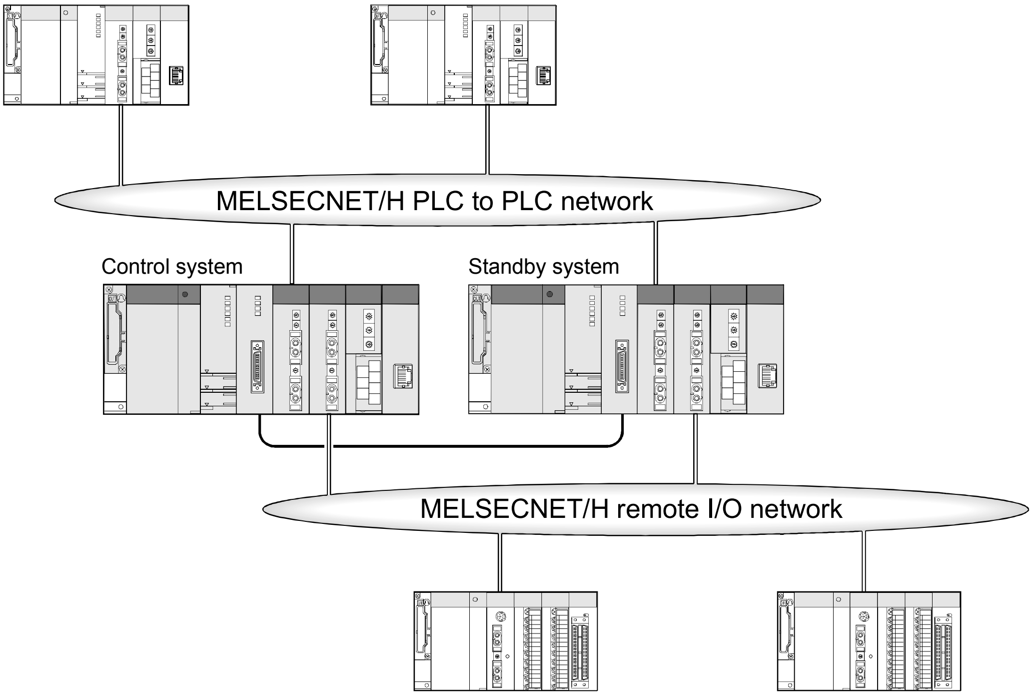
A system containing a network module can be dualized (redundant system) by installing another network module and using redundant CPUs.
In case of an error in the control system CPU or a network module, the redundant system including double network modules switches the control system to the standby system, allowing system control and data linking to be continued on the standby system. (Refer to Section 7.10.1.)

(b) Automatically issuing system switching request to the control system CPU

If failure of a network module mounted to the control system CPU of the redundant system or a data link error is detected, a system switching request will be automatically issued to the CPU. (Refer to Section 7.10.5.)

(c) Transient transmission to redundant system is available.

By transient transmission using special link instructions or GX Developer, device data can be read from or written to the host system, control/standby system, or system A/B in the redundant system, and remote RUN/STOP can be executed. (Refer to Section 7.4.5.)
When the redundant system is a target station, even if system switching occurs, the target can be followed by specifying the CPU type of the station to control or standby system.



1.3 Symbols Used in This Manual

(1) Symbols

Symbol	Name
MP	Control station
NS	Normal station (Station that can serve as a control station)

(2) Symbol format

□MP□−□□

Group number (1 to 32): G□
Station number (1 to 64)
Symbol
Network number (1 to 239)

[Example]

1) Network No. 3, control station, station number 6: 3MP6
2) Network No. 5, normal station, station number 3: 5NS3

(3) Generic terms and abbreviations for CPU modules

Generic terms and abbreviations for CPU modules	CPU model									
	Q00J Q00 Q01	Q02 Q02H Q06H Q12H Q25H	Q02PH Q06PH Q12PH Q25PH	Q12PRH Q25PRH	Q00UJ Q00U Q01U	Q02U Q03UD Q04UDH Q06UDH Q10UDH Q13UDH Q20UDH Q26UDH	Q03UDE Q04UDEH Q06UDEH Q10UDEH Q13UDEH Q20UDEH Q26UDEH Q50UDEH Q100UDEH	Q03UDV Q04UDV Q06UDV Q13UDV Q26UDV	QS001	Q06CCPU-V Q06CCPU-V-B Q12DCCPU-V Q24DHCCPU-V Q24DHCCPU-VG Q24DHCCPU-LS Q26DHCCPU-LS
Basic model QCPU	○	—								
High Performance model QCPU	—	○	—							
Process CPU	—		○	—						
Redundant CPU	—			○	—					
Universal model QCPU	—				○				—	
Safety CPU	—								○	—
C Controller module	—									○
Other than Redundant CPU	○			—	○					—
Other than Universal model QCPU	○				—				○	—
Other than Safety CPU	○								—	

2 SYSTEM CONFIGURATION

This chapter explains system configurations available with the MELSECNET/H.

2.1 MELSECNET/H Network Configurations

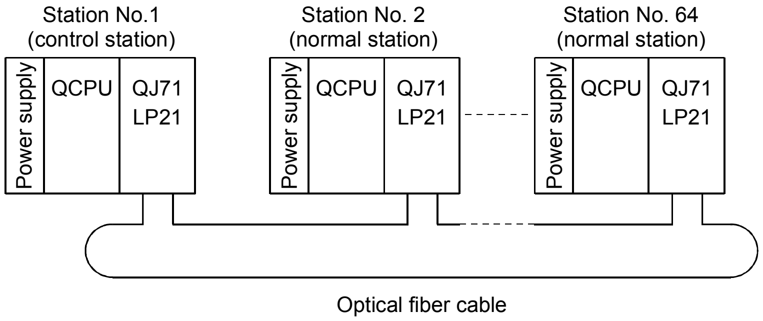
This section describes network configurations available with the MELSECNET/H.

2.1.1 Single network system

A single network system is the system where the control station and normal stations are connected with any of the following cables.
- Optical loop system: Optical fiber cable
- Coaxial bus system: Coaxial cable
- Twisted bus system: Shielded twisted pair cable or CC-Link Ver. 1.10-compatible cable.

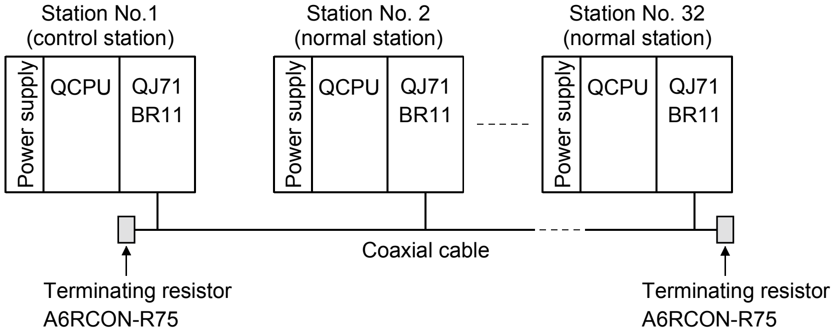
(1) Optical loop system

In the optical loop system, 1 control station and 63 normal stations (a total of 64 stations) can be connected.
Any station number can be assigned as the control station.
Note that only one station can be set as the control station per system.
In the following sample system, station number 1 is assigned as the control station.



(2) Coaxial bus system

In the coaxial bus system, 1 control station and 31 normal stations (a total of 32 stations) can be connected.
Any station number can be assigned as the control station.
Note that only 1 station can be assigned as the control station per system.

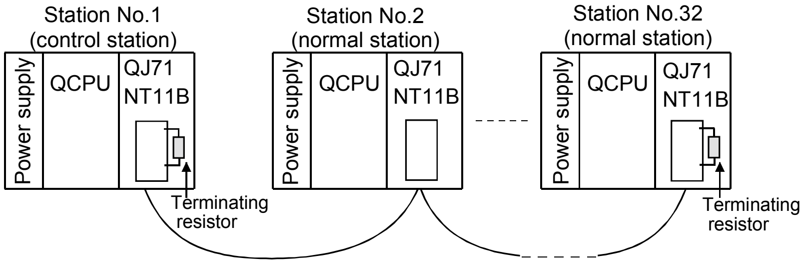


(3) Twisted bus system

In the twisted bus system, 1 control station and 31 normal stations (a total of 32 stations) can be connected.

Any station number can be assigned as the control station.

Note that, only 1 station can be assigned as the control station per system.



Twisted pair cable or CC-Link Ver.1.10-compatible cable

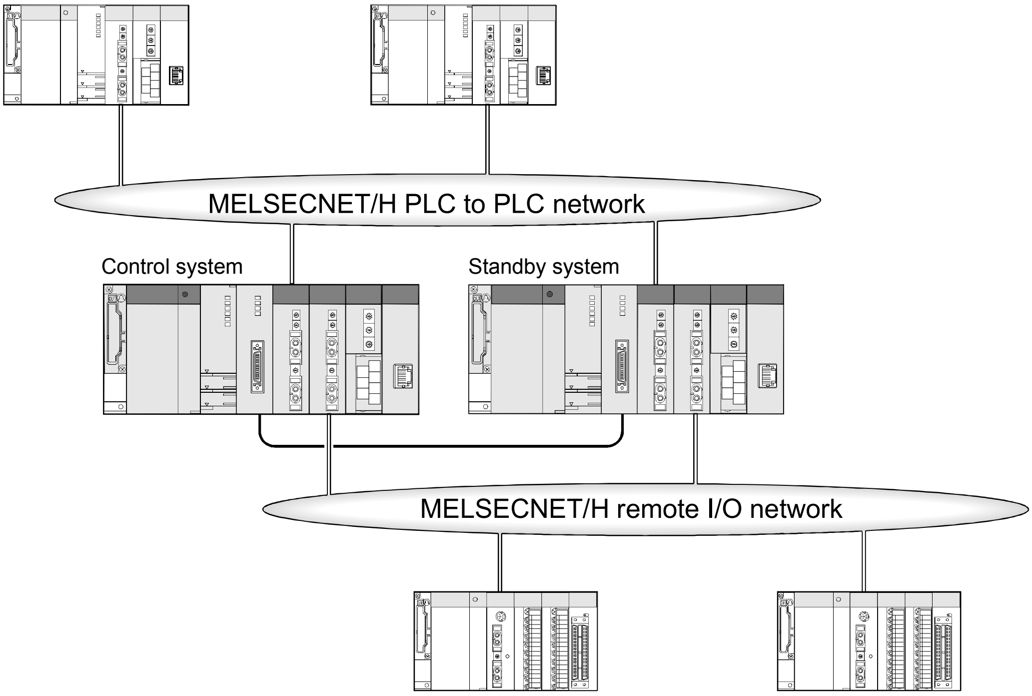
POINT
A safety CPU operates as a normal station. (It cannot be set to a control station.)

2.1.2 Redundant system (Redundant CPU)

The redundant system refers to a system where a system including a network module is dualized by connecting another network module to another redundant CPU (redundant system).

If failure of the control system CPU or a network module occurs, the redundant system switches the control system to the standby system, allowing system control and data linking to be continued on the standby system.

For details, refer to Section 7.10.1.

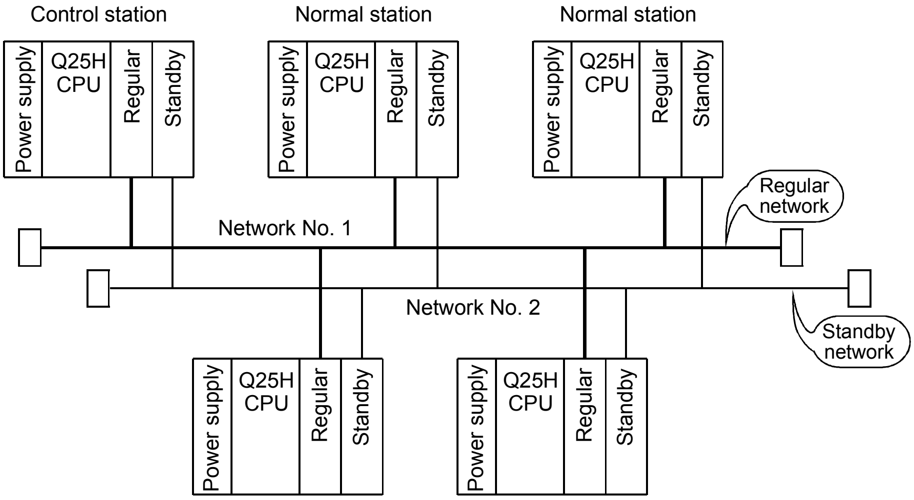


POINT

The QJ71NT11B does not support the Redundant CPU.

2.1.3 Simple dual-structured system (High Performance model QCPU and Process CPU)

In a simple dual-structured system, "regular" and "standby" network modules are installed in each CPU module, so that if the regular network is down, the data link can still be continued by switching to the standby network through link data refresh.
For details, refer to Section 7.7.



POINT

Simple dual-structured system cannot be configured with the Basic model QCPU, Redundant CPU, and Universal model QCPU. These CPUs are applicable for a single network system.

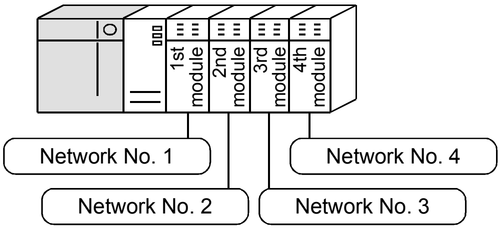
2.1.4 Multiple network system (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU)

(1) What is multiple network system

The multiple network system is a network system in which multiple networks are connected via relay stations.

(a) Duplicated setting of a network number is not allowed. The network number can be freely set within a range from 1 to 239 unless the same number is used two or more times in a system.

(b) A maximum of 4 network modules can be installed per programmable controller.
Note that there are restrictions on the number of modules that can be installed to each programmable controller, depending on the CPU module model. (Refer to the user's manual for the CPU module used.).

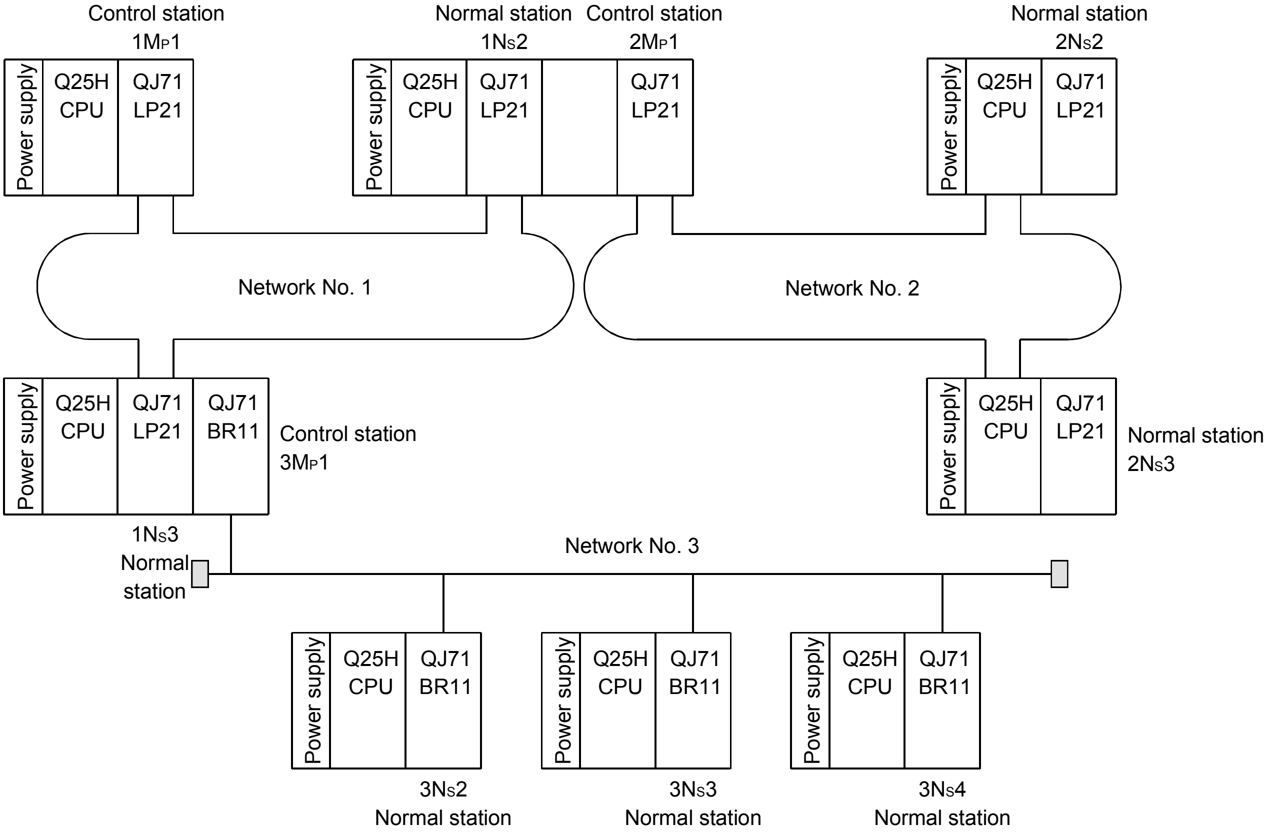


POINT

Only one network module can be mounted to the Basic model QCPU, Q00UJCPU, Q00UCPU, Q01UCPU, and safety CPU.
For this reason, these CPUs cannot be used as relay stations when configuring a multiple network system using the MELSECNET/H.

(2) Configuration

The following example shows how three networks can be connected.



2.2 Applicable Systems

This section describes the applicable systems.
No. of mountable modules is the maximum number of mountable network modules with CC-Link IE Controller Network.

(1) Applicable modules and base units, and number of mountable modules

(a) When mounted with a CPU module
Refer to the user's manual for the CPU module used.

Observe the following:

- Use the network module which satisfies the following conditions for the Redundant CPU.
  - Function version D or later
  - Network modules other than the QJ71NT11B
- Use the network module which satisfies the following conditions for the safety CPU.
  - Serial number (first five digits) "08102" or later
  - Function version D or later
  - Network modules other than the QJ71NT11B
- A shortage of the power capacity may result depending on the combination of mounted modules or the number of mounted modules. When mounting modules, consider the power capacity. If the power is insufficient, change the combination of modules.
- Mount modules so that the total number of I/O points does not exceed the point range of the CPU module. Modules can be mounted in any slot within the applicable range.

REMARKS

When mounted with a C Controller module, refer to the user's manual for the C Controller module used..

(b) When mounted on a MELSECNET/H remote I/O station
The network module cannot be mounted on a MELSECNET/H remote I/O station.
Mount it with a CPU module on the master station.

(c) When mounted on an RQ extension base unit
Refer to the MELSEC iQ-R Module Configuration Manual.

(2) Support of the multiple CPU system

Before using the network module in a multiple CPU system, refer to the QCPU User's Manual (Multiple CPU System).
To configure the MELSECNET/H with a multiple CPU system, use a network module of function version B or later.
For precautions for the use in a multiple CPU system, refer to Section 2.2.2.

(3) Compatible network modules

Available network types and systems vary depending on the function version of the network module.

(a) When optical loop system or coaxial bus system is used

		MELSECNET/H Extended mode	MELSECNET/H mode MELSECNET/10 mode
Basic model QCPU	Single CPU system	Function version D or later (Serial number (first five digits) "06092" or later)	Function version A or later
	Multiple CPU system		Function version B or later
High Performance model QCPU	Single CPU system		Function version A or later
	Multiple CPU system		Function version B or later
Process CPU	Single CPU system		Function version A or later
	Multiple CPU system		Function version B or later
Redundant CPU	Redundant system	Function version D or later (Serial number (first five digits) "06092" or later)	Function version D or later
Universal model QCPU	Single CPU system	Function version D or later (Serial number (first five digits) "06092" or later)	Function version A or later
	Multiple CPU system		Function version B or later
Safety CPU	Single CPU system	Function version D or later (Serial number (first five digits) "08102" or later)	

(b) When twisted bus system is used

		MELSECNET/H Extended mode	MELSECNET/H mode
Basic model QCPU	Single CPU system	From the first version	
	Multiple CPU system		
High Performance model QCPU	Single CPU system		
	Multiple CPU system		
Process CPU	Single CPU system		
	Multiple CPU system		
Redundant CPU	Redundant system	Not supported	
Universal model QCPU	Single CPU system	From the first version	
	Multiple CPU system		
Safety CPU	Single CPU system	Not supported	

(4) Compatible software packages (when using GX Developer)

The systems using network modules and compatible software packages are shown in the table below.

(a) When the optical loop system or coaxial bus system is used

		MELSECNET/H Extended mode	MELSECNET/H mode MELSECNET/10 mode
Q00J/Q00/Q01CPU	Single CPU system	Version 8.20W or later	Version 7 or later
	Multiple CPU system		Version 8 or later
Q02/Q02H/Q06H/ Q12H/Q25HCPU	Single CPU system		Version 4 or later
	Multiple CPU system		Version 6 or later
Q02PH/Q06PHCPU	Single CPU system	Version 8.68W or later	
	Multiple CPU system		
Q12PH/Q25PHCPU	Single CPU system	Version 8.20W or later	Version 7.10L or later
	Multiple CPU system		
Q12PRH/Q25PRHCPU	Redundant system	Version 8.29F or later	Version 8.18U or later
Q02U/Q03UD/Q04UDH/ Q06UDHCPU	Single CPU system	Version 8.48A or later	
	Multiple CPU system		
Q13UDH/ Q26UDHCPU	Single CPU system	Version 8.62Q or later	
	Multiple CPU system		
Q03UDE/Q04UDEH/ Q06UDEH/Q13UDEH/ Q26UDEHCPU	Single CPU system	Version 8.68W or later	
	Multiple CPU system		
Q00UJ/Q00U/Q01U/ Q10UDH/Q20UDH/ Q10UDEH/Q20UDEHCPU	Single CPU system	Version 8.78G or later	
	Multiple CPU system		
QS001CPU	Single CPU system	Version 8.40S or later	
CPU modules other than the above	Single CPU system	Not supported	
	Multiple CPU system		

(b) When the twisted bus system is used

		MELSECNET/H Extended mode	MELSECNET/H mode
Q00J/Q00/Q01CPU	Single CPU system	Version 8.78G or later	
	Multiple CPU system		
Q02/Q02H/Q06H/ Q12H/Q25HCPU	Single CPU system		
	Multiple CPU system		
Q02PH/Q06PH/ Q12PH/Q25PHCPU	Single CPU system		
	Multiple CPU system		
Q00UJ/Q00U/Q01U/Q02U/ Q03UD/Q04UDH/Q06UDH/ Q10UDH/Q13UDH/Q20UDH/ Q26UDH/Q03UDE/ Q04UDEH/Q06UDEH/ Q10UDEH/Q13UDEH/ Q20UDEH/Q26UDEHCPU	Single CPU system	Version 8.78G or later	
	Multiple CPU system		
CPU modules other than the above	Single CPU system	Not supported	
	Multiple CPU system		

(5) Compatible software packages (when using GX Works2)

For a system with a network module and GX Works2 version, refer to the following manual.

- GX Works2 Version 1 Operating Manual (Common)

2.2.1 Precautions when using link dedicated instructions

When accessing to other stations from MELSECNET/H network modules (who issue the request) with function version B or later upon link dedicated instructions, the handling methods are different depending on the module of the target station.
The handling methods for each module of the target station are explained below.

(1) Link dedicated instructions modified for function version B

The data length of the SEND, READ, SREAD, WRITE and SWRITE instructions is changed (480 words → 960 words.)

(a) When the target station is a network module

Request issued by	Target station				
	CC-Link IE Controller Network module	CC-Link IE Field Network module	MESLECNET/H network module		MESLECNET/10 network module
			Function version B or D	Function version A	
480 words or less	○	○	○	○	○
481 to 960 words	○	○	○	×*1	×

○: Processed normally
×: Ends abnormally. Error code returned to the request source.

*1: The SEND instruction ends abnormally. Error code returned to the request source.
The READ, SREAD, WRITE, and SWRITE instructions are processed normally.

(b) When the target station is a Q series Ethernet module

Request issued by	Target station (Q series Ethernet module)			
	Function version D		Function version B	Function version A
	07082 or later*3	07081 or earlier*3		
480 words or less	○	○	○	○
481 to 960 words	○	×*1	×*1	×*2

○: Processed normally
×: Ends abnormally. Error code returned to the request source.

*1: The SEND instruction ends abnormally. Error code returned to the request source.
The READ, SREAD, WRITE, and SWRITE instructions are processed normally.
*2: The operations for the SEND instruction are not normal. (Error support available F7C3$_H$)
The READ, SREAD, WRITE, and SWRITE instructions are processed normally.
*3: Serial number (first five digits)

(2) Instructions added for function version B

Request issued by	Target station				
	CC-Link IE Controller Network module	CC-Link IE Field Network module	MELSECNET/H network module	MELSECNET/10 network module	Q series Ethernet module
RRUN, RSTOP, RTMRD, RTMWR	○	×	○	×	○

○: Processed normally.
×: Ends abnormally. Error code returned to the request source.

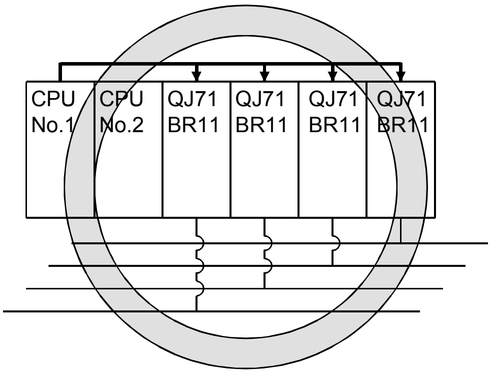
2.2.2 Precautions when using network modules in the multiple CPU system

Pay attention to the following points when configuring a MELSECNET/H network system with a multiple CPU system.

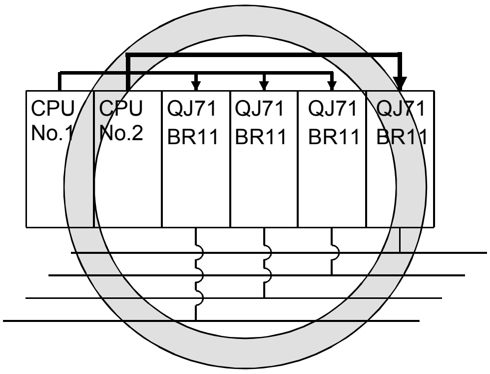
(1) Set the network parameters in the control CPU that controls the network modules.

(2) A maximum of four network modules can be set for each control CPU module. Note that a total of four network modules can be mounted in the multiple CPU system.

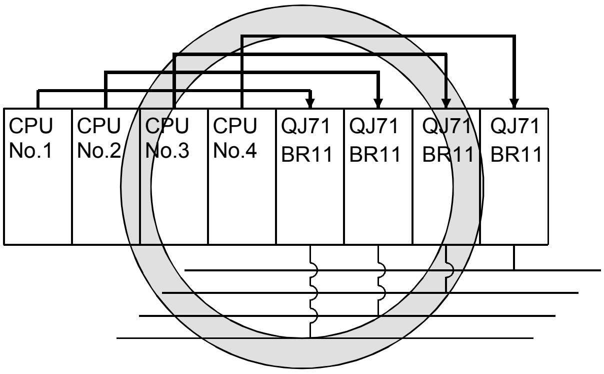
(a) CPU No.1 controls all network modules.



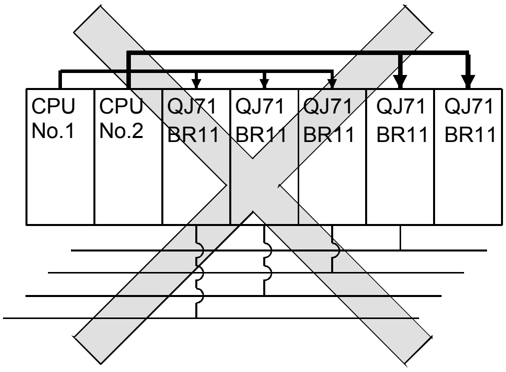
(b) CPU No.1 and CPU No.2 control network modules separately.



(c) CPU No.1 to CPU No.4 control each network module.



(d) Up to 4 network modules can be mounted on the system.



＊: The number of modules exceeded the limit.

(3) Precautions for execution of transient transmission

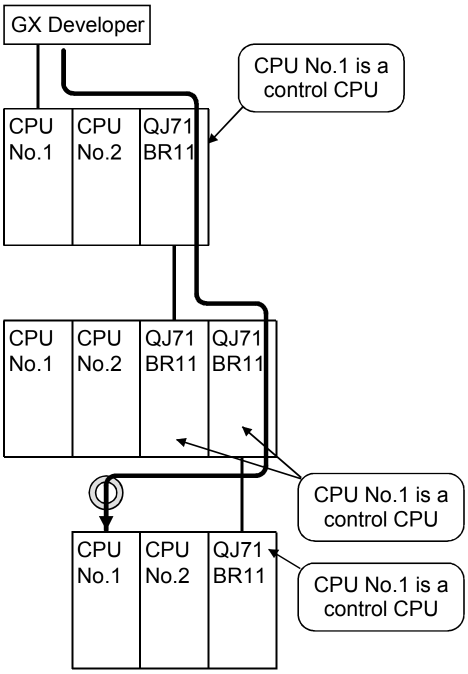
(a) Access range of GX Developer

When connecting GX Developer to a CPU module and accessing other stations, it is possible for GX Developer to access up to the 8 network systems whether the relay stations on the multiple CPU system are control or non-control CPUs.

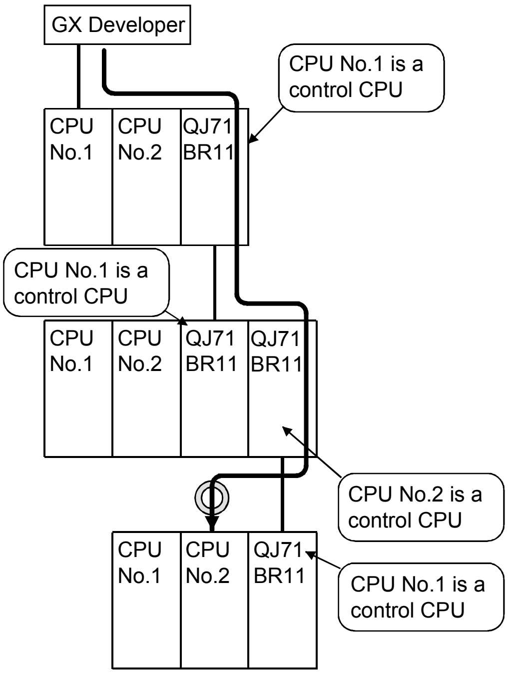
(Refer to 7.4.2 Routine Functions in section)

It is also possible for GX Developer to access either a control or non-control CPU if the target station is in a multiple CPU system.

1) Relaying is possible if the relay station's control CPU is the same



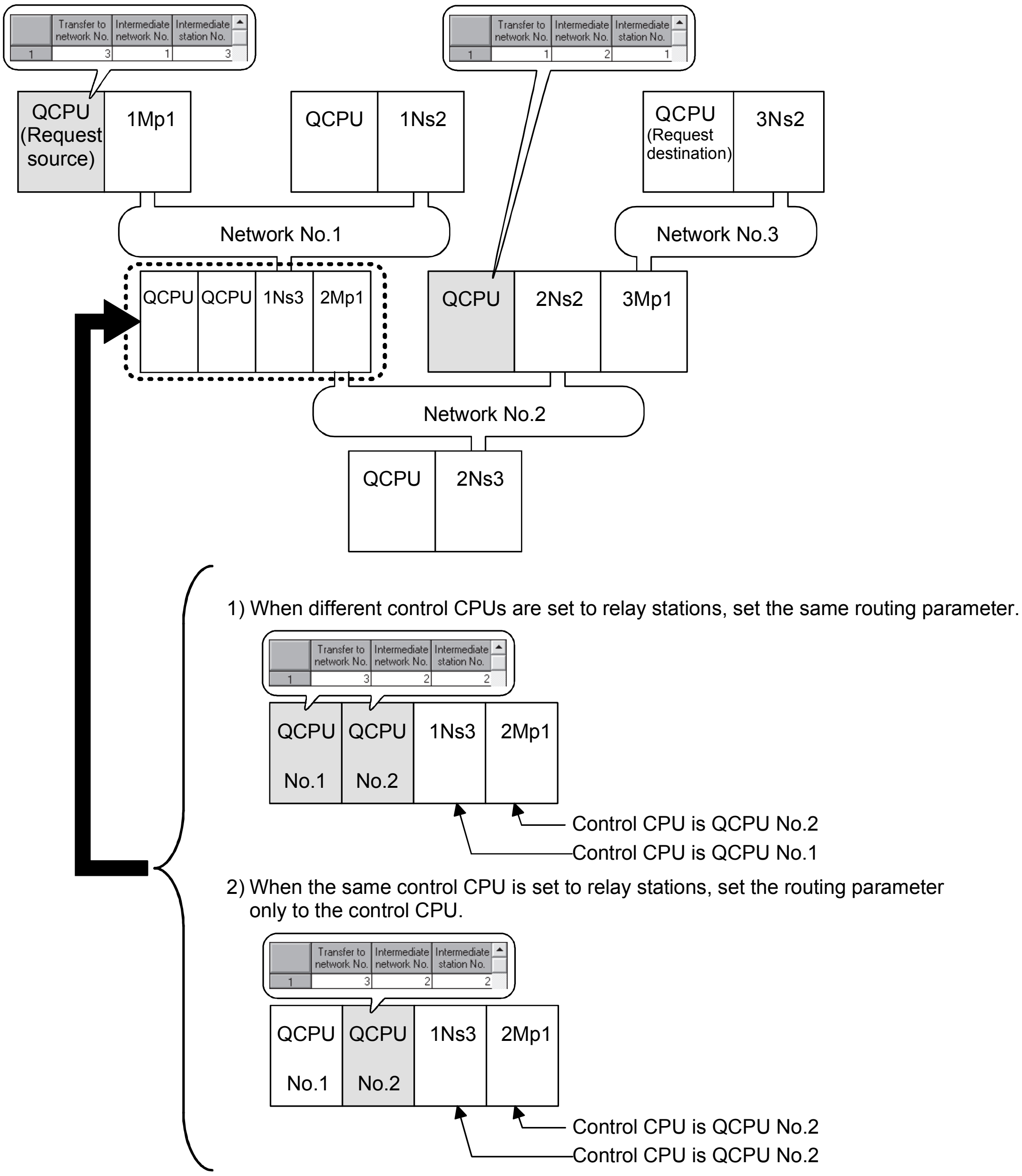
2) Relaying is also possible if the relay station's control CPU is different



(b) Setting routing parameters

If different control CPUs are set to relay stations, set the same routing parameter to each of the control CPUs.

The following illustration shows a setting example where transient data are transmitted from 1Mp1 to 3Ns2.



Routing parameter of the request source (1Mp1):

	Transfer to network No.	Intermediate network No.	Intermediate station No.
1	3	1	3

Routing parameter of the QCPU of 2Ns2/3Mp1:

	Transfer to network No.	Intermediate network No.	Intermediate station No.
1	1	2	1

1) When different control CPUs are set to relay stations, set the same routing parameter.

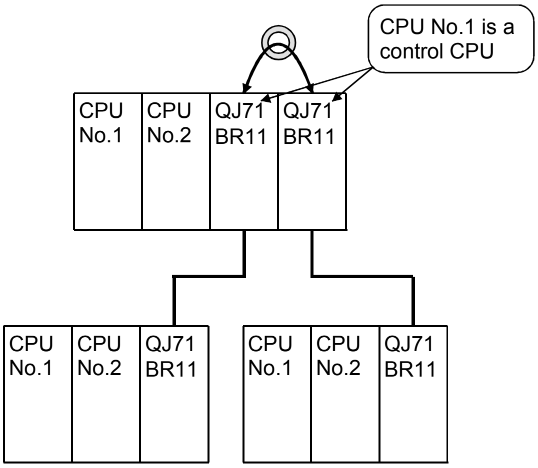
	Transfer to network No.	Intermediate network No.	Intermediate station No.
1	3	2	2

2) When the same control CPU is set to relay stations, set the routing parameter only to the control CPU.

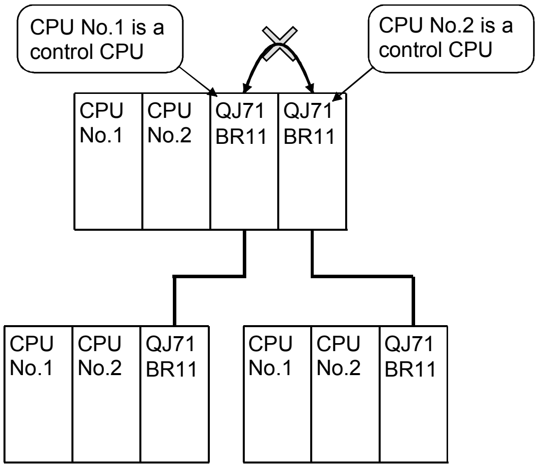
	Transfer to network No.	Intermediate network No.	Intermediate station No.
1	3	2	2

(4) Data cannot be transferred between data links with data link transmission parameters if the control CPUs of the network modules on the multiple CPU system are different.
To transfer data to another network, use the CPU shared memory.

(a) Transmission between data links possible



(b) Transmission between data links not possible



(5) Precautions for executing a link dedicated instruction to a multiple CPU system (Group specification, All stations)

If a WRITE/SWRITE, REQ, RRUN/RSTOP or RTMWR instruction is issued under the following conditions (a), it may not be executed on some stations depending on the system configuration (Control CPU setting) of the target multiple CPU system. (Refer to (b).)

(a) Execution conditions

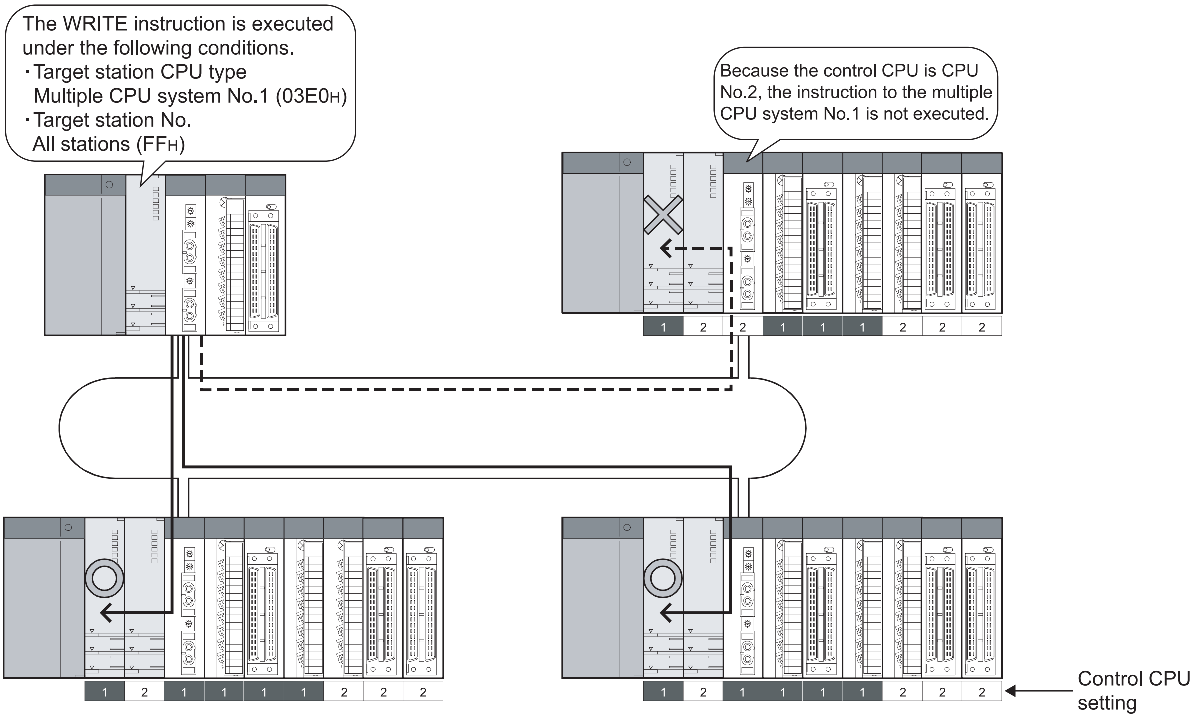
Item	Setting
Target station CPU type ((S1)+3) setting	Set the CPU type to any of the following. • Multiple CPU system No.1 (03E0$_H$) • Multiple CPU system No.2 (03E1$_H$) • Multiple CPU system No.3 (03E2$_H$) • Multiple CPU system No.4 (03E3$_H$)
Target station No. ((S1)+5) setting	Set the station No. of the target station to either of the following. • Group specification (81$_H$ to A0$_H$) • All stations (FF$_H$)

(b) Execution result

Target station No. ((S1)+5) setting	Target station CPU type ((S1)+3) setting	Execution result			
		Target station's control CPU is No.1	Target station's control CPU is No.2	Target station's control CPU is No.3	Target station's control CPU is No.4
Group specification (81$_H$ to A0$_H$) or All stations (FF$_H$)	Multiple CPU system No.1 (03E0$_H$)	○	×	×	×
	Multiple CPU system No.2 (03E1$_H$)	×	○	×	×
	Multiple CPU system No.3 (03E2$_H$)	×	×	○	×
	Multiple CPU system No.4 (03E3$_H$)	×	×	×	○

O : The instruction is executed.

X : The instruction is not executed. Error completion is not identified on the execution source.



(6) When all of the following conditions from a) to d) are met, use a MELSECNET/H module whose serial number (first five digits) is "10042" or later.

(a) A multiple CPU system containing a Built-in Ethernet port QCPU is configured.

(b) To the Ethernet port of the Built-in Ethernet port QCPU, GX Developer or GOT is connected.

(c) From GX Developer or GOT, access is made to another station through a MELSECNET/H module controlled by another CPU.

(d) The access target on another station is an A/QnA series CPU module.

2.2.3 List of functions for each CPU module

The available functions of the MELSECNET/H depend on the CPU module with which a network module is mounted.

1)High Performance model QCPU, Process CPU
2)Basic model QCPU
3)Redundant CPU
4)Universal model QCPU
5)Safety CPU

Function		CPU module					Reference section
		1)	2)	3)	4)	5)	
Cyclic transmission function		○	○	○	○	○	Section 3.2.1
	MELSECNET/H Extended mode	○	○	○	○	○	Section 5.1
	Refresh parameter	○	○*1	○	○	○*1	Section 5.7
	Common parameter	○	○*2	○	○	○*2	Section 5.3
	Station inherent parameter	○	×	○	○	×	Section 5.6
	Inter-link data transfer function	○	×	○	○*5*8	×	Section 7.2
	Designation of I/O master station	○	○	○	○	○	Section 5.3.3
	Designation of reserved station	○	○	○	○	○	Section 5.3.4
	Low-speed cyclic transmission function	○	×	○	○*5*8	×	Section 7.3
	Redundant system function	×	×	○	×	×	Section 7.10
Transient transmission function		○	○	○	○	○	Section 7.4
	Routing function	○	○*1	○	○	○*1	Section 7.4.2
	Group function	○	○	○	○	○	Section 7.4.3
	Message sending function using logical channel numbers	○	○	○	○	×	Section 7.4.4
	Link dedicated instruction	○	○*3	○	○	○*3*6	Section 7.4.5
RAS function		○	○	○	○	○	Section 3.2.2
	Automatic return function	○	○	○	○	○	Section 3.2.2
	Control station shift function	○	○	○	○	○	Section 3.2.2
	Control station return control function	○	○	○	○	×	Section 3.2.2
	Loopback function	○	○	○	○	○	Section 3.2.2
	Station detach function	○	○	○	○	○	Section 3.2.2
	Transient transmission possible even in case of CPU error	○	○	○	○	○	Section 3.2.2
	Confirmation of transient transmission error detection time	○	○	○	○	○	Section 3.2.2
	Module diagnosis	○	○	○	○	○	Section 3.2.2
	Network test	○	○*7	○	○*5	○*7	Section 7.8
	Network diagnosis	○	○	○	○	○	Section 8.1
Direct accessing of link device		○	○	○	○	×	Section 7.1
Clock setting to a station on the network by GX Developer		○	○	○	○	○	Section 7.4.6
Getting the interrupt sequence program started		○	○*4	○	○	×	Section 7.5
Multiplexed transmission function		○	○	○	○	○	Section 7.6
Simplified redundant setting of network		○	×	×	×	×	Section 7.7
Increasing the number of send points by connecting multiple modules of the same network number		○	×	○	○	×	Section 7.9

○: Available, ×: Unavailable

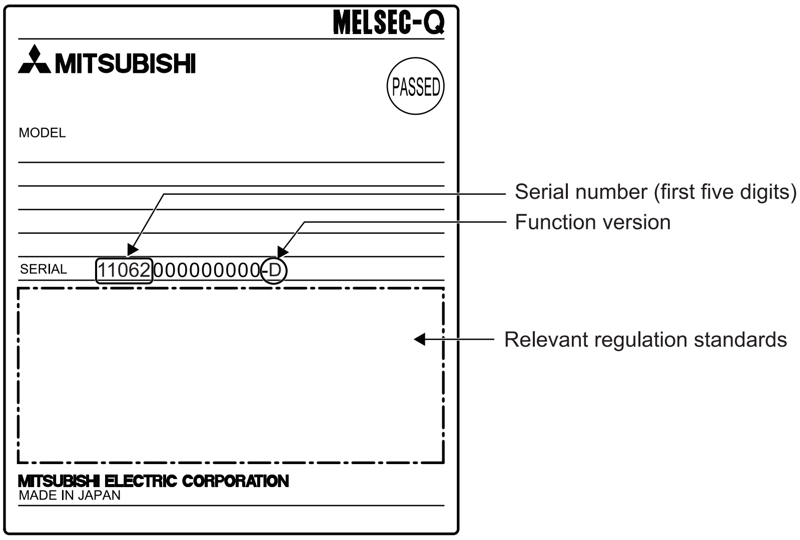
*1: Up to 8 modules can be set.
*2: The low-speed LB/LW cannot be set because these models do not support the low-speed cyclic transmission function.
*3: The SREAD/SWRITE instruction's read/write notice device (D3) becomes invalid. (The same operation as the READ/WRITE instructions takes place.)
*4: It is available for the Basic model QCPU of function version B or later.
*5: Available for the Universal model QCPU whose serial No. (first 5 digits) is "09042" or later.
*6: For link dedicated instructions for the safety CPU, refer to Section 6.3.
*7: Basic model QCPU and safety CPU cannot execute a network test on a sequence program.
*8: Applicable to the Universal model QCPU excluding the Q00UJCPU, Q00UCPU, and Q01UCPU.

2.3 Checking Serial Number and Function Version

The serial number and function version of the network module can be checked on the rating plate, front of the module, or system monitor window in GX Developer.

(1) Checking on the rating plate

The rating plate is located on the side of the network module.

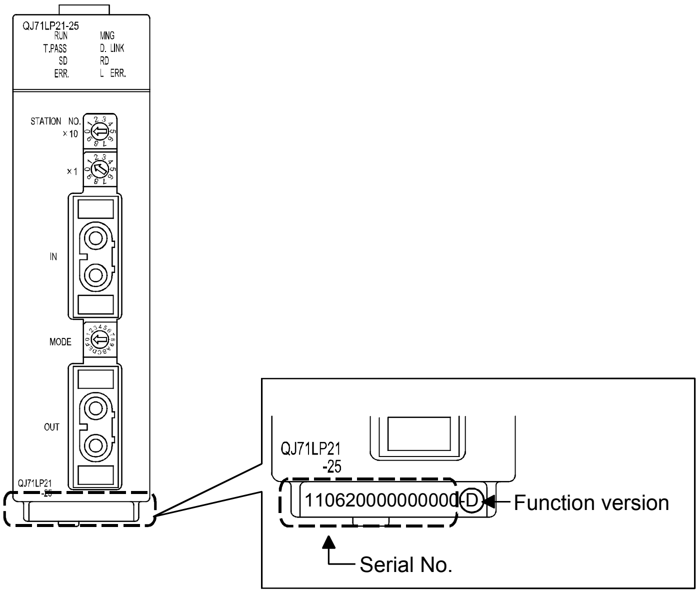


(2) Checking on the front of the module

The serial number and function version on the rating plate is printed on the front (at the bottom) of the module.

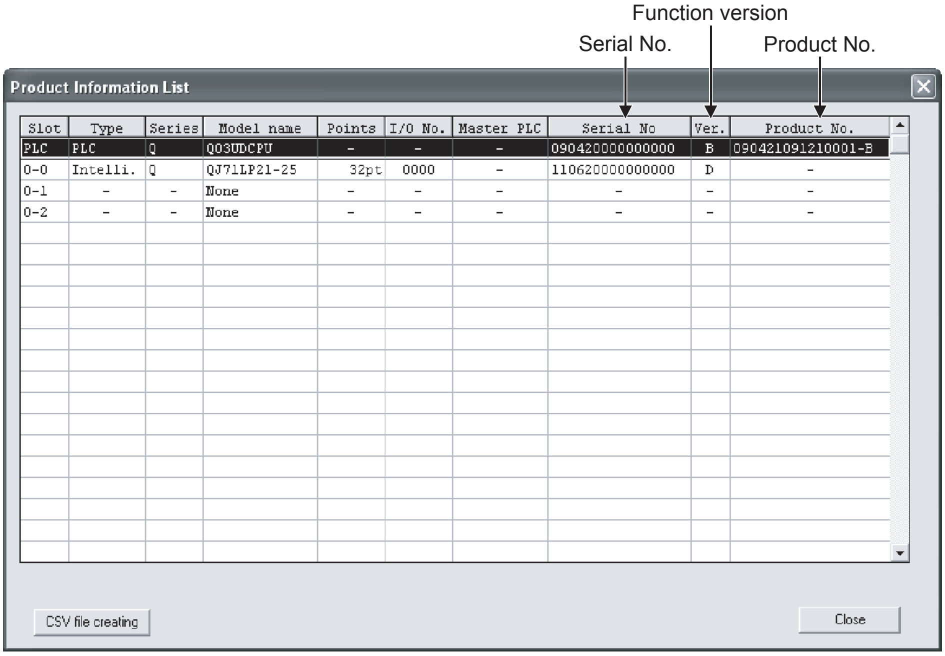
The following network module is not included.

- QJ71LP21



(3) Checking on the System Monitor screen (Product Information List)

To display the system monitor, select [Diagnostics] → [System monitor] → Product Inf. List button of GX Developer.



Slot	Type	Series	Model name	Points	I/O No.	Master PLC	Serial No	Ver.	Product No.
PLC	PLC	Q	Q03UDCPU	-	-	-	090420000000000	B	090421091210001-B
0-0	Intelli.	Q	QJ71LP21-25	32pt	0000	-	110620000000000	D	-
0-1	-	-	None	-	-	-	-	-	-
0-2	-	-	None	-	-	-	-	-	-

(a) Production number display

Since the network module does not support the production number display, "-" is displayed.

POINT

The serial number displayed on the Product Information List screen of GX Developer may differ from that on the rating plate or on the front of the module.

- The serial number on the rating plate or on the front of the module indicates the management information of the product.
- The serial number displayed on the Product Information List screen indicates the functional information of the product.
  The functional information of the product will be updated when a function is added.

3 SPECIFICATIONS

This chapter explains the performance specifications and function specifications of the network modules as well as the specifications of the send/receive processing time of the link data.
For details of the general specifications, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

3.1 Performance Specifications

3.1.1 Performance specifications

The following table lists the performance specifications of the network modules.

(1) Performance specifications of the optical loop system

Item		Optical loop system				
		QJ71LP21	QJ71LP21-25	QJ71LP21S-25	QJ71LP21G	QJ71LP21GE
Maximum number of link points per network	LX/LY	8192 points				
	LB	16384 points (8192 points in the MELSECNET/10 mode)				
	LW	16384 points (8192 points in the MELSECNET/10 mode)				
Maximum number of link points per station *1		{(LY + LB) / 8 + (2 × LW)} ≦ 2000 bytes	• MELSECNET/H mode, MELSECNET/10 mode {(LY + LB) / 8 + (2 × LW)} ≦ 2000 bytes • MELSECNET/H Extended mode {(LY + LB) / 8 + (2 × LW)} ≦ 35840 bytes			
Communication speed		10 Mbps	25 Mbps/10 Mbps (Change with mode setting switch)		10 Mbps	
Number of stations per network		Up to 64 stations (1 control station, 63 normal stations)				
Connection cable		Optical fiber cable (obtained by user)*2				
Applicable connector		Two-core optical connector plug (obtained by user) F06/F08 or equivalent (JIS C5975/5977 compliant)				
Overall distance		30km				
Distance between stations*2	During 25Mbps	—	SI optical cables: 200m H-PCF optical cables: 400m Broad-band H-PCF Optical Cables: 1km QSI optical cables: 1km		—	
	During 10Mbps	SI optical cables: 500m H-PCF optical cables: 1km Broad-band H-PCF optical cables: 1km QSI optical cables: 1km			GI-50/125 optical cables: 2km	GI-62.5/125 optical cables: 2km
Maximum number of networks		239 (total including remote I/O networks)				
Maximum number of groups		32 (9 in the MELSECNET/10 mode)				
Transmission path format		Duplex loop				
Communication method		Token ring				
Synchronous method		Frame synchronous				
Encoding method		NRZI code (Non Return to Zero Inverted)				
Transmission format		Conforms to HDLC (frame type)				
Error control system		Retries based on CRC ($X^{16} + X^{12} + X^5 + 1$) and timeover				
RAS function		• Loopback function upon abnormal detection and cable breakage (optical loop system only) • Diagnostic function of host link line check • Prevention of system down by switching the control station • Abnormal detection using link special relays and link special registers				
Transient transmission		• N:N communication (monitor, program upload/download, etc.) • Various send/receive instructions from sequence programs (ZNRD/ZNWR, SEND/RECV, RECVS, READ/WRITE, SREAD/SWRITE, REQ, RRUN/RSTOP, RTMRD/RTMWR.) • Send function addressed to logical channel number of channel numbers 1 to 8				
Special cyclic transmission function		• Low-speed cyclic transmission function				
Number of occupied I/O points		32 points (I/O assignment: intelli.; 32 points)		48 (I/O assignment: Empty; first 16, intelli.; last 32)*3	32 points (I/O assignment: intelli.; 32 points)	
External Power Supply	Voltage	—		20.4 to 31.2 V DC	—	
	Current	—		0.20 A	—	
	Size of terminal screw	—		M3 Screw	—	
	Suitable crimp terminal	—		R1.25-3	—	
	Suitable cable size	—		0.3 to 1.25 mm^2	—	
	Tightening torque	—		0.42 to 0.58 N·m	—	
	Allowable momentary power failure time	—		1ms (Level PS1)	—	

Item		Optical loop system				
		QJ71LP21	QJ71LP21-25	QJ71LP21S-25	QJ71LP21G	QJ71LP21GE
External Power Supply	Noise immunity	—		By noise simulator of 500Vp-p noise voltage, 1µs noise width, and 25 to 60Hz noise frequency	—	
Internal current consumption (5VDC)		0.55 A				
External dimensions	H	98mm		98mm	98mm	
	W	27.4mm		55.2mm	27.4mm	
	D	90mm		90mm	90mm	
Weight		0.11 kg		0.20kg	0.11kg	

✻1 The number of LY points of the stations set in the I/O master station is the sum total of the LY points for output to all stations within the block.

✻2 For old optical fiber cables (A-2P-☐), L type differs from H type in the distance between stations. Refer to Section 4.6.1 for details.

✻3 Two slots are occupied.
Set the numeric value resulted from adding 10_H to the I/O No. of the slot where a module mounted as the "Starting I/O No." of the "Network parameter".
The first empty 16 points can be set to "0" on the "I/O assignment" tab screen within the "Q Parameter" screen.
Example: Set 10_H as the "Starting I/O No." when the module is mounted on slot 0.
(Set 0_H as the "Starting I/O No." when 0 has been set to slot 0 on the "I/O assignment" tab screen.)

(2) Performance specifications of the coaxial bus system

Item		Coaxial bus system	
		QJ71BR11	
Maximum number of link points per network	LX/LY	8192 points	
	LB	16384 points (8192 points in the MELSECNET/10 mode)	
	LW	16384 points (8192 points in the MELSECNET/10 mode)	
Maximum number of link points per station *1		• MELSECNET/H mode, MELSECNET/10 mode {(LY + LB) / 8 + (2 × LW)} ≦ 2000 bytes • MELSECNET/H Extended mode {(LY + LB) / 8 + (2 × LW)} ≦ 35840 bytes	
Communication speed		10 Mbps	
Number of stations per network		Up to 32 stations (1 control station, 31 normal stations)	
Connection cable		Coaxial cable (obtained by user)	
Applicable connector		Connector plug for 3C-2V Connector plug for 5C-2V Connector plug for 5C-FB (obtained by user)	
Overall distance for one network		3C-2V	300m *2
		5C-2V	500m *2
		5C-FB	500m *2
		Can be extended up to 2.5km with the use of a repeater unit (A6BR10, A6BR10-DC.)	
Maximum number of networks		239 (total including remote I/O networks)	
Maximum number of groups		32 (9 in the MELSECNET/10 mode)	
Transmission path format		Single bus	
Communication method		Token bus	
Synchronous method		Frame synchronous	
Encoding method		Manchester code	
Transmission format		Conforms to HDLC (frame type)	
Error control system		Retries based on CRC ($X^{16} + X^{12} + X^5 + 1$) and timeover	
RAS function		• Diagnostic function of host link line check • Prevention of system down by switching the control station • Abnormal detection using link special relays and link special registers	
Transient transmission		• N:N communication (monitor, program upload/download, etc.) • Various send/receive instructions from sequence programs (ZNRD/ZNWR, SEND/RECV, RECVS, READ/WRITE, SREAD/SWRITE, REQ, RRUN/RSTOP, RTMRD/RTMWR.) • Send function addressed to logical channel number of channel numbers 1 to 8	
Special cyclic transmission function		• Low-speed cyclic transmission function	
Number of occupied I/O points		32 points (I/O assignment: intelli.; 32 points)	
Internal current consumption (5V DC)		0.75A	
External dimensions	H	98mm	
	W	27.4mm	
	D	90mm	
Weight		0.11kg	

*1 The number of LY points of the stations set in the I/O master station is the sum total of the LY points for output to all stations within the block.

*2 Some restrictions are applied to the cable length between stations depending on the number of stations connected. Refer to section 4.6.2 for details.

(3) Performance specifications of the twisted bus system

<table>
<tr><th colspan="2" rowspan="2">Item</th><th>Twisted bus system</th></tr>
<tr><th>QJ71NT11B</th></tr>
<tr><td rowspan="3">Maximum number of link points per network</td><td>LX/LY</td><td>8192 points</td></tr>
<tr><td>LB</td><td>16384 points</td></tr>
<tr><td>LW</td><td>16384 points</td></tr>
<tr><td colspan="2">Maximum number of link points per station ＊1</td><td>• MELSECNET/H mode
{(LY + LB) / 8 + (2 × LW)} ≤ 2000 bytes
• MELSECNET/H Extended mode
{(LY + LB) / 8 + (2 × LW)} ≤ 35840 bytes</td></tr>
<tr><td colspan="2">Communication speed</td><td>156kbps/312kbps/625kbps/1.25Mbps/2.5Mbps/5Mbps/10Mbps (Switched by network parameters)</td></tr>
<tr><td colspan="2">Number of stations per network</td><td>Up to 32 stations (1 control station, 31 normal stations)</td></tr>
<tr><td colspan="2">Connection cable</td><td>Shielded twisted pair cable or CC-Link Ver.1.10-compatible cable</td></tr>
<tr><td colspan="2">Overall distance for one network</td><td>
<table>
<tr><th>Communication speed</th><th>Shielded twisted pair cable</th><th>CC-Link Ver.1.10-compatible cable</th></tr>
<tr><td>156kbps＊2</td><td>1200m</td><td>1200m</td></tr>
<tr><td>312kbps</td><td>600m</td><td>900m</td></tr>
<tr><td>625kbps</td><td>400m</td><td>600m</td></tr>
<tr><td>1.25Mbps</td><td>200m</td><td>400m</td></tr>
<tr><td>2.5Mbps</td><td rowspan="3">—
(Not applicable)</td><td>200m</td></tr>
<tr><td>5Mbps</td><td>150m</td></tr>
<tr><td>10Mbps</td><td>100m</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Maximum number of networks</td><td>239</td></tr>
<tr><td colspan="2">Maximum number of groups</td><td>32</td></tr>
<tr><td colspan="2">Transmission path format</td><td>Bus (RS-485)</td></tr>
<tr><td colspan="2">Communication method</td><td>Token bus</td></tr>
<tr><td colspan="2">Synchronous method</td><td>Frame synchronous</td></tr>
<tr><td colspan="2">Encoding method</td><td>Manchester code</td></tr>
<tr><td colspan="2">Transmission format</td><td>Conforms to HDLC (frame type)</td></tr>
<tr><td colspan="2">Error control system</td><td>Retries based on CRC ($X^{16} + X^{12} + X^5 + 1$) and timeover</td></tr>
<tr><td colspan="2">RAS function</td><td>• Diagnostic function of host link line check
• Prevention of system down by switching the control station
• Abnormal detection using link special relays and link special registers</td></tr>
<tr><td colspan="2">Transient transmission</td><td>• N:N communication (monitor, program upload/download, etc.)
• Various send/receive instructions from sequence programs (ZNRD/ZNWR, SEND/RECV, RECVS, READ/WRITE, SREAD/SWRITE, REQ, RRUN/RSTOP, RTMRD/RTMWR.)
• Send function addressed to logical channel number of channel numbers 1 to 8</td></tr>
<tr><td colspan="2">Special cyclic transmission function</td><td>• Low-speed cyclic transmission function</td></tr>
<tr><td colspan="2">Number of occupied I/O points</td><td>32 points (I/O assignment: intelli.; 32 points)</td></tr>
<tr><td colspan="2">Internal current consumption (5V DC)</td><td>0.6A</td></tr>
<tr><td rowspan="3">External dimensions</td><td>H</td><td>98mm</td></tr>
<tr><td>W</td><td>27.4mm</td></tr>
<tr><td>D</td><td>90mm</td></tr>
<tr><td colspan="2">Weight</td><td>0.13kg</td></tr>
</table>

＊1 The number of LY points of the stations set in the I/O master station is the sum total of the LY points for output to all stations within the block.

＊2 This value is set as default of the communication speed.

3.1.2 Optical fiber cable specifications

This section explains the specifications of the optical fiber cables used with the MELSECNET/H optical loop system.
Details of the cable specifications must be checked for each cable used.
A technical skill and a special tool are needed when connecting an optical fiber cable to an exclusive connector.
Optical fiber cables with connectors are available from Mitsubishi Electric System & Service Co. Ltd. (Catalogs of the optical fiber cables are also available.)
For cabling, consult your local Mitsubishi Electric System & Service representative.

Item		SI (Multi-particulate glass)	H-PCF (Plastic-clad)	Broad-band H-PCF (Plastic-clad)	QSI (Quartz glass)	GI-50/125 (Quartz glass)	GI-62.5/125 (Quartz glass)
Distance between stations	10 Mbps	500m	1 km	1 km	1 km	2 km	2 km
	25 Mbps	200m	400m	1 km	1 km	Must not be used	Must not be used
Transmission loss		12 dB/km	6 dB/km	5 dB/km	5.5 dB/km	3 dB/km	3 dB/km
Core diameter		200 µm	200 µm	200 µm	185 µm	50 µm	62.5 µm
Clad diameter		220 µm	250 µm	250 µm	230 µm	125 µm	125 µm
Primary membrane		250 µm	—	—	250 µm	—	—
Applicable connector		F06/F08 or equivalent (JIS C5975/5977 compliant)					

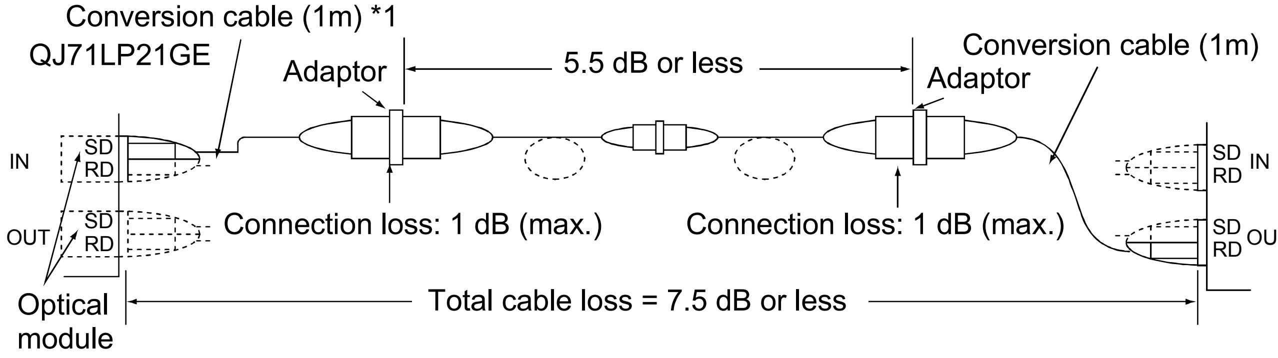
REMARKS

The following types of optical fiber cables are available.

A type	: Cable for connection inside control panel
B type	: Cable for connection between control panels inside a building
C type	: Cable for outdoor connection
DL type	: Reinforced cable for outdoor connection

For other special-purpose cables such as flexible cables or heat-resistant cables, contact Mitsubishi Electric System & Service Co., Ltd.

(1) Cable loss of GI-62.5/125 optical fiber cable



＊1: Conversion cable

Conversion Type	Cable
CA type ↔ FC type	AGE-1P-CA/FC1.5M-A
CA type ↔ ST type	AGE-1P-CA/ST1.5M-A
CA type ↔ SMA type	AGE-1P-CA/SMA1.5M-A

Purchased from: Mitsubishi Electric Europe GmbH

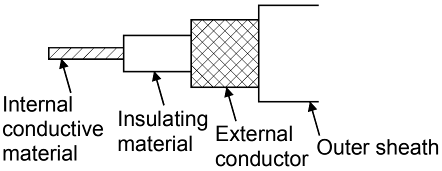
3.1.3 Coaxial cable specifications

The following table lists the specifications of the coaxial cables used for the coaxial bus system.

Use the following high frequency coaxial cables:
- 3C-2V (JIS C 3501 compliant)
- 5C-2V (JIS C 3501 compliant)
- 5C-FB (JIS C 3502 compliant)

(1) Coaxial cable specifications

The following table indicates the specifications of the coaxial cable.
Select coaxial cables that meet the operating ambient temperature (0 to 55℃) shown in the general specifications of the programmable controller.

Item	3C-2V	5C-2V	5C-FB
Structure			
Cable diameter	5.4 mm (0.21 inches)	7.4 mm (0.29 inches)	7.7 mm (0.3 inches)
Minimum allowable bend radius	23 mm (0.91 inches) or more	30 mm (1.18 inches) or more	30 mm (1.18 inches) or more
Internal conductor diameter	0.5 mm (0.02 inches) (annealed copper wire)	0.8 mm (0.03 inches) (annealed copper wire)	1.05 mm (0.04 inches) (annealed copper wire)
Insulating material diameter	3.1 mm (0.12 inches) (polyethylene)	4.9 mm (0.19 inches) (polyethylene)	5.0 mm (0.19 inches) (polyethylene)
External conductor diameter	3.8 mm (0.15 inches) (single annealed copper wire mesh)	5.6 mm (0.22 inches) (single annealed copper wire mesh)	5.7 mm (0.22 inches) (aluminum foil tape and annealed copper wire mesh)
Applicable connector plug	3C-2V connector plug The following connector plugs are recommended: • BNC-P-3-NiCAu[*1] (Manufactured by DDK Ltd.) • BCP-C3B[*2] (Manufactured by Canare Electric Co., Ltd.)	5C-2V connector plug The following connector plugs are recommended: • BNC-P-5-NiCAu[*1] (Manufactured by DDK Ltd.) • BCP-C5B[*2] (Manufactured by Canare Electric Co., Ltd.)	5C-FB connector plug BCP-C5FA[*2] (manufactured by Canare Electric Co., Ltd.) is recommended.

＊1: This connector plug is a soldering-type connector plug.
＊2: This connector plug is a crimping-type connector plug.

REMARKS

To order or for inquiries regarding connector plugs and coaxial cables, contact your local Mitsubishi representative.

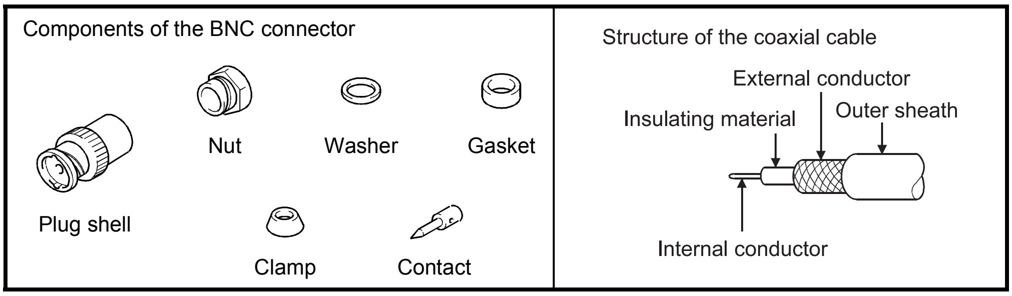
(2) Connecting the coaxial cable connectors

The following section explains how to connect the BNC connector (the connector plug for the coaxial cable) to the cable.

(a) Using a BNC connector manufactured by DDK Ltd.
The following explains how to connect the BNC-P-3-NiCAu or BNC-P-5-NiCAu to the cable.

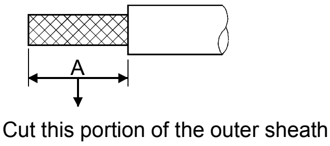
⚠CAUTION
- Correctly solder coaxial cable connectors. Incorrect soldering may result in malfunction.

- Structure of the BNC connector and coaxial cable



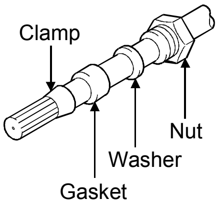
- How to connect the BNC connector and the coaxial cable

1) Cut the portion of the outer sheath of the coaxial cable as shown in the figure below.

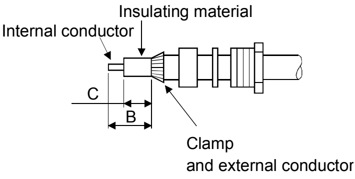


Cable	A
3C-2V	15mm (0.59 inches)
5C-2V, 5C-2V-CCY	10mm (0.39 inches)

2) Fit the nut, washer, gasket, and clamp onto the coaxial cable, as shown below, and then loosen the external conductor.

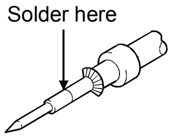


3) Cut the external conductor, insulating material and internal conductor to the dimensions shown below. Note that the external conductor must be cut to the same dimension as the tapered section of the clamp and smoothed down to the clamp.

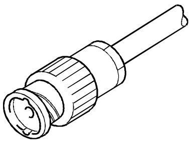


Cable	B	C
3C-2V	6mm (0.24 inches)	3mm (0.12 inches)
5C-2V, 5C-2V-CCY	7mm (0.28 inches)	5mm (0.20 inches)

4) Solder the contact to the internal conductor.



5) Insert the connector assembly shown in (4) into the plug shell and screw the nut into the plug shell.



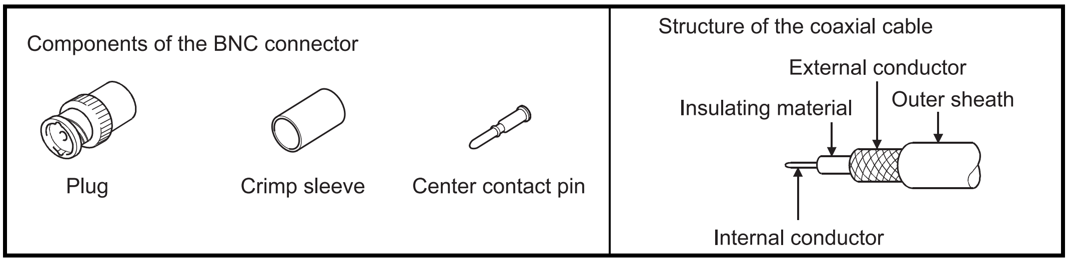
POINT

(1) Note the following precautions when soldering the internal conductor and contact.
    - Make sure that the solder does not bead up at the soldered section.
    - Make sure there are no gaps between the connector and cable insulator or they do not cut into each other.
    - Perform soldering quickly so the insulation material does not become deformed.

(2) Before connecting or disconnecting the coaxial connector, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may result in a module malfunction.

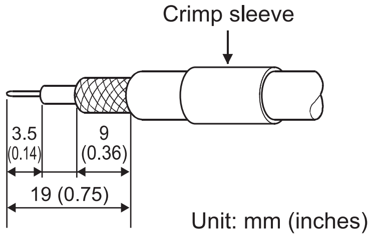
(b) Using a BNC connector manufactured by Canare Electric Co., Ltd.
The following explains how to connect the BCP-C3B, BCP-C5B, or BCP-C5FA to the cable.

- Structure of the BNC connector and coaxial cable

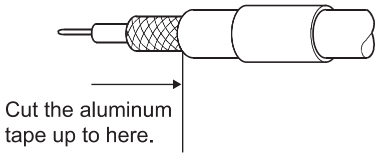


- How to connect the BNC connector and the coaxial cable

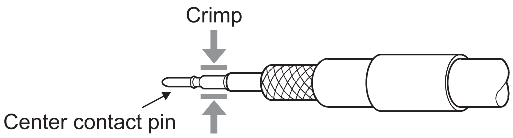
1) Thread a coaxial cable through a crimping sleeve as shown in the figure below.
When using a cable with aluminum tape, cut the tape as shown in the figure below.



When cutting the tape, make a clean cut, without leaving any stray pieces or loose strands. Failure to do so may cause a short circuit or result in an improper crimp.



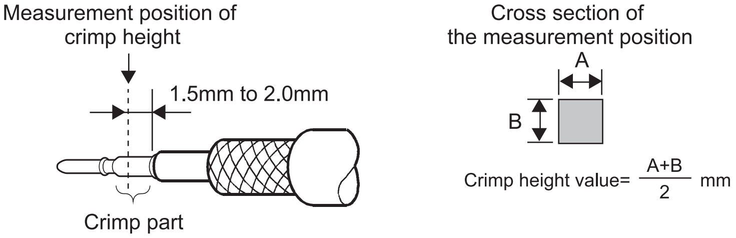
2) Insert a center contact pin into the internal conductor. Crimp the pin using a crimp tool to seal the gap between the center contact pin and the insulating material.



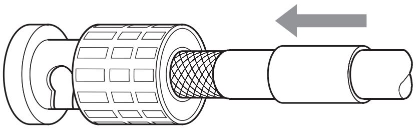
POINT

(1) Use a crimp tool specified for a BNC connector.
(2) Do not crimp the junction of the insulating material and the center contact pin.
(3) Horizontally insert the center contact pin into the insulating material and crimp the pin. If the pin is on the tilt, straight it.

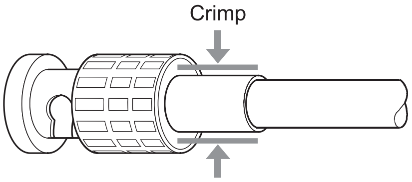
3) After the crimp, check the crimp height of the crimp part. When the crimp height at the measurement position is between 1.4mm and 1.5mm, the pin is properly crimped.
If the crimp height is not between 1.4mm and 1.5mm, adjust the crimp tool and crimp the center contact pin again.



4) Hold the root of the coaxial cable and fully insert the cable into a plug.
After inserting the cable, pull it lightly to check that the center contact pin is fixed.
Move the crimp sleeve until it contacts with the plug.



5) Crimp the crimp sleeve using the crimp tool with attention paid to the orientations of the crimp tool and connector.
Do not pull the cable when crimping the sleeve.



POINT

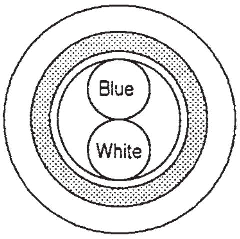
Before connecting or disconnecting the coaxial connector, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may result in a module malfunction.

3.1.4 Shielded twisted pair cable specifications

The following shows the specifications of a shielded twisted pair cable used in the twisted bus system.
Shielded twisted pair cables that satisfy the following specifications can also be used even not introduced.

(1) Shielded twisted pair cable specifications

The following table lists the shielded twisted pair cable specifications.

Item	KNPEV-SB 0.5SQ×1P＊1
Cross section	
Cable	Shielded twisted pair cable
Core	2-core
Conductor resistance (20°C)	39.4Ω/km or less
Insulation resistance (20°C)	10000MΩ•km or more
Dielectric withstand voltage V-min	1000VAC 1 minute
Capacitance (1KHz)	70nF/km or less on average
Characteristic impedance (100KHz)	110±10Ω

＊1: Applicable only when the communication speed is 1.25Mbps or less.

(2) Connection of shielded twisted pair cables and terminals

This section explains connecting method of terminal and cable.

(a) Applicable solderless terminals and crimping tools

Product name	Model	Manufacturer	Remarks
Solderless terminal	FA-VTC125T9	For inquiries and orders, please contact your local Mitsubishi Electric Engineering Co., Ltd representative.	0.3 to 1.65mm^2
Tool dedicated for solderless terminal	FA-NH65A		—
Solderless terminal	TE0.5-10	For inquiries and orders, please contact your local NICHIFU TERMINAL MFG. Co., Ltd representative.	0.3 to 0.5mm^2
Tool dedicated for solderless terminal	NH-79		—
Solderless terminal	AI0.5-10WH	For inquiries and orders, please contact your local Phoenix Contact representative.	0.5mm^2
Tool dedicated for solderless terminal	CRIMPFOX UD6		—
	CRIMPFOX UD6-4		＊1
	CRIMPFOX UD6-6		＊1
	CRIMPFOX ZA3		—

＊1: If a shielded or FG wire is crimped to a solderless terminal using the CRIMPFOX UD6-4 or CRIMPFOX UD6-6, the wire may not be connected to the terminal block depending on the condition of cross section of the solderless terminal after crimping.

(b) Stripping the cable end

Use an appropriate tool to crimp the solderless terminal. (Refer to (a) in this section)
For details of the crimping method, refer to the manuals for the solderless terminal or crimping tool used.
In the example, a crimping tool "FA-VTC125T9" manufactured by Mitsubishi is used.

1) Strip the cable jacket by 5.5mm to 6.5mm.
2) Place the terminal in the correct place (in the end) of the locator.
3) Insert the terminal until it reaches to the locator.
4) Insert the stripped cable into the terminal and crimp it.

3.1.5 CC-Link Ver. 1.10-compatible cable specifications

(1) CC-Link Ver. 1.10-compatible cables for the twisted bus system

The following CC-Link Ver. 1.10-compatible cables can be used.

Product name	Model	Manufacturer
CC-Link Ver. 1.10-compatible cable	FANC-110SBH	Mitsubishi Electric System & Service Co., Ltd.
	FA-CBL200PSBH	Mitsubishi Electric Engineering Co., Ltd.

(2) Connection of a solderless terminal to the Version 1.10 compatible CC-Link dedicated cable

For connection method of a solderless terminal and the cable, refer to Section 3.1.4 (2).

REMARKS

For details, refer to the CC-Link cable wiring manual issued by CC-Link Partner Association.

3.2 Function Specifications

This section describes the functions of the MELSECNET/H.
The list of functions is shown below:

Basic functions	Cyclic transmission function (Periodical communication)	Communication using LB/LW	Section 3.2.1 (1)
		Communication using LX/LY	Section 3.2.1 (2)
	RAS function	Automatic return function	Section 3.2.2 (1)
		Control station switch function	Section 3.2.2 (2)
		Control station return control function	Section 3.2.2 (3)
		Loopback function (optical loop system)	Section 3.2.2 (4)
		Prevention of station failure by using external power supply (Optical loop system)	Section 3.2.2 (5)
		Station detach function (coaxial bus system and twisted bus system)	Section 3.2.2 (6)
		Transient transmission enabled even at CPU module error	Section 3.2.2 (7)
		Checking transient transmission abnormal detection time	Section 3.2.2 (8)
		Diagnostic function	Section 3.2.2 (9)
Application functions	Direct access to link devices		Section 7.1
	Cyclic transmission function (Periodical communication)	Inter-link data transfer function	Section 7.2
		Low-speed cyclic transmission	Section 7.3
	Transient transmission function (Non-periodical communication)	Communication function	Section 7.4.1
		Routing function	Section 7.4.2
		Group function	Section 7.4.3
		Message transmission function using logical channel numbers	Section 7.4.4
		Data sending/receiving (SEND/RECV)	Section 7.4.5 (1)
		Other station word device read/write (READ/SREAD/WRITE/SWRITE)	Section 7.4.5 (2)
		Other station transient request (REQ)	Section 7.4.5 (3)
		Other station word device read/write (ZNRD/ZNWR)	Section 7.4.5 (4)
		Remote RUN/Remote STOP (RRUN/RSTOP)	Section 7.4.5 (5)
		Reading and writing other station CPU module's clock data (RTMRD/RTMWR)	Section 7.4.5 (6)
	Clock setting to stations on a network using GX Developer		Section 7.4.6
	Starting interrupt sequence program	Message receiving "1 scan completion" (RECVS)	Section 7.5
	Multiplex transmission function (optical loop system)		Section 7.6
	Simple dual-structured network		Section 7.7
	Stopping/restarting of cyclic transmission and stopping link refresh (network test)		Section 7.8
	Increasing number of send points by installing multiple modules with the same network number		Section 7.9
	Redundant system function	Pairing setting	Section 7.10.3
		Redundant settings	Section 7.10.4
		System switching request function	Section 7.10.5
	Network diagnostic (network monitor)		Section 8.1

3.2.1 Cyclic transmission function (periodical communication)

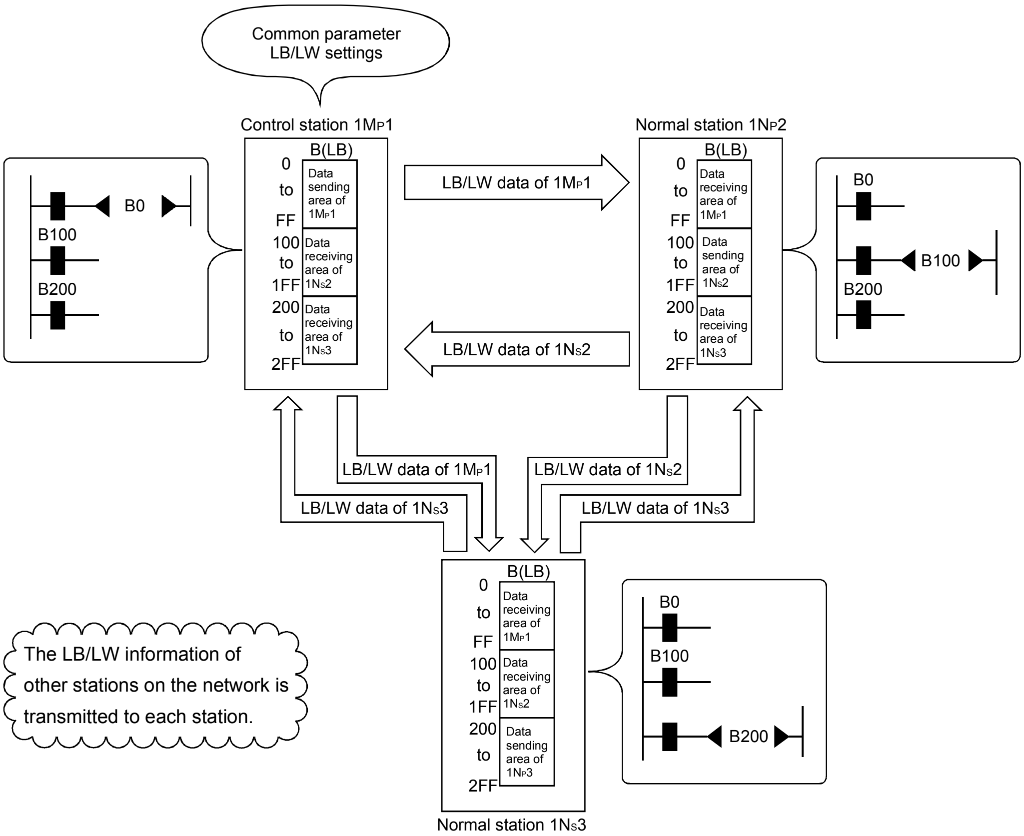
The cyclic transmission function periodically allows data communication between stations on the same network using the link devices (LB/LW/LX/LY).
In this manual, the devices on the network module side are prefixed by "L" so that devices on the CPU module side (B/W/X/Y) and the link devices on the network module side can be distinguished.

(1) Communication using LB/LW

By using this function, it is possible to write data to the link relay (LB) and link register (LW) of the network module and to send the data to all the stations connected within the same network.

(a) Available device range
Assign the link devices (LB/LW) in the network within the valid range for writing data of each station on the common parameter LB/LW setting screen of the control station. In addition, the actual device range may be set with the refresh parameters or the station inherent parameters for each station.

(b) Data communication
The link relay (LB) can send and receive the on/off information and the link register (LW) can send and receive 16-bit data.
For example, in a network consisting of a control station and two normal stations, when B0 of the control station turns on, the B0 contacts of the two normal stations turn on. At this point, the station inherent parameters have not been set.



(2) Communication using LX/LY

This function allows 1:1 communication between the I/O master station that controls LX/LY and other stations (maximum of 63 stations in the optical loop system and maximum of 31 stations in the coaxial bus system and twisted bus system).

(a) Available device range

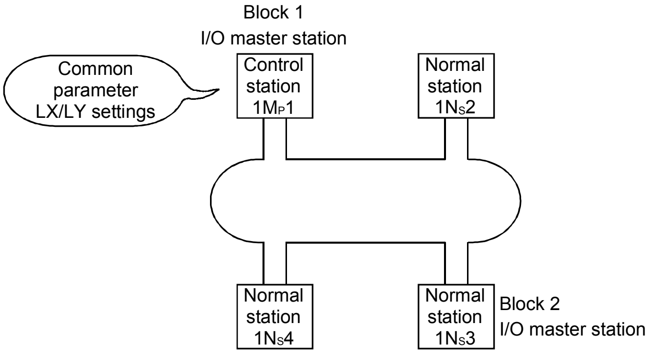
Data communication is performed using the input (X) and output (Y) after the actual I/O of the host.

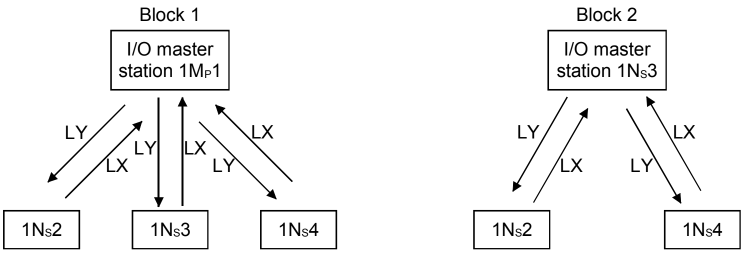
For the assignments of the link devices (LX/LY) in the network, the I/O master station and the valid range for writing data for each station are set on the common parameter LX/LY setting screens (two screens) of the control station. The actually available device ranges can also be set for each station with refresh parameters. Up to two stations in a network may be set as the I/O master stations.

(b) Data communication

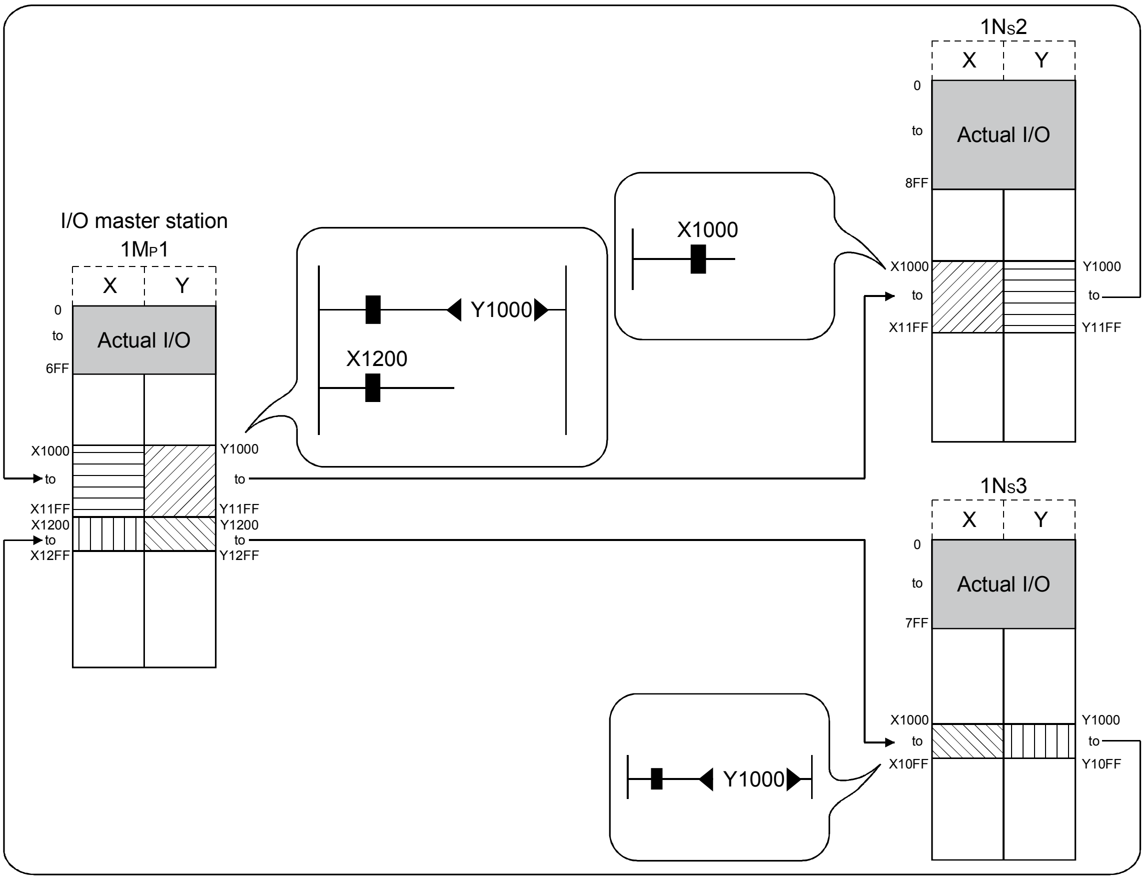
The link input (LX) can send/receive the input information of each station in the block and the link output (LY) can send/receive the output information of the I/O master station.

For example, in a network consisting of a control station and three normal stations, the on/off status can be controlled using the input/output devices between each station and the I/O master station in each block, as shown below.





The following figure shows an example of the LX/LY communication assignments between the 1MP1 station (I/O master station) and the 1NS2 and 1NS3 stations. When the 1MP1 station turns on Y1000, X1000 of the 1NS2 station turns on. Also, when the 1NS3 station turns on Y1000, X1200 of the 1MP1 station turns on.



POINT

1) Any station can be set as an I/O master station regardless of whether the station is a control or normal station.
2) The range in which the X/Y signals are set for the LX/LY communication is the device range starting from the end of the actual I/O of the host (X/Y1000 or thereafter is recommended). Assign these device ranges so that they do not overlap in the following situations:
   - When using multiple network modules (CC-Link IE Controller Network, CC-Link IE Field Network, MELSECNET/H, CC-Link, etc.)
   - When setting two I/O master stations.

3.2.2 RAS function

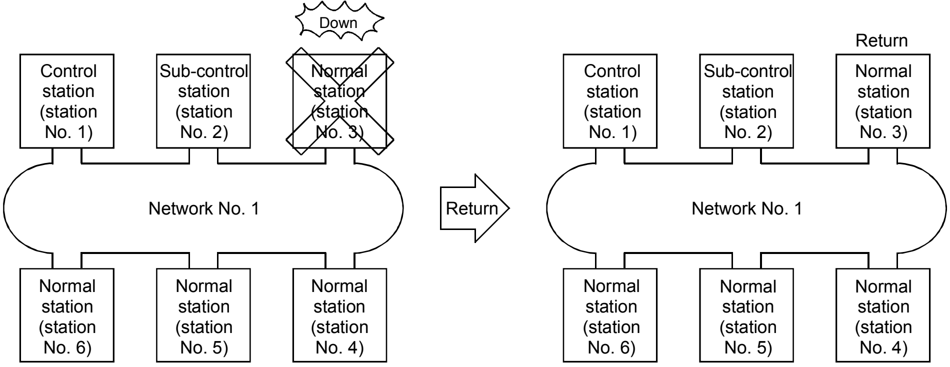
The RAS as in the RAS function stands for Reliability, Availability and Serviceability and refers to the overall ease of use of the automated equipment.

(1) Automatic return function

When a station disconnected from a network due to a data link error recovers from the error, the station is automatically reconnected to the network and restarts data link.

1) The normal station No. 3 is disconnected due to a data link error.

2) The station No. 3 recovers to the normal status and returns to the system.

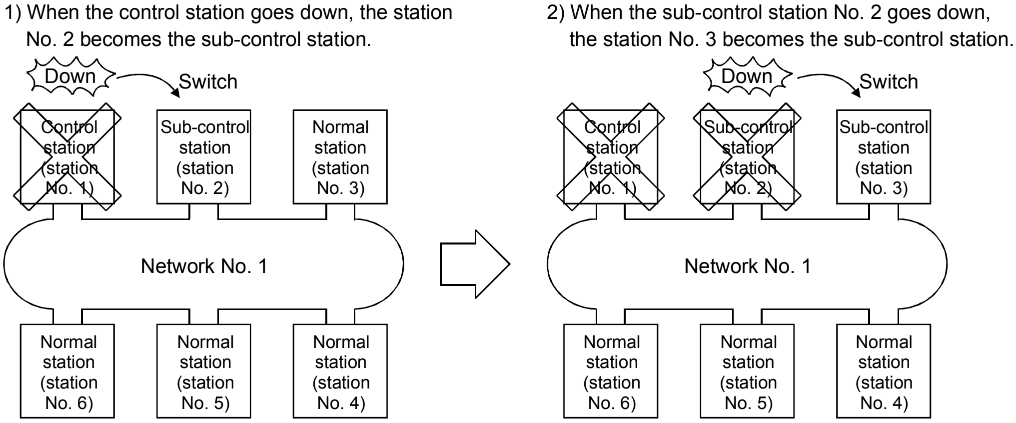


POINT

There is a limit to the number of faulty stations that can return to the system within one link scan. For details, refer to Section 5.4, "Supplementary Settings."

(2) Control station switch function

By using this function, if the control station (the station for which the common parameters have been set) goes down, another normal station becomes the sub-control station to continue the data link.



(a) When switching the control station, whether to continue the cyclic transmission or not can be selected from sub-control station.

- Common parameter supplementary setting: "Data link by sub-control station when control station is down." is available. (For more details, refer to Section 5.4, "Supplementary Settings.")

	Selection of function	Operation during control station switching	
		Cyclic transmission	Transient transmission
1	Select	○	○
2	Do not select	×	○

○: Continued, ×: Stopped

(b) When the control station is switched, the data link stops temporarily. During the data link pause, data immediately before the stop is maintained.

(c) During the data link pause, all the stations except the host are treated as faulty stations.

REMARKS

1) The control station does not switch even if the cyclic transmission of the control station is stopped with GX Developer (Refer to Section 7.8).
2) Any of the normal stations whose cyclic transmission is stopped with GX Developer can be a control station.

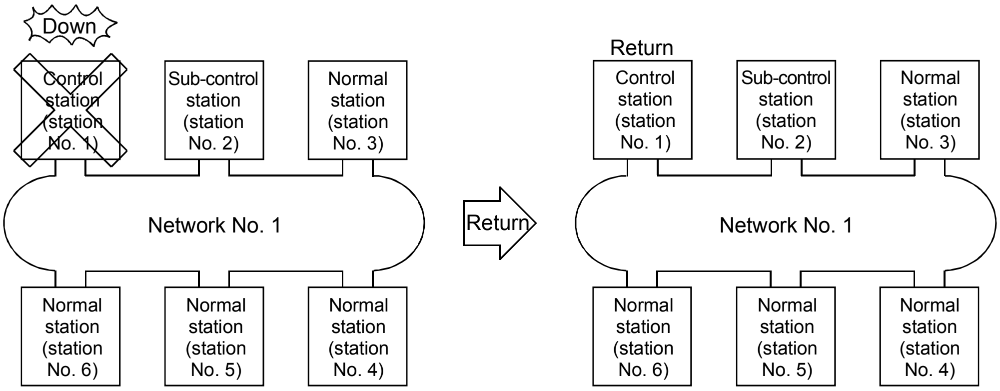
(3) Control station return control function

The network stop time can be eliminated by correcting the errors that caused the control station to go down and making it return to the network as a normal station.
How the control station returns to the network can be selected by the network settings.
For details of the network setting, refer to Section 5.5, "Control Station Return Setting."
For the control station return control function in the redundant system, refer to Section 7.10.6.

	Selection of function	Control station after returning
1	Return as the control station	The control station returns as the control station of the network.
2	Return as a normal station	The control station returns to the network again as a normal station, making the operating sub-control station the new control station of the network. It can become the control station again only by returning to the network when all other stations have gone down.

1) When the control station is down, the station No. 2 becomes the sub-control station.

2) The network does not stop since the control station returns to the network as a normal station.



REMARKS

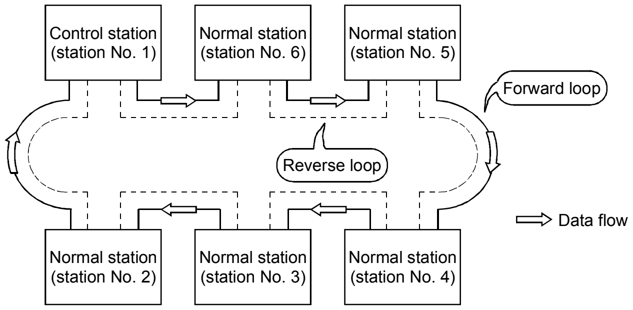
- When "Return as the control station" is selected, the network stop time becomes longer because the baton pass is stopped, but the common parameters can be changed only by resetting the CPU of the control station.
- If "Return as a normal station" is selected, the network does not stop because the control station returns to the network without stopping the baton pass. However, it is necessary to reset the CPUs of all the stations after changing the common parameters of the control station while the network is operating. If only the CPU of the control station is reset, a parameter mismatch error is detected in the control station and it is disconnected from the network.

(4) Loopback function (optical loop system)

In the optical loop system, the transmission path is dual-structured. When an error occurs in a transmission path, the faulty area is disconnected by switching the transmission path from the forward loop to the reverse loop or from the reverse loop to the forward loop, or performing a loopback. The transmission is continued normally between the stations that are still able to perform data communication.

(a) When normal

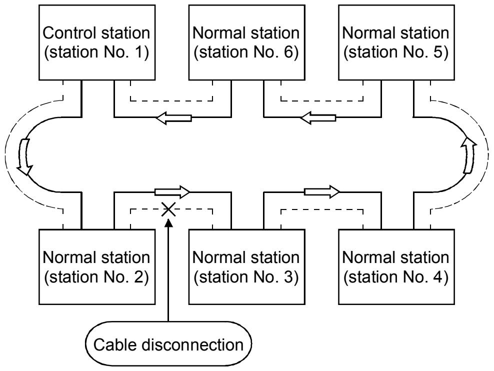
The data link is performed using the forward loop (or the reverse loop).



(b) When abnormal

1) Error in the forward loop (reverse loop)

The data link continues using the reverse loop (forward loop).

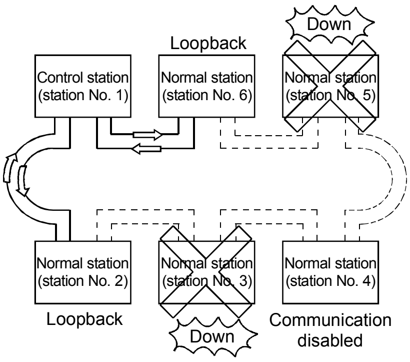


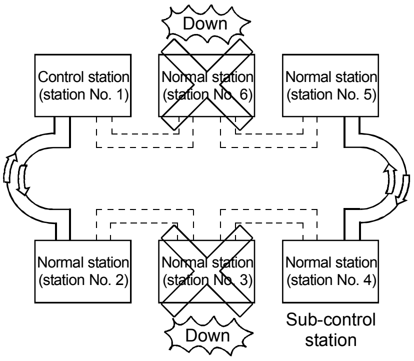
2) When some of the stations are down

The data link continues excluding the stations that are down.

When two or more stations are down, the data link cannot be performed with the station located between the stations that are down.

However, when there are two or more stations between the stations that are down, the normal station with younger station number becomes the sub-control station to continue the data link.





(c) Precautions in using the optical loop system

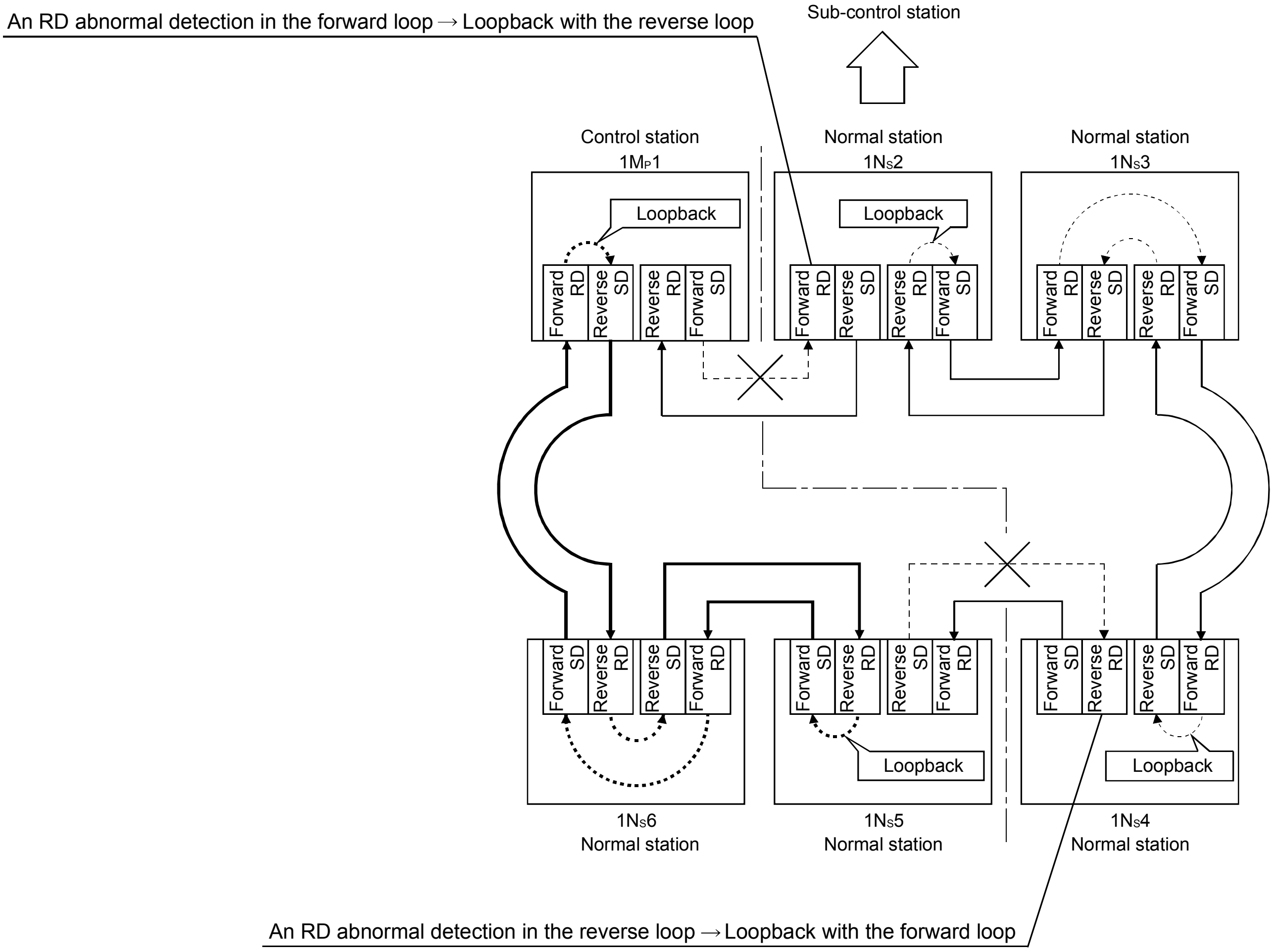
1) When the cable is inserted or removed, the line (forward loop/reverse loop) may be switched, but the data link will be performed normally.

2) When the loopback is being executed due to a cable disconnection, both the forward and reverse loops may be recognized as normal depending on the condition of the cable disconnection.
Whether the forward/reverse loop is normal/abnormal is determined by the status of "RD" (receive) of the loopback station.

(Example)
In the cases described below, the data link continue by dividing the network into two loops: "1MP1-1NS5-1NS6" and "1NS2-1NS3-1NS4."

<Loop containing 1MP1-1NS5-1NS6>
1MP1: Forward loop normal/reverse loop normal
1NS5: Forward loop normal/reverse loop normal
1NS6: Forward loop normal/reverse loop normal
} Forward loop normal
} Reverse loop normal

<Loop containing 1NS2-1NS3-1NS4>
1NS2: Forward loop "RD" abnormal/reverse loop normal
1NS3: Forward loop normal/reverse loop normal
1NS4: Forward loop normal/reverse loop "RD" abnormal
} Forward loop abnormal
} Reverse loop abnormal



REMARKS

If the network module has become faulty, a loopback may not be made depending on the fault. In this case, the data link may become deactivated. Identify the faulty network module in the following method.

(1) Check the LED indications (RUN LED off, ERR. LED on) of all network modules for a faulty station.

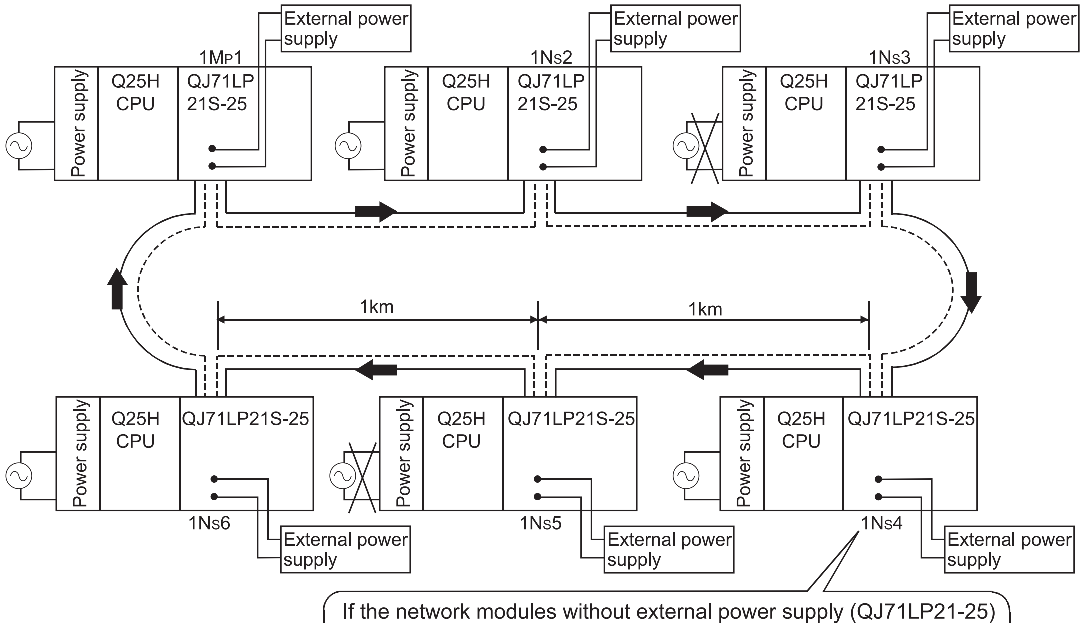
(2) Turn off the power to all stations, then turn it on in order from the control station. In this process, check to which station of the network loopback is properly executed.
Confirm in the Link information of the Network diagnostics (Host information) screen that the control station and the normal station returned to the network is displayed as loopback stations. (Refer to Section 8.1.1.)

Replace any network module in which malfunction has been detected, and confirm that the data link is properly recovered.

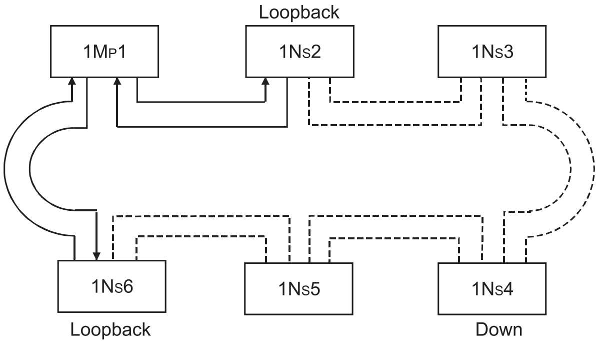
(5) Prevention of station failure by using external power supply (Optical loop system)

Direct power supply (24 V DC) from outside to network modules will prevent the loopback operation. Because of this, station(s) placed between faulty stations will not go down when more than one station go down, (The QJ71LP21S-25 is the network module where power can be supplied from outside.)

Even if the distance between normally operating stations (1Ns2 and 1Ns4, 1Ns4 and 1Ns6) is 1 km or more, normal data link will be available



If the network modules without external power supply (QJ71LP21-25) are placed in 1Ns3 and 1Ns5, stations between them will go down.



(a) Precautions for operation

If the external power supply of the network module is powered on while the CPU module power supply is off, the network module will not normally operate.

Power on the CPU module and the external power supply then start system operations.

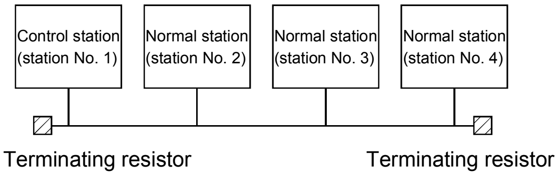
REMARKS

Even if the CPU module on the control station is powered off, the control station will not shift to a normal station because the network module operates normally.

(6) Station detach function (coaxial bus system and twisted bus system)

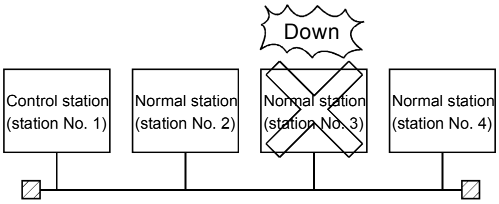
In the coaxial bus system and twisted bus system, even if the power to a connected station is turned off, the data link continues between other stations which are still able to perform data communication.

(a) When normal



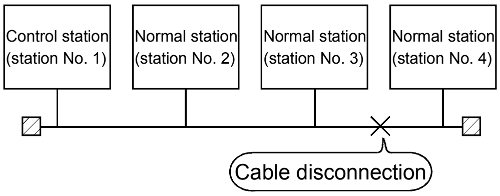
(b) When abnormal

The data link continues excluding the station that is down.



POINT

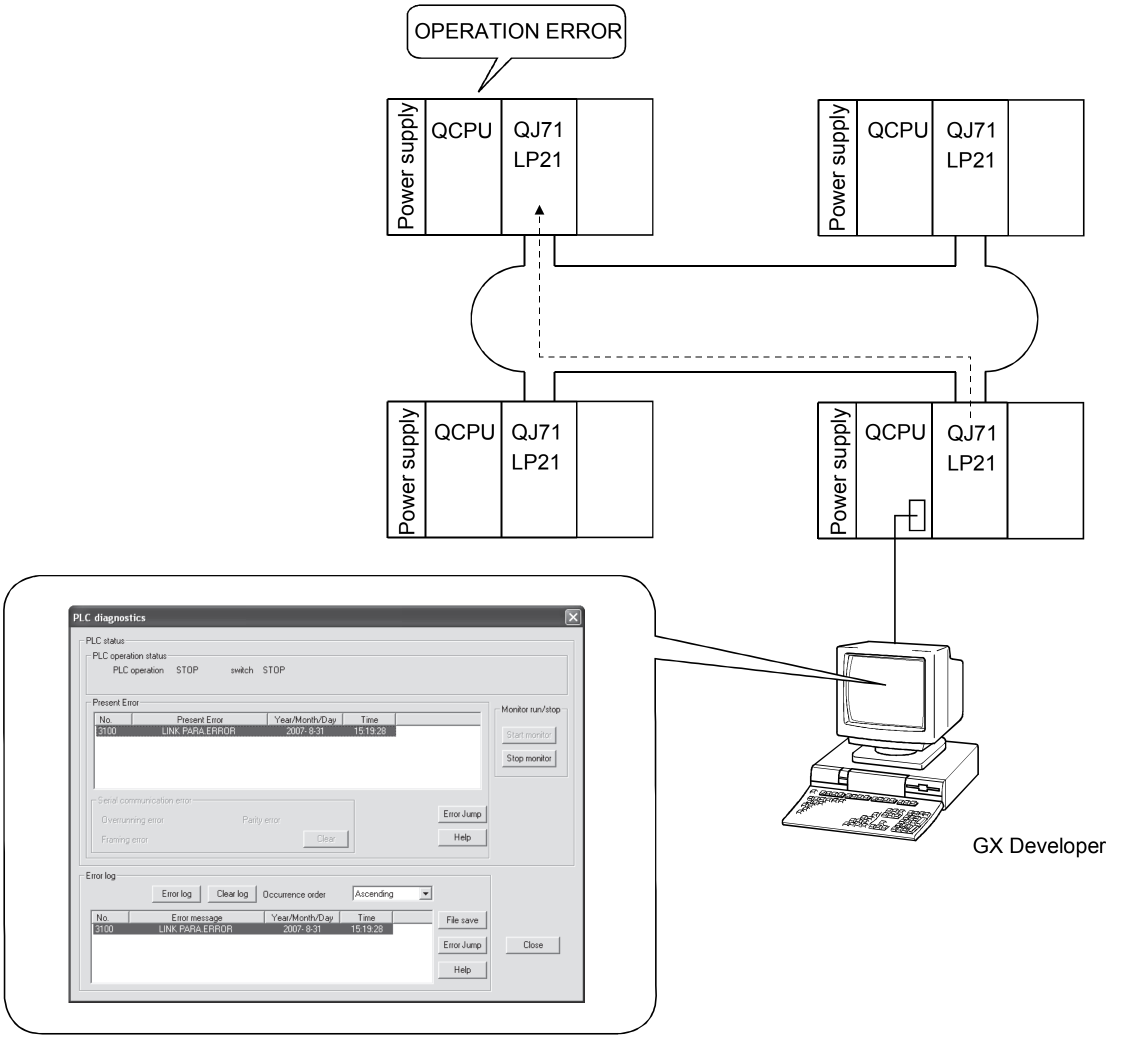
When a cable disconnection occurs, the data link cannot be performed because there will be no terminating resistors.



In addition, even if the cable is normal, the data link cannot be performed if a terminating resistor is detached.

(7) Transient transmission enabled even at CPU module error

By using this function, the network module can continue the transient transmission even if an error that stops the CPU module occurs while the system is operating.
The description of the error of the corresponding station can be checked from other stations using GX Developer.



PLC status

PLC operation status

PLC operation STOP switch STOP

Present Error

No.	Present Error	Year/Month/Day	Time
3100	LINK PARA.ERROR	2007- 8-31	15:19:28

Monitor run/stop

Serial communication error

Overrunning error Parity error

Framing error

Error log

Occurrence order Ascending

No.	Error message	Year/Month/Day	Time
3100	LINK PARA.ERROR	2007- 8-31	15:19:28

The following table lists the operations of the cyclic and transient transmissions for each CPU module status.

CPU module status		Cyclic transmission	Transient transmission
	Rank		
Battery error Annunciator error ON, etc. (Continue error)	Minor error	Continued	Enabled
Parameter error Instruction code error, etc. (Stop error)	Medium error	Stopped	Enabled
CPU reset, etc. (MAIN CPU down)	Major error	Stopped	Disabled＊1

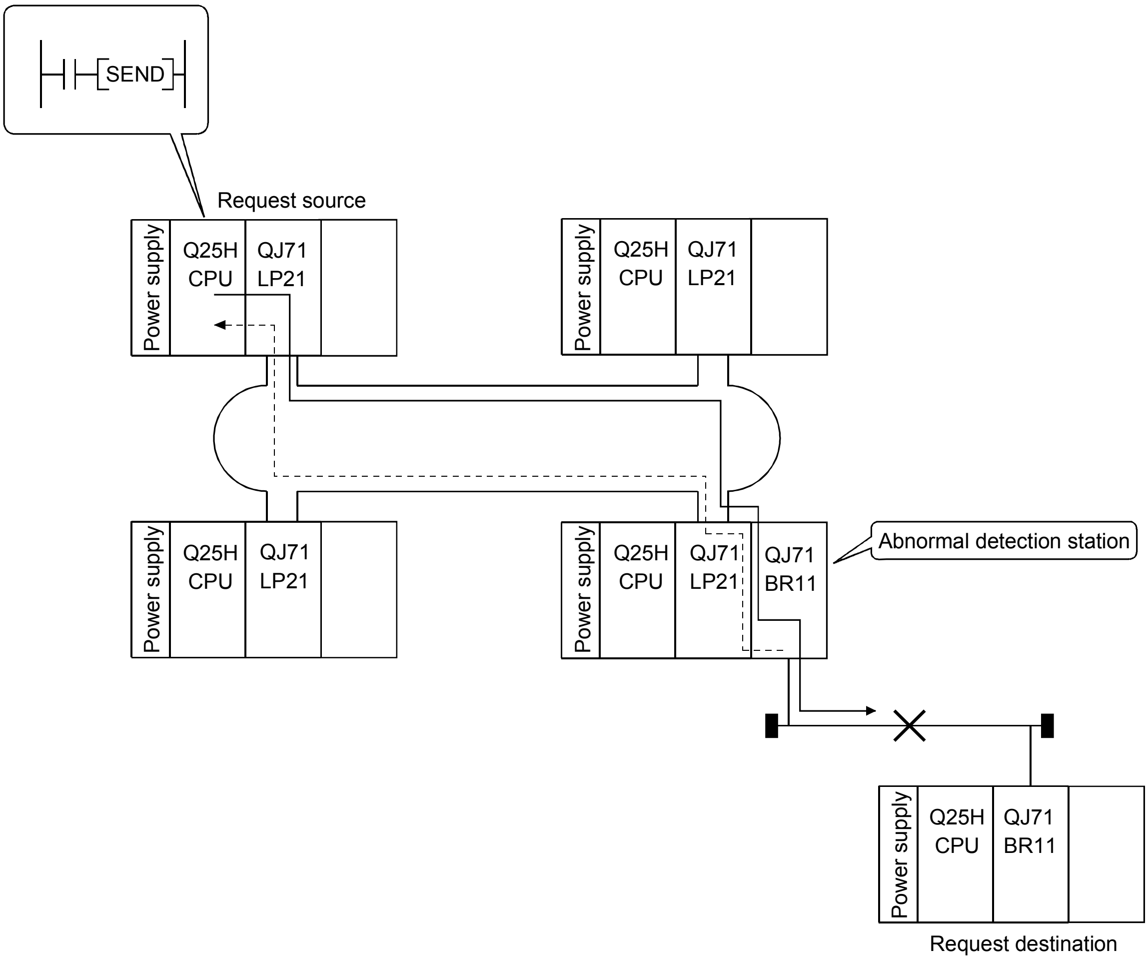
＊1 When the CPU module on the target station is an ACPU, a communication error occurs.
In case of the QCPU and QnACPU, a CC-Link IE Controller Network, CC-Link IE Field Network, MELSECNET/H, MELSECNET/10 error is returned.

(8) Checking the transient transmission abnormal detection time

By using this function, the "Time," "Abnormal detection network number," and "Abnormal detection station number" can be checked when a transient transmission (SEND, READ, SREAD, WRITE, SWRITE, REQ and other instructions) ends abnormally.

Logs such as time logs can be used to identify the network problems.

For details of these instructions, refer to Section 7.4.5.



(9) Diagnostic function

The diagnostic function is used to check the network's line status and the module setting status.

The diagnostic function consists mainly of following two types of tests:

- Offline tests
- Online tests

POINT

Execute the online tests when the network module is communicating (T.PASS LED is on). An error occurs if any of the online tests is executed from a station that has been disconnected from the data link.

1) Offline tests

The network module's hardware and the data link cable wiring can be checked at the system startup by setting the network module or GX Developer to the test mode.

Item	Description	Optical loop system	Coaxial/twisted bus system	Reference section
Self-loopback test	Checks hardware including the send/receive circuits and the cables of the transmission system of an individual network module.	○	○	Section 4.5.1
Internal self-loopback test	Checks hardware including the send/receive circuits of the transmission system of an individual network module.	○	○	Section 4.5.2
Hardware test	Checks hardware inside the network module.	○	○	Section 4.5.3
Station-to-station test	Checks a line between two stations.	○	○	Section 4.7.1
Forward loop/reverse loop test	Checks the wiring status of the forward and reverse loops in the status in which all the stations are connected.	○	×	Section 4.7.2

2) Online tests

The status of a line and other items can be easily checked with GX Developer.

If an error occurs while the system is in operation, the diagnostics listed below can be executed while remaining in the online status.

Item	Description	Optical loop system	Coaxial/twisted bus system	Data link status (cyclic transmission or transient transmission)	Reference section
Loop test	Checks the line status.	○	×	Pause	Section 4.8.1
Setup confirmation test	Checks for duplicate control stations and station numbers.	○	○✻1	Pause	Section 4.8.2
Station order check test	Checks the order of stations connected in the directions of the forward and reverse loop.	○	×	Pause	Section 4.8.3
Communication test	Checks whether or not the transient transmission can be performed normally. It also checks the routing parameter settings.	○	○	Continue	Section 4.8.4

✻1: The setup confirmation test cannot be executed in the twisted bus system.

3.3 Specifications of the Link Data Sending/Receiving Processing Time

This section explains the link data sending/receiving processing time and how to calculate the data link transmission delay time in the MELSECNET/H network system.

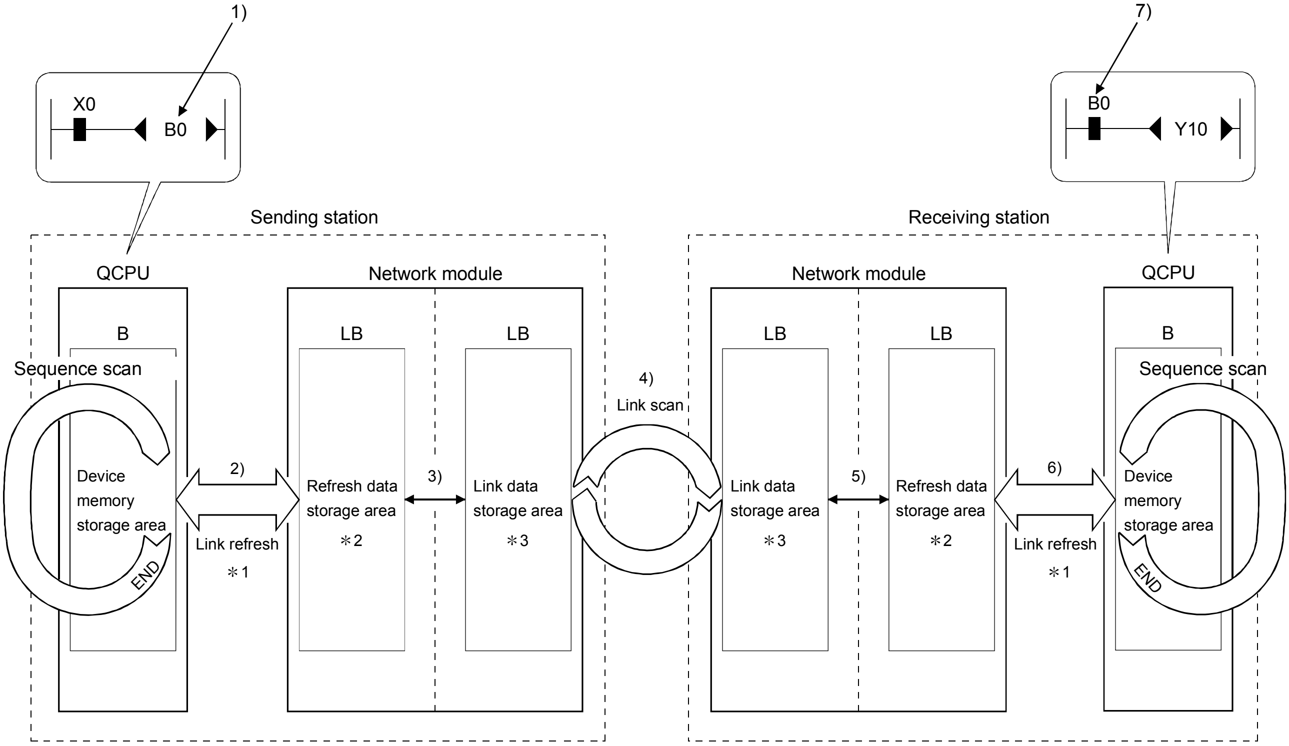
3.3.1 Link data sending/receiving processing

(1) Overview of the sending/receiving processing

In the cyclic transmission, communication is performed using the LB/LW/LX/LY devices of the network module.

This section explains the case when the link relay (B) is used on the CPU module side.

1) B0 on the sending station turns on.
2) By a link refresh, the B0 information is stored in the refresh data storage area (LB) of the network module.
3) The B0 information in the refresh data storage area (LB) is stored in the link data storage area (LB).
4) By a link scan, the B0 information in the link data storage area (LB) is stored in the link data storage area (LB) of the network module on the receiving station.
5) The B0 information in the link data storage area (LB) is stored in the refresh data storage area (LB).
6) By a link refresh, the B0 information is stored in the device memory storage area (B) of the CPU module.
7) B0 on the receiving station turns on.

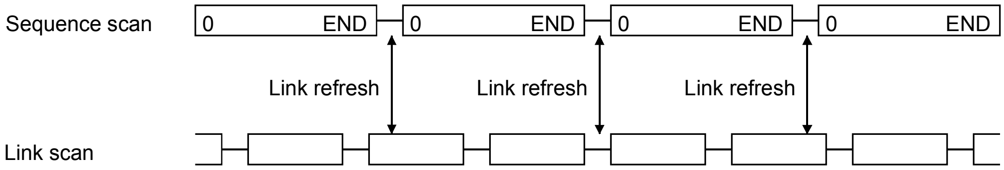


∗1: Sets the values with the refresh parameters.
∗2: Sets the values with the station inherent parameters. (If the settings are not made, the values of the common parameters are stored as is.)
∗3: Sets the values with the common parameters of the control station.

(2) Link scan and link refresh

The link scan is executed "asynchronous" with the sequence scan of the CPU module.

The link refresh is executed by the "END processing" of the CPU module.



POINT

When the CPU module is powered on or reset, even if latched device (listed in "CPU side device" in the table below) data is cleared to "0" using a sequence program, the latched data may be output depending on the timing of link scan and link refresh.

For how to prevent outputting latched device data, refer to "Method for disabling output" in the table below.

CPU side device	Method for disabling output
Latch relay (L)	Clear the device data to "0" using an initial device value (∗1).
File register (R, ZR)	
Extended data register (D) (Universal model QCPU only)	Delete all latch range settings.
Extended link register (W) (Universal model QCPU only)	
Device within latch range	

∗1: For initial device value setting, refer to the user's manual (Function Explanation, Program Fundamentals) for the CPU module used.

(3) Link data when a communication error station or communication stop station occurs on the network

When a communication error or communication stop station occur on the network during the data link, the receive data from those stations immediately before the error occurrence is retained.

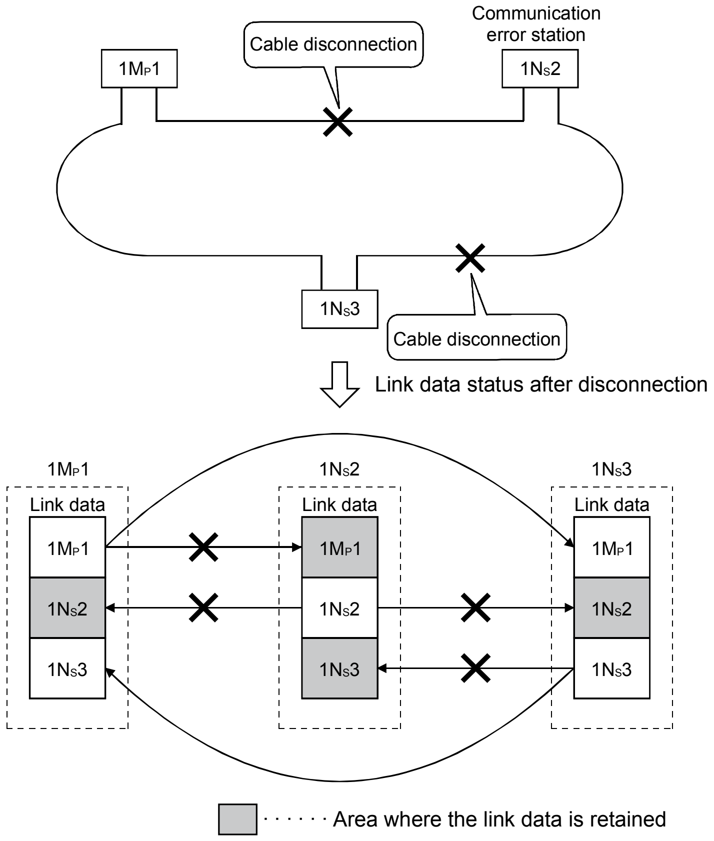
(A "communication stop station" refers to a station whose cyclic transmission has been stopped by a peripheral device.)

(a) The receive data from a communication error station or communication stop station is retained by a normally communicating station.

(b) The receive data from other station is retained by a communication stop station.

(Example)

When a communication error has occurred to 1NS2 due to cable disconnection



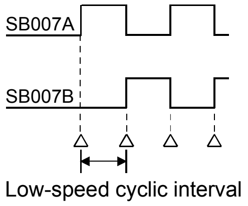
(4) SB/SW when a communication error station/communication stop station occurs on the network

The status of whether there are any communication error/communication stop stations on the network can be checked with the link special relay/link special register (SB/SW).

Use them as interlocks for programs.

For interlock program examples, refer to Section 6.1.2.

Link special relays and registers

Link special relay/link special register	Description	Signal status	
		Off	On
SB0020	Shows the communication status between the network module and CPU module.	Normal	Abnormal
SB0047	Shows the baton pass execution status of the host.	The baton pass is being executed	The baton pass is stopped
SB0049	Shows the cyclic transmission status of the host.	Normal	Abnormal
SB0070	Shows the baton pass execution status of all stations (including the host). However, it only shows the status for the number of stations set with parameters.	The baton pass is being executed on all stations	Occurrence of communication stop station
SW0070 to 0073	Shows the baton pass execution status of each station. Each bit corresponds to the status of each station.	The baton pass is being executed	The baton pass is stopped
SB0074	Shows the cyclic transmission status of all stations (including the host). However, it only shows the status for the number of stations set with parameters.	All stations normal	Occurrence of abnormal station
SW0074 to 0077	Shows the cyclic transmission status of each station. Each bit corresponds to the status of each station.	Normal	Abnormal
SB007A, 007B	Shows the low-speed cyclic transmission status. The transmission completion is indicated by the on/off status of either bit SB007A or 007B.		
SW01FC to SW01FF	Indicates the redundant system status (control system/standby system) of each station. Each bit corresponds to the status of each station.	Control system*1	Standby system

*1: Signals for the stations in other than a redundant system are off.

3.3.2 How to calculate the transmission delay time

(1) Transmission delay time in the same network

(a) Cyclic transmission (LB/LW/LX/LY periodical communication)

The transmission delay time in the B/W/Y communication is obtained by the equation below using the following variables:

- Scan time for the sending and receiving stations (except link refresh time)
- Link refresh time
- Link scan time
- Tracking time
- Scan time delay due to tracking transfer

[Transmission delay time (T_{D1}) in B/W/Y communication]

1) When a non-redundant CPU receives data

$T_{D1} = S_T + \alpha_T + (LS \times 0.5) + (S_R + \alpha_R) \times 1.5$ [ms]

(MAX : $T_{D1} = S_T + \alpha_T + (LS \times 1) + (S_R + \alpha_R) \times 2$)

2) When a redundant CPU receives data

$T_{D1} = S_T + \alpha_T + (LS \times 0.5) + (S_R + \alpha_R + Ts) \times 1.5$ [ms]

(MAX : $T_{D1} = S_T + \alpha_T + (LS \times 1) + (S_R + \alpha_R + Ts) \times 2$)

S_T : Scan time of the sending station (except link refresh time)
S_R : Scan time of the receiving station (except link refresh time)
α_T : Link refresh time of the sending station ✽1
α_R : Link refresh time of the receiving station ✽1
LS : Link scan time
Ts : Scan time delay due to tracking transfer✽2

✽1: Total of installed network modules

✽2: For the scan time delay due to tracking transfer, refer to the QnPRHCPU User's Manual (Redundant System).

The equation above assumes the following conditions:

- There is no faulty station.
- The transient transmission is not executed.

POINT

(1) For the transmission delay time in the B/W/Y communication (T_{D1}), use the equation for the "MAX" if the worst conditions coincide because the scan of the sequence program and the link scan are asynchronous.

(2) When the "Block send/receive data assurance per station" boxes is checked, add the following delay time to the transmission delay time (T_{D1}).

- In the case of S_T >LS
  Normal : Add "+ 0.5 × ($S_T + \alpha_T$)"
  MAX : Add "+ 1.0 × ($S_T + \alpha_T$)"
- In the case of S_T <LS
  Normal : Add "+ 0.5 × LS"
  MAX : Add "+ 1.0 × LS"

(3) In the MELSECNET/H Extended mode, the "Block send/receive data assurance per station" boxes are preset by default. Therefore, add any of the values shown in (2) above to the transmission delay time (T_{D1}).

(b) Communication with the SEND/RECV/RECVS/ZNRD/ZNWR instruction

The transmission delay time in communication with the SEND, RECV, RECVS, ZNRD, or ZNWR instruction depends on the system of the sending and receiving stations, as shown below.

Receiving station Sending station	Non-redundant system	Redundant system (control system CPU)
Non-redundant system	Expression of 1)	Expression of 2) (Note that the T_{ST} value is "0.")
Redundant system	Expression of 2) (Note that the T_{SR} value is "0.")	Expression of 2)

The transmission delay time can be calculated using the following:

- Scan time for the sending and receiving stations (except link refresh time)
- Link refresh time
- Link scan time
- Scan time delay due to tracking transfer

[Transmission delay time in SEND, RECV, RECVS, ZNRD, or ZNWR instruction communication]

1) $T_{D2} = (S_T + \alpha_T + S_R + \alpha_R) \times 2 + (LS \times 4) + LS_U$ [ms]
   (MAX : $T_{D2} = (S_T + \alpha_T + S_R + \alpha_R) \times 2 + (LS \times 6) + LS_U$)
2) $T_{D3} = (S_T + \alpha_T + T_{ST} + S_R + \alpha_R + T_{SR}) \times 2 + (LS \times 4) + LS_U$ [ms]
   (MAX : $T_{D3} = (S_T + \alpha_T + T_{ST} + S_R + \alpha_R + T_{SR}) \times 2 + (LS \times 6) + LS_U$)

S_T : Scan time of the sending station (except link refresh time)
S_R : Scan time of the receiving station (except link refresh time)
α_T : Link refresh time of the sending station ∗2
α_R : Link refresh time of the receiving station ∗2
T_{ST} : Scan time delay due to tracking transfer on the sending side∗3
T_{SR} : Scan time delay due to tracking transfer on the receiving side∗3
LS : Link scan time

$$LS_U \left\{ \left(\frac{\text{(Number of simultaneous transient requests)}}{\text{(Maximum number of transient times)}} \right)^{*1} - 1 \right\} \times (LS \times 2)$$

Number of simultaneous transient requests:
The total number of times transient requests that are made during one link scan from a station on the same network.
Maximum number of transients:
The maximum number of transients within one link scan set in the supplementary settings of the common parameters.

∗1: The fraction is rounded up to the nearest whole number.
∗2: Total of installed network modules
∗3: For the scan time delay due to tracking transfer, refer to the QnPRHCPU User's Manual (Redundant System).

REMARKS

When executing transient transmissions from multiple stations at the same time, the execution time of the instruction may be shortened by increasing the setting value for the maximum number of transient requests in one link scan.
For instance, when there are seven stations that execute an instruction, the time for "LS × 4" may be shortened by changing the setting value of the maximum transient requests from the default value of two to seven or larger with the transient setting in the supplementary settings of the common parameters of GX Developer.
Note, however, that the scan time of the CPU module increases by that time amount.

(c) READ, WRITE, REQ, RRUN, RSTOP, RTMRD, or RTMWR instruction communication
The transmission delay time in communication with the READ, WRITE, REQ, RRUN, RSTOP, RTMRD, or RTMWR instruction depends on the system of the sending and receiving stations.

Receiving station / Sending station	Non-redundant system	Redundant system			
		Host system		Other system	
		Access to control system CPU	Access to standby system CPU	Access to standby system CPU via control system	Access to control system CPU via standby system
Non-redundant system	Expression of 1)	Expression of 2) (Note that the T_{ST} value is "0.")	Expression of 2) (Note that the values of T_{ST}, S_R, and α_R are "0.")	Expression of 3) (Note that the T_{ST} value is "0.")	Expression of 3) (Note that the values of T_{ST}, S_R, and α_R are "0.")
Redundant system	Expression of 2) (Note that the T_{SR} value is "0.")	Expression of 2)	Expression of 2) (However, the values of S_R, and α_R are "0.")	Expression of 3)	Expression of 3) (Note that the values of S_R, and α_R are "0.")

The transmission delay time in instruction communication can be calculated from the following:

- Scan time of the sending and receiving stations (except link refresh time)
- Link refresh time
- Link scan time
- Scan time delay due to tracking transfer

[Transmission delay time in READ/WRITE/REQ/RRUN/RSTOP/RTMRD/RTMWR instruction communication]

1) $T_{D4} = (S_T + \alpha_T + S_R + \alpha_R) \times 2 + (LS \times 4) + LS_U$ [ms]
(MAX : $T_{D4} = (S_T + \alpha_T + S_R + \alpha_R) \times 2 + (LS \times 6) + LS_U$)
2) $T_{D5} = (S_T + \alpha_T + T_{ST} + S_R + \alpha_R + T_{SR}) \times 2 (LS \times 4) + LS_U$ [ms]
(MAX : $T_{D5} = (S_T + \alpha_T + T_{ST} + S_R + \alpha_R + T_{SR}) \times 2 + (LS \times 6) + LS_U$)
3) $T_{D6} = (S_T + \alpha_T + T_{ST} + S_R + \alpha_R + T_{SR}) \times 2 (LS \times 4) + 3 + LS_U$ [ms]
(MAX : $T_{D6} = (S_T + \alpha_T + T_{ST} + S_R + \alpha_R + T_{SR}) \times 2 (LS \times 6) + 6 + LS_U$)

(To next page)

S_T : Scan time of the sending station (except link refresh time)
S_R : Scan time of the receiving station ＊1 (except link refresh time)
α_T : Link refresh time of the sending station ＊2
α_R : Link refresh time of the receiving station ＊2
LS : Link scan time
T_{ST} : Scan time delay due to tracking transfer on the sending side＊4
T_{SR} : Scan time delay due to tracking transfer on the receiving side＊4

$$LS_U\left\{\left(\frac{\text{(Number of simultaneous transient requests)}}{\text{(Maximum number of transient times)}}\right)^{*3}-1\right\}\times(LS\times 2)$$

Number of simultaneous transient requests:
The total number of times transient requests that are made during one link scan from a station on the same network.
Maximum number of transients:
The maximum number of transients within one link scan set in the supplementary settings of the common parameters.

＊1: For the redundant system, it is a scan time of the control system CPU.
＊2: Total time for the installed network modules.
＊3: The fraction is rounded up to the nearest whole number.
＊4: For the scan time delay due to tracking transfer, refer to the QnPRHCPU User's Manual (Redundant System).

REMARKS

When executing transient transmissions from multiple stations at the same time, the execution time of the instruction may be shortened by increasing the setting value for the maximum number of transient requests in one link scan.
For instance, when 7 stations are supposed to execute an instruction, the time for "LS × 4" may be shortened by changing the setting value of the maximum transient requests from the default value of 2 to 7 or larger in the transient setting in supplementary settings of Common parameters from GX Developer.
Note, however, that the scan time of the CPU module increases by that time amount.

(d) Link refresh time

1) Basic model QCPU, High Performance model QCPU, Process CPU, Redundant CPU, Universal model QCPU

The link refresh time (the time delay of the END processing time in the CPU module) is obtained by the equation below using the following variables:

- Number of assignment points of the link device
- Transfer to the file registers (R, ZR), extended data register (D), and extended link register (W) on the memory card
- Inter-link data transfer

[Link refresh time]

$$\alpha_T, \alpha_R = KM1 + KM2 \times \left(\frac{LB + LX + LY + SB}{16} + LW + SW \right) + \alpha_E + \alpha_L \ \text{[ms]}$$

$$\alpha_E = KM3 \times \left(\frac{LB + LX + LY}{16} + LW \right) \ \text{[ms]}$$

$$\alpha_L = KM4 + KM5 \times \left(\frac{LB}{16} + LW \right) \ \text{[ms]}$$

α_T : Link refresh time (sending station)
α_R : Link refresh time (receiving station)
LB : Total points of link relays (LB) refreshed by the corresponding station ＊1
LW : Total points of link registers (LW) refreshed by the corresponding station ＊1
LX : Total points of link inputs (LX) refreshed by the corresponding station ＊1
LY : Total points of link outputs (LY) refreshed by the corresponding station ＊1

Refer to Section 3.3.3.

SB : Number of points of the link special relay (SB)
SW : Number of points of the link special register (SW)
α_E : Transfer time of the file registers (R, ZR), extended data register (D), and extended link register (W) on the memory card ＊2
α_L : Inter-link data transfer time ＊3
KM1, KM2, KM3, KM4, KM5 : Constant

＊1: Total link device points that are within the range set in Refresh parameters and that are set in Network range assignment.
Note that points assigned to reserved stations are excluded.

＊2: Add this value only when data is refreshed to the file register on the memory card.
Do not add this value when data is refreshed to the file register on the standard RAM and the extended SRAM cassette.

＊3: Add this value only when the inter-link data transfer function is used.
For Universal model QCPUs, the calculation method for the data link transfer time varies.
The calculation method is shown in REMARKS.

- When network modules are installed on the main base unit

Constant CPU type		KM1 ($\times 10^{-3}$)	KM2 ($\times 10^{-3}$)	KM3 ($\times 10^{-3}$)	KM4 ($\times 10^{-3}$)	KM5 ($\times 10^{-3}$)
Basic model QCPU	Q00JCPU	1300	0.67			
	Q00CPU	1100	0.66			
	Q01CPU	900	0.61			
High Performance model QCPU	Q02CPU	300	0.48	0.60	600	140
	Q02H/Q06H/Q12H/Q25HCPU	130	0.41	0.53	250	130
Process CPU	Q02PH/Q06PH/Q12PH/ Q25PHCPU	130	0.41	0.53	250	130
Redundant CPU	Q12PRH/Q25PRHCPU	130	0.41	0.53	250	130
Universal model QCPU	Q00UJ/Q00U/Q01UCPU	160	0.41		The calculation method of inter-link data transfer time differs. (Refer to Remarks.)	
	Q02UCPU	160	0.41	0.39		
	Q03UD/Q03UDECPU	90	0.41	0.39		
	Q04UDH/Q04UDEH/ Q06UDH/Q06UDEH/ Q10UDH/Q10UDEH/ Q13UDH/Q13UDEH/ Q20UDH/Q20UDEH/ Q26UDH/Q26UDEH/ Q50UDEH/Q100UDEHCPU	90	0.41	0.33		
	Q03UDV/Q04UDV/Q06UDV/ Q13UDV/Q26UDVCPU	45	0.41			

- When network modules are installed on the extension base unit

Constant CPU type		KM1 ($\times 10^{-3}$)	KM2 ($\times 10^{-3}$)	KM3 ($\times 10^{-3}$)	KM4 ($\times 10^{-3}$)	KM5 ($\times 10^{-3}$)
Basic model QCPU	Q00JCPU	1300	1.50			
	Q00CPU	1100	1.44			
	Q01CPU	900	1.42			
High Performance model QCPU	Q02CPU	300	1.20	1.32	610	280
	Q02H/Q06H/Q12H/Q25HCPU	130	0.97	1.09	270	260
Process CPU	Q02PH/Q06PH/Q12PH/ Q25PHCPU	130	0.97	1.09	270	260
Redundant CPU	Q12PRH/Q25PRHCPU					
Universal model QCPU	Q00UJ/Q00U/Q01UCPU	160	1.06		The calculation method of inter-link data transfer time differs. (Refer to Remarks.)	
	Q02UCPU	160	1.06	0.39		
	Q03UD/Q03UDECPU	90	0.97	0.39		
	Q04UDH/Q04UDEH/ Q06UDH/Q06UDEH/ Q10UDH/Q10UDEH/ Q13UDH/Q13UDEH/ Q20UDH/Q20UDEH/ Q26UDH/Q26UDEH/ Q50UDEH/Q100UDEHCPU	90	0.97	0.33		
	Q03UDV/Q04UDV/Q06UDV/ Q13UDV/Q26UDVCPU	45	0.97			

2) Safety CPU

[Link refresh time]

$$\alpha T,\ \alpha R = \left\{1.85 \times \left(\frac{LB + LX + LY + SB}{16} + LW\right) + 1000\right\} \times 10^{-3}\ \text{[ms]}$$

αT : Link refresh time (sending station)
αR : Link refresh time (receiving station)
LB : Total points of link relays (LB) refreshed by the corresponding station ＊1
LW : Total points of link registers (LW) refreshed by the corresponding station ＊1
LX : Total points of link inputs (LX) refreshed by the corresponding station ＊1
LY : Total points of link outputs (LY) refreshed by the corresponding station ＊1
Refer to Section 3.3.3.
SB : Number of points of the link special relay (SB)
SW : Number of points of the link special register (SW)

＊1: Total points are the sum of link devices set in refresh parameter settings and network range settings.
The points assigned for reserved station are not included.

POINT

The values in this section are calculated on the basis that data are received from all stations during one sequence scan.
When the link scan is long or when the sequence scan is short, data from all stations may not be received within one sequence scan.
If this occurs, the actual link refresh time is less than the calculated value shown in this section.

REMARKS

(1) Data link transfer time (for Universal model QCPU)

Universal model QCPUs transfer interlink data in several batches.
The following are the calculation formulas for the data link transfer time.

(a) Data link transfer time taken in one END

$$\alpha_L = KM4 + (KM5 \times n1) + \left[\frac{LB_T}{16} + LW_T \right]^{*1} \times KM6\ [ms]$$

αL : Data link transfer time taken in one END
n1 : Number of lines where interlink transmission parameters are set
LB_T : Total number of link relay (LB) points set in interlink transmission parameters
LW_T : Total number of link register (LW) points set in interlink transmission parameters
KM4, KM5, KM6: Constants

*1: The number of words that can be transferred in one END (N) is restricted as follows:
N = Sequence scan time (under no interlink transmission parameter setting) (μs) $\times$ 0.05

CPU type	KM4($\times 10^{-3}$)	KM5($\times 10^{-3}$)
Q00UJ/Q00U/Q01UCPU		
Q02UCPU	120	11
Q03UD/Q03UDECPU	34	16.3
Q04UDH/Q04UDEH/ Q06UDH/Q06UDEH/ Q10UDH/Q10UDEH/ Q13UDH/Q13UDEH/ Q20UDH/Q20UDEH/ Q26UDH/Q26UDEH/ Q50UDEH/Q100UDEHCPU	25	16.3
Q03UDV/Q04UDV/Q06UDV/ Q13UDV/Q26UDVCPU	12	4

CPU type	KM6($\times 10^{-3}$)			
	Network module mounting position			
	Source (main base) → Target (main base)	Source (main base) → Target (extension base)	Source (extension base) → Target (main base)	Source (extension base) → Target (extension base)
Q00UJ/Q00U/Q01UCPU				
Q02UCPU	0.76	1.27	1.37	1.79
Q03UD/Q03UDECPU	0.73	1.27	1.37	1.78
Q04UDH/Q04UDEH/ Q06UDH/Q06UDEH/ Q10UDH/Q10UDEH/ Q13UDH/Q13UDEH/ Q20UDH/Q20UDEH/ Q26UDH/Q26UDEH/ Q50UDEH/Q100UDEHCPU	0.73	1.25	1.35	1.78
Q03UDV/Q04UDV/Q06UDV/ Q13UDV/Q26UDVCPU	0.73	1.27	1.37	1.78

(b) Data link transfer time required for transferring data of all the set points

$$\alpha_{L1} = KM7\times\left(\frac{LB_T}{16}+LW_T\right)\ [ms]$$

$\alpha L1$: Data link transfer time taken to transfer all the set points of data
LB_T : Total number of link relay (LB) points set in interlink transmission parameters
LW_T : Total number of link register (LW) points set in interlink transmission parameters
KM7: Constants

CPU type	KM7($\times 10^{-3}$)			
	Network module mounting position			
	Source (main base) → Target (main base)	Source (main base) → Target (extension base)	Source (extension base) → Target (main base)	Source (extension base) → Target (extension base)
Q00UJ/Q00U/Q01UCP	25.00	25.20	25.20	25.50
Q02UCPU	25.00	25.20	25.20	25.50
Q03UD/Q03UDECPU	22.10	22.50	22.70	23.00
Q04UDH/Q04UDEH/ Q06UDH/Q06UDEH/ Q10UDH/Q10UDEH/ Q13UDH/Q13UDEH/ Q20UDH/Q20UDEH/ Q26UDH/Q26UDEH/ Q50UDEH/Q100UDEHCPU	22.10	22.50	22.70	23.00
Q03UDV/Q04UDV/Q06UDV/ Q13UDV/Q26UDVCPU	22.10	22.50	22.70	23.00

(e) Link scan time in the optical loop system and coaxial bus system

The link scan time in the optical loop system and coaxial bus system is obtained by the equation below using the following variables:

- Network type
- Number of assignment points of the link device
- Number of connected stations

1) MELSECNET/H mode

a) With a communication speed of 10Mbps

[Link scan time]

$$LS = KB + (0.45 \times \text{total number of stations}) + \left(\frac{LB + LY + (LW \times 16)}{8} \times 0.001\right)$$
$$+ (T \times 0.001) + (F \times 4)\ [ms]$$

b) With a communication speed of 25Mbps

[Link scan time]

$$LS = KB + (0.40 \times \text{total number of stations}) + \left(\frac{LB + LY + (LW \times 16)}{8} \times 0.0004\right)$$
$$+ (T \times 0.0004) + (F \times 4)\ [ms]$$

LS : Link scan time

KB : Constant

Total number of stations	1 to 8	9 to 16	17 to 24	25 to 32	33 to 40	41 to 48	49 to 56	57 to 64
KB	4.0	4.5	4.9	5.3	5.7	6.2	6.6	7.0

LB : Total points of link relays (LB) used in all stations ＊1

LW : Total points of link registers (LW) used in all stations ＊1

LX : Total points of link inputs (LX) used in all stations ＊1

LY : Total points of link outputs (LY) used in all stations ＊1

} Refer to Section 3.3.3.

T : Maximum number of bytes sent by the transient transmission in one link scan. ＊2

F : Number of stations returned to the network (Only if there are faulty stations. : Maximum number of stations returned to the network in 1 scan (set value))

＊1: Total link device points set up in Network range assignment. Note that the points assigned to reserved stations are excluded.

＊2: The total transfer time when transient transmissions are simultaneously executed from multiple stations.

REMARK

For the link scan time in MELSECNET/10 mode, refer to For QnA/Q4AR MELSECNET/10 Network System Reference Manual.

2) MELSECNET/H Extended mode

a) With a communication speed of 10Mbps

[Link scan time]

$$LS = KB + (0.45 \times SP) + \left(\frac{LB + LY + (LW \times 16)}{8} \times 0.001 \right)$$
$$+ (T \times 0.001) + (F \times 4) \text{ [ms]}$$

b) With a communication speed of 25Mbps

[Link scan time]

$$LS = KB + (0.40 \times SP) + \left(\frac{LB + LY + (LW \times 16)}{8} \times 0.0004 \right)$$
$$+ (T \times 0.0004) + (F \times 4) \text{ [ms]}$$

LS : Link scan time
KB : Constant

Total number of stations	1 to 8	9 to 16	17 to 24	25 to 32	33 to 40	41 to 48	49 to 56	57 to 64
KB	4.0	4.5	4.9	5.3	5.7	6.2	6.6	7.0

$$SP = \sum_{i=1}^{n} \left(\frac{\text{Number of bytes sent by station No. (i)}}{2000} \right)^{*1}$$

n=Total number of stations
Number of bytes sent = {(LY + LB) / 8 + (2 x LW)}
∗1: The number after the decimal point is rounded up. 0 is handled as 1.

The calculation example of SP in the setting example ⓐ is shown in ⓑ.

ⓐ Setting example

Station No.	Number of bytes sent by each station
Station No. 1	8000 bytes
Station No. 2	7800 bytes
Station No. 3	0 bytes
Station No. 4	2000 bytes

ⓑ Calculation example of SP

$$SP=\frac{8000}{2000}+\underbrace{\frac{7800}{2000}}_{\text{Number after decimal point is rounded up.}}+\underbrace{\frac{0}{2000}}_{\text{0 is handled as 1.}}+\frac{2000}{2000}$$

$$=4 + 4 + 1 + 1$$
$$=10$$

LB : Total points of link relays (LB) used in all stations ∗2
LW : Total points of link registers (LW) used in all stations ∗2
LX : Total points of link inputs (LX) used in all stations ∗2
LY : Total points of link outputs (LY) used in all stations ∗2

Refer to Section 3.3.3.

T : Maximum number of bytes sent by the transient transmission in one link scan. ∗3
F : Number of stations returned to the network (Only if there are faulty stations. : Maximum number of stations returned to the network in 1 scan (set value))

∗2: Total link device points set up in the network range parameter assignment.
Note that the points assigned to reserved stations are excluded.
∗3: "0" when not used.

(f) Link scan time in the twisted bus system

The link scan time in the twisted bus system is obtained by the equation below using the following variables:

- Network type
- Number of assignment points of the link device
- Constant 1 to 3

1) MELSECNET/H mode

[Link scan time]

$$LS = KB1+(KB2\times \text{total number of stations}) + \left(\frac{LB+LX+(LW\times 16)}{8} \times KB3 \right) + (T\times KB3) + (F\times 4)\ \text{[ms]}$$

2) MELSECNET/H Extended mode

[Link scan time]

$$LS = KB1+(KB2\times SP) + \left(\frac{LB+LX+(LW\times 16)}{8} \times KB3 \right) + (T\times KB3) + (F\times 4)\ \text{[ms]}$$

LS : Link scan time

KB1 to 3: Constant

Total number of stations	1 to 8	9 to 16	17 to 24	25 to 32
KB1	8.0	8.5	8.9	9.3

Communication speed	156kbps	312kbps	625kbps	1.25Mbps	2.5Mbps	5Mbps	10Mbps
KB2	4.6	3.83	3.06	2.55	2.05	1.55	1.05

Communication speed	156kbps	312kbps	625kbps	1.25Mbps	2.5Mbps	5Mbps	10Mbps
KB3	0.064	0.032	0.016	0.008	0.004	0.002	0.001

LB : Total points of link relays (LB) used in all stations ✻1
LW : Total points of link registers (LW) used in all stations ✻1
LX : Total points of link inputs (LX) used in all stations ✻1
LY : Total points of link outputs (LY) used in all stations ✻1

} Refer to Section 3.3.3.

T : Maximum number of bytes sent by the transient transmission in one link scan. ✻2
F : Number of stations returned to the network (Only if there are faulty stations. : Maximum number of stations returned to the network in 1 scan (set value))
SP : Refer to Section 3.3.3 (e).

✻1: Total link device points set up in the network range parameter assignment.
Note that the points assigned to reserved stations are excluded.

✻2: "0" when not used.

(2) Transmission delay time between multiple networks using the inter-link data transfer function

The following shows the cyclic transmission delay time for the case where link device data are transferred to another network with the interlink transfer function.

[Inter-link data transfer]

(Transmission delay time)

$$T_D = (S_T + \alpha_T) + (LS_T \times 1) + \alpha_{MR} + K_M + \alpha_{MT} + (LS_R \times 1) + (S_R \times 2) + \alpha_R \text{ [ms]}$$

(Transmission delay time)...For Universal model QCPU

$$T_D = (S_T + \alpha_T) + (LS_T \times 1) + \alpha_{MR} + \alpha_{MT} + (LS_R \times 1) + (S_R \times 2) + \alpha_R \text{ [ms]}$$

S_T : Scan time of the sending station (except link refresh time)
S_R : Scan time of the receiving station (except link refresh time)
α_T : Link refresh time of the transmitting station ＊1
α_{MT} : Link refresh time of the relay station and the sending station (for transfer) ＊1
α_{MR} : Link refresh time of the relay station and the receiving station (for transfer) ＊1
α_R : Link refresh time of the receiving station ＊1
LS_T : Link scan time of the sending station
LS_R : Link scan time of the receiving station
K_M : Transmission processing time of the CPU module of the relay station

＊1: Total for the network modules mounted

$$K_M = KM6 \times \left(\frac{LB}{16} + LW \right) \div 1000 + KM7 \text{ [ms]}$$

LB : Total of transfer source LB points that are set with interlink transmission parameters.
LW : Total of transfer source LW points that are set with interlink transmission parameters.
KM6 : Constant
KM7 : 4.5 (Worst value: 60)

Module location		KM6 ($\times 10^{-3}$)
Transfer source module	Transfer target module	
Main base unit	Main base unit	6.7
Main base unit	Extension base unit	10.00
Extension base unit	Main base unit	10.00
Extension base unit	Extension base unit	12.00

POINT

Although KM7 is usually 4.5ms, it can be 60ms if monitoring or a dedicated instruction is executed from GX Developer or any other station.
Depending on the monitoring timing from GX Developer or another station, the time may be longer than that.
If the time increase may cause a system problem, use link direct devices in the sequence program to transfer data.

(3) Example of the transmission delay time calculation

The following example calculates the transmission delay time with the following system configuration and under the following conditions:

(System configuration and conditions)

1) CPU module: Q06HCPU
2) Network type: MELSECNET/H mode
3) Communication speed: 10Mbps
4) Total number of stations: 8 stations (1 control station, 7 normal stations)
5) Number of link device points: LB = 1024 points, LW = 1024 points, LX = LY = 0 points, SB = SW = 512 points
6) Scan time of the CPU module for all stations: 1 ms
7) The file register is not used.
8) The data inter-link transfer and the transient transmission are not used.
9) The network modules are installed on the basic base unit on all stations.

<Constants used when network modules are installed on main base unit>

Constant CPU type	KM1 ($\times 10^{-3}$)	KM2 ($\times 10^{-3}$)	KM3 ($\times 10^{-3}$)	KM4 ($\times 10^{-3}$)	KM5 ($\times 10^{-3}$)
Q06HCPU	130	0.41	0.53	250	130

(a) Link refresh time

$$\text{Link refresh time} = KM1 + KM2 \times \left(\frac{LB + LX\ \ + LY + SB}{16} + LW + SW\right) + \alpha E + \alpha L$$

$$\text{The link refresh time on the sending station } \alpha T = 130 \times 10^{-3} + 0.41 \times 10^{-3} \times \left(\frac{1024 + 0 + 0 + 512}{16} + 1024 + 512\right) + 0 + 0$$

$$\fallingdotseq 0.80 \text{ (ms)}$$

The link refresh time on the receiving station $\alpha R \fallingdotseq 0.80$ (ms)

(b) Link scan time

$$\text{Link scan time } LS = KB + (0.45 \times \text{total number of stations}) + \left\{\frac{(LB + LY + (LW \times 16)}{8} \times 0.001\right\}$$

$$= 4.0 + (0.45 \times 8) + \left\{\frac{1024 + 0 + (1024 \times 16)}{8} \times 0.001\right\}$$

$$\fallingdotseq 9.776 \text{ (ms)}$$

(c) Cyclic transmission delay

$$\text{Transmission delay time } T_{D1} = S_T + \alpha_T + (LS \times 0.5) + (S_R + \alpha_R) \times 1.5$$

$$= 1 + 0.80 + (9.776 \times 0.5) + (1 + 0.80) \times 15$$

$$\fallingdotseq 9.39 \text{ (ms)}$$

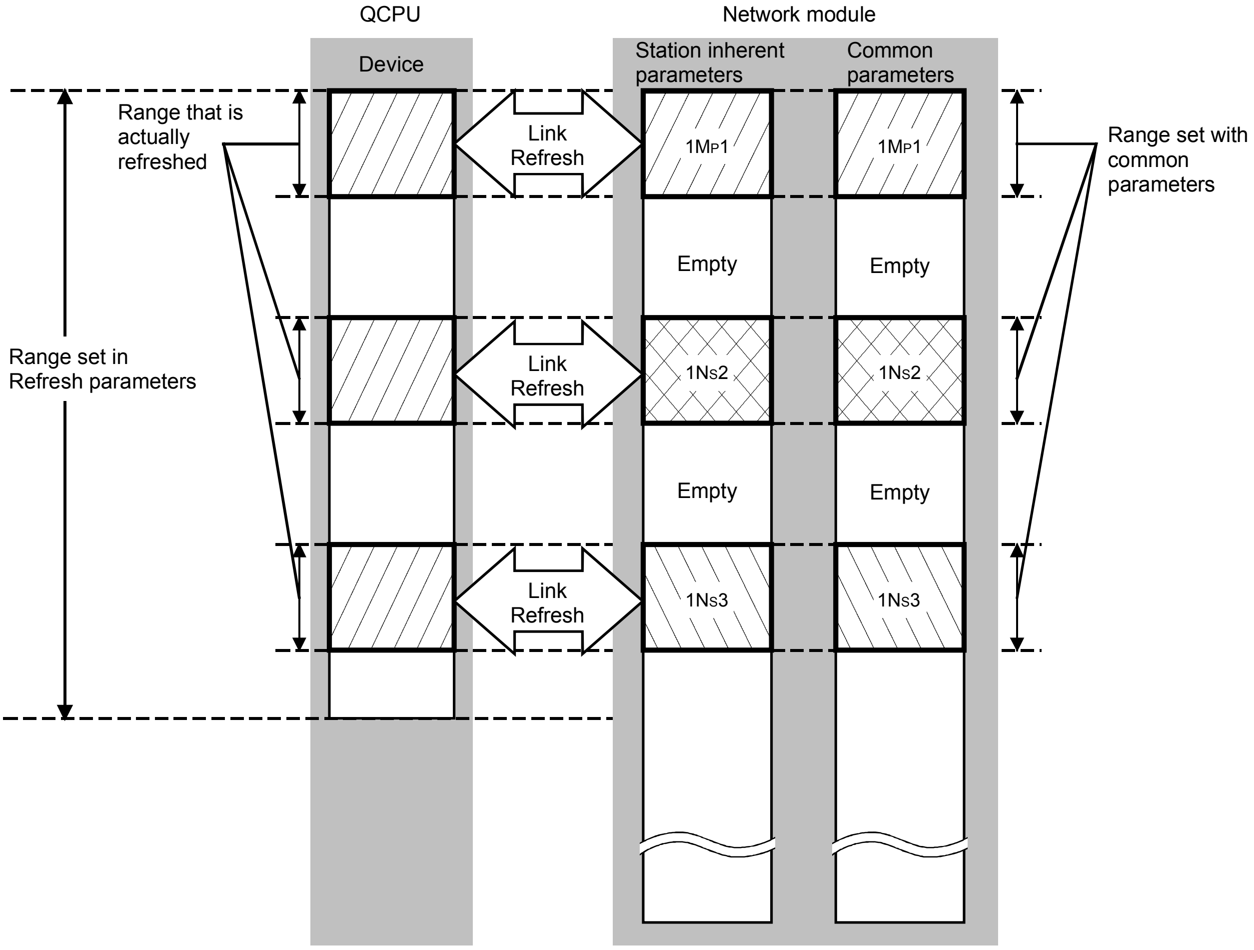
3.3.3 Reducing the link refresh time

The link refresh time can be reduced by decreasing the number of refresh points to the CPU module.
Reduce the refresh points by any of the following:

- Refresh parameters
- Common parameters
- Direct access to link devices
- Station inherent parameters

(1) Concept of the refresh range (number of points)

The ranges set with common parameters and within the set range of Refresh parameters are refreshed.



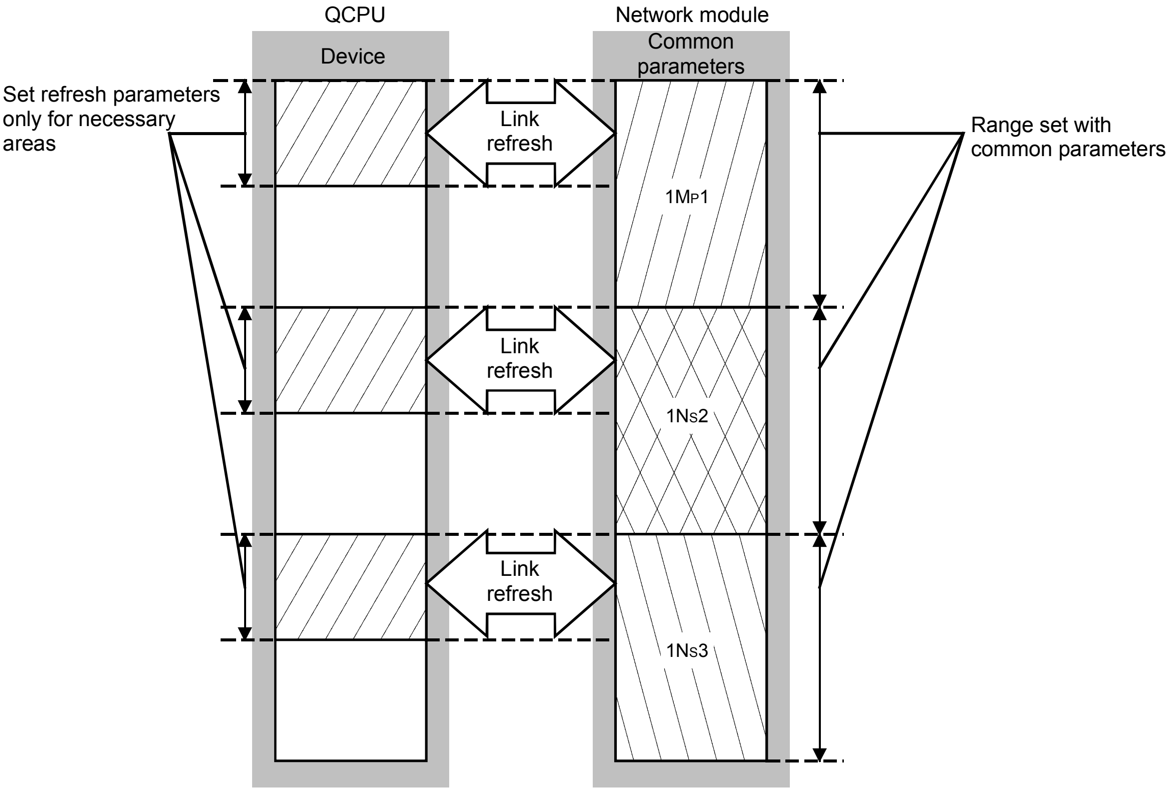
POINT

(1) During the initial settings (to return to the initial settings, click the default button of GX Developer) of the refresh parameters, the range from the start to end addresses is set, which can be viewed with the assignment image figure of the refresh parameters.

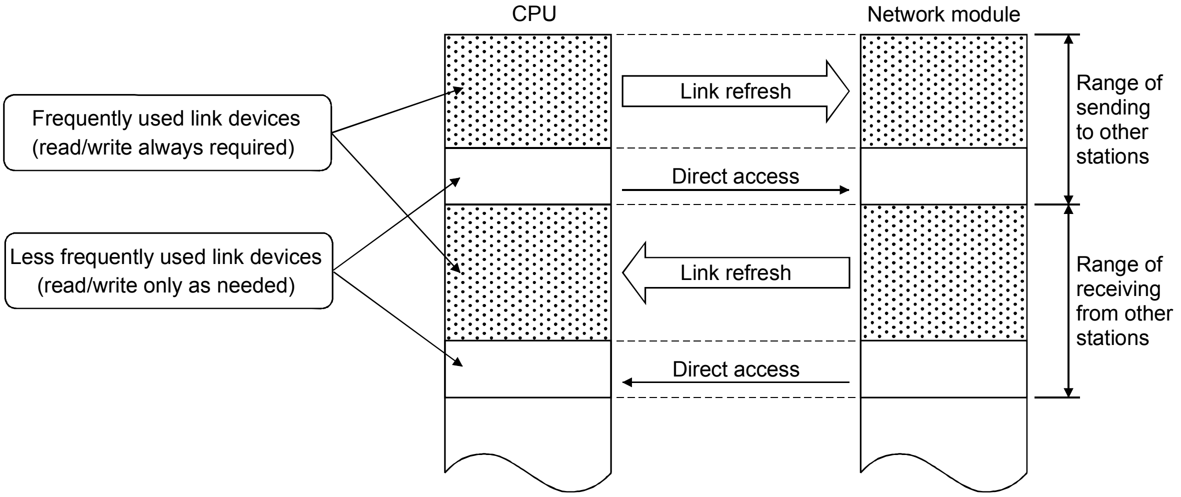
(2) The initial settings of the station inherent parameters are the same as the setting range of the common parameters.

(2) How to decrease the number of refresh points

(a) Using the refresh parameters
Set the values so that only the required parts are refreshed.
For more details, refer to Section 5.7.1.

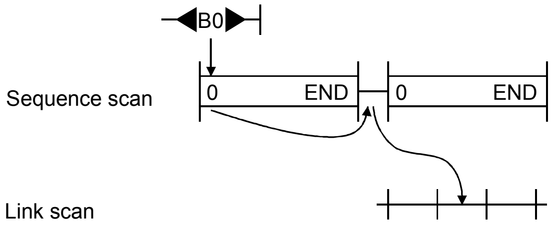


(b) Using direct access to link devices
The refresh time can be reduced by directly accessing link devices that are less frequently used by the host and excluding them from the refresh range. (Refer to Section 7.1)

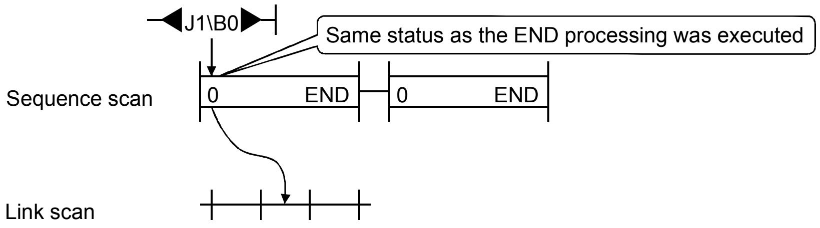


The link refresh is executed by the END processing of the CPU module, but reading from/writing to the network module is directly performed when an instruction is executed; thus the transmission delay time can be reduced.

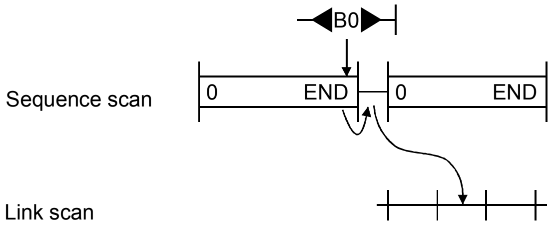
1) Direct access to the sending station
   a) When close to step 0
      The direct access is faster by a maximum of one scan of a sequence program when compared with the link refresh.
      (Link refresh)



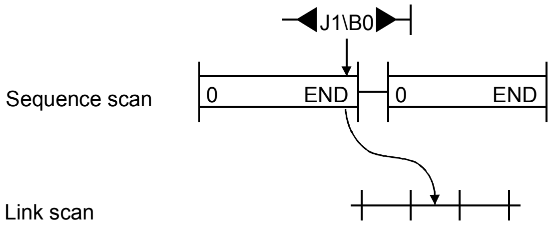
(Direct access)



   b) When close to END
      The link refresh and the direct access occur at almost the same time.
      (Link refresh)



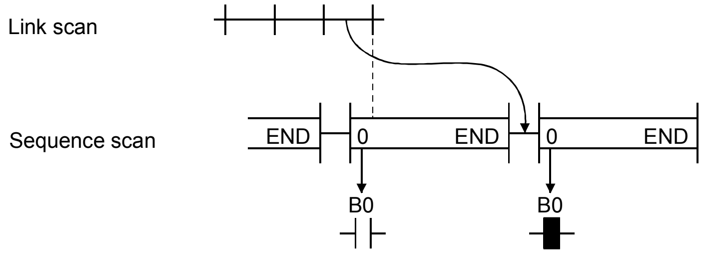
(Direct access)



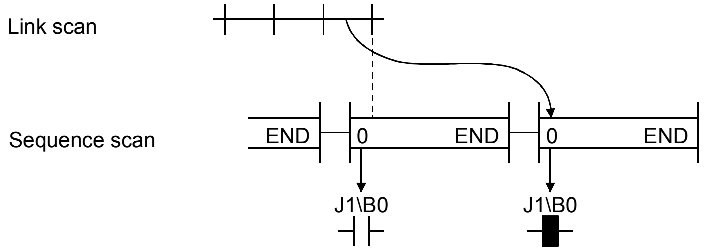
2) Direct access to the receiving station

a) When close to step 0
The link refresh and the direct access occur at almost the same time.

(Link refresh)

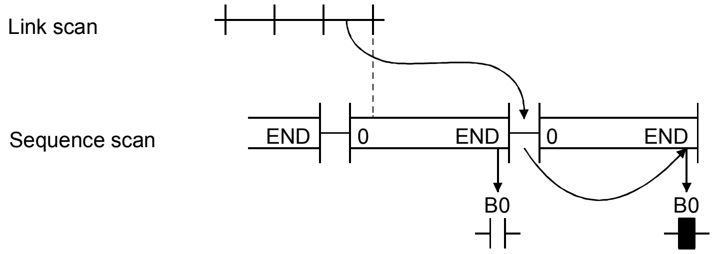


(Direct access)

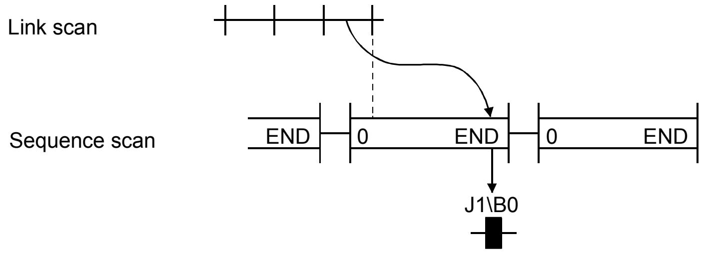


b) When close to END
The direct access is faster by a maximum of one scan of a sequence program when compared with the link refresh.

(Link refresh)

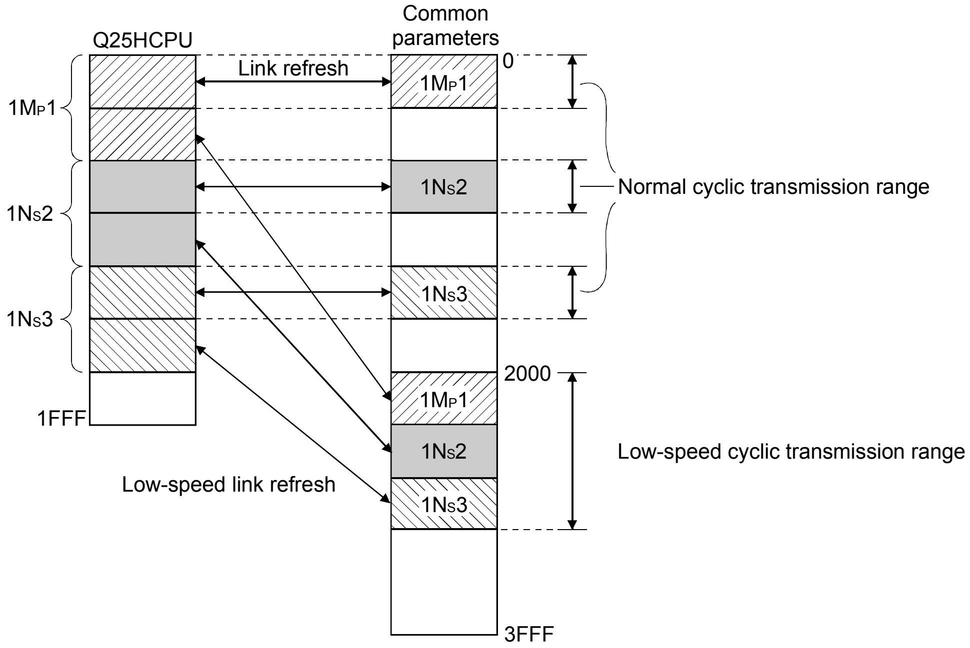


(Direct access)



3.3.4 Reduction of the link scan time

The amount of link refresh and link scan data (LB/LW) per END processing can be reduced by assigning the data in the link devices (LB/LW) for normal cyclic transmission, which does not require high-speed transmission, to the extension area (2000_H to $3FFF_H$), and transmit it by the low-speed cyclic transmission.
(High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU)



3.3.5 Control station shift time

The time required to shift the control station status (control station shift time) can be calculated from the following expression:

[Control station shift time (Csw)]

Csw=(ⓐ×12) + (ⓑ×11) + (ⓒ× 3) + 450 [ms]

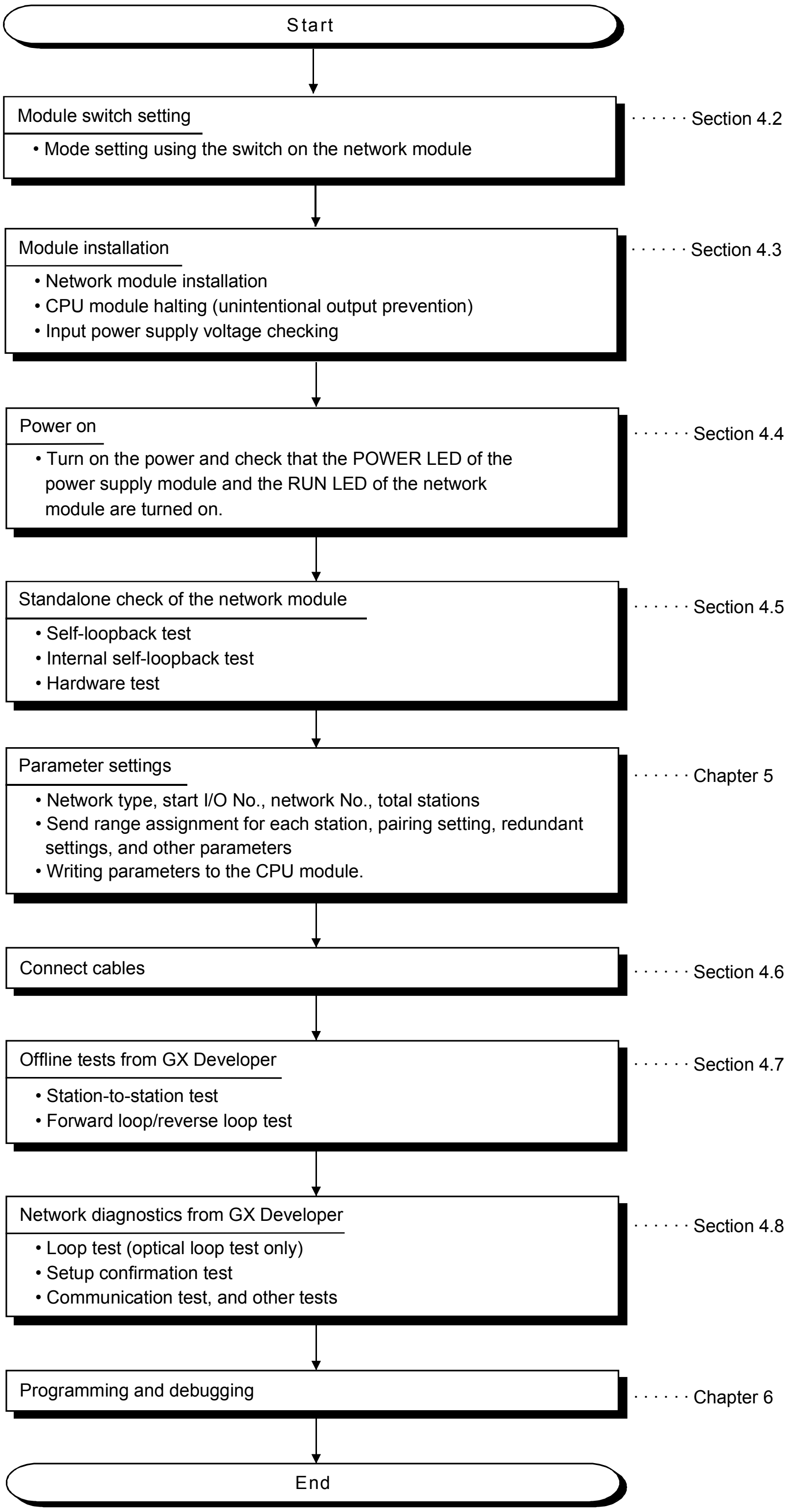
ⓐ : Number of normal stations after control station cut-off
ⓑ : Number of abnormal stations after control station cut-off
ⓒ : Set value of constant link scan (Refer to Section 5.4.)

4 SETUP AND PROCEDURES BEFORE STARTING THE OPERATION

This chapter explains the procedures, settings, connections and testing that are required to start the data link operation.

4.1 Procedures Before Starting the Operation

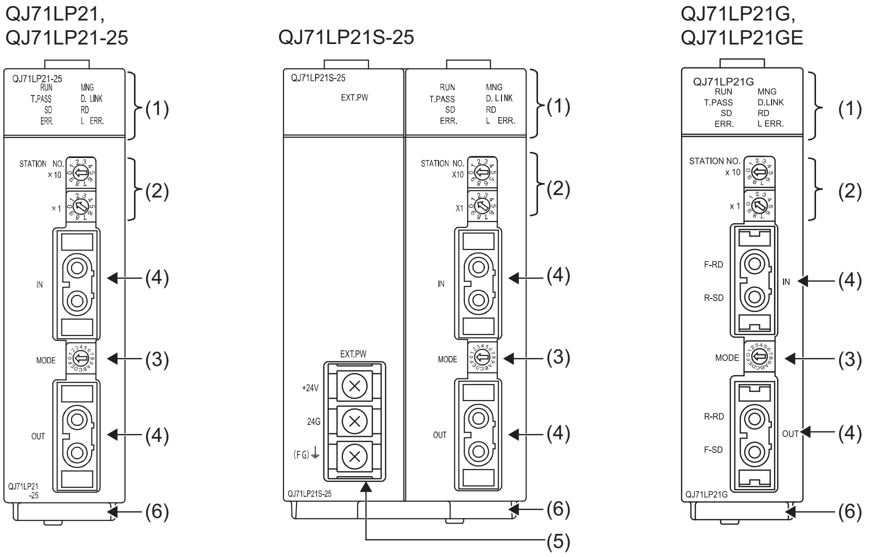
The following flowchart shows the procedure for the data link operation:



4.2 Part Names and Settings

This section explains part names and settings of the network modules.

4.2.1 QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21G, QJ71LP21GE



(1) Indicator LEDs

Name	LED status	Description
RUN	ON (green)	The module operating normally
	OFF	A watchdog timer error occurred (hardware failure).
MNG	ON (green)	Operating as a control station or sub-control station
	OFF	Normal station (not operating as a control station or sub-control station)
T.PASS	ON (green)	Executing baton pass (being joined in a network)
	Flashing (green)	The test is determined to have completed when this LED flashes 20 times or more (approximately 10s) during the test.
	OFF	Baton pass not yet executed (The host station is disconnected from the network.)
D.LINK	ON (green)	Data link being executed (Cyclic transmission is being executed.)
	OFF	Data link not yet executed (e.g. parameter receiving not completed, host CPU error, data link stop instructed)
SD	ON (green)	Data being sent
	OFF	Data not yet sent
RD	ON (green)	Data being received
	OFF	Data not yet received
ERR.	ON (red)	• An error, such as a station number setting error, mode setting error (set to use prohibited), operating condition setting error by parameter, and a mounted CPU type error (setting outside the range used, incorrect CPU type), occurred. • A station with the same number already exists in the network. • Although a control station has already existed in the network, the host station is specified as a control station. • Invalid parameter setting • The parameters received from the sub-control station and the parameters retained by the host (received from the control station) are different. • A moderate or serious error occurred in the CPU module.
	Flashing	• An error was detected while the network module was being tested. • The setting of the mode setting switch or the station number setting switch was changed during operation. ∗1
	OFF	Normal status

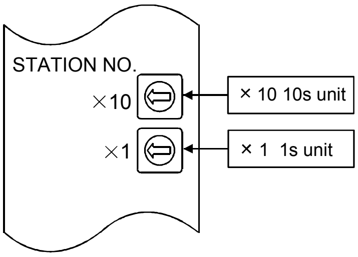
Name	LED status	Description
L ERR.	ON (red)	A communication error occurred (one of the following communication errors has occurred): CRC : An error was generated by a fault such as a cable error and noise. OVER : This error occurs when the next data is received before the last receive data is loaded into the module, and the previous data is lost. It is caused by hardware failure in the receive area of the network module. AB.IF : This error occurs when the number of receive bit data indicating "1" in the frame is more than or equal to the specified number of data, or when the receive data is shorter than the specified data length. TIME : This error occurs when a baton pass was not handed to the host within the monitoring time. DATA : This error occurs when abnormal code data is received. UNDER : This error occurs when the internal processing of the send data was not executed at a fixed interval. LOOP : This error occurs when the forward loop line or reverse loop line is faulty and the power to the adjacent station, which sends data to the host station, is turned off or the hardware of the sending station part in the loop is faulty. <Corrective action> Check the cables and connectors (e.g. disconnected or loosened connector, wrong IN/OUT connection, disconnected cable, damaged connector/cable, improper cable routing). For details, refer to the network diagnostics (Section 8.1).
	OFF	No communication error
EXT. PW	ON (green)	External power being supplied (Power supply status of host (SB0042) is on.)
	OFF	External power not supplied (Power supply status of host (SB0042) is off.)

∗1: The ERR. LED flashes on the following modules whose serial No. (first five digits) is "02112" or later.

- QJ71LP21
- QJ71LP21-25
- QJ71BR11

(2) Station number setting switch

Used to set the station number of the network module. (Factory default: 1)

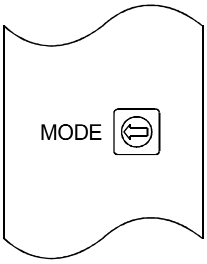


Setting	Description
0	Setting error (The ERR. LED turns on.)
1 to 64	Station number 1 to 64
65 to 99	Setting error (The ERR. LED turns on.)

POINT

(1) Station numbers cannot be duplicated in the same network.
(2) Any station can be set as the control station as long as the station number is within the setting range.
(3) The station number can be set randomly. Note that stations with no number assignment must be set as reserved stations.
(4) When setting, use a station number within the range set to "Total stations" parameter of network parameter.

(3) Mode setting switch
Used to set the mode of the network module. (Factory default: 0)
Set the mode setting switches in the same position on all network modules.



(a) QJ71LP21, QJ71LP21G, QJ71LP21GE

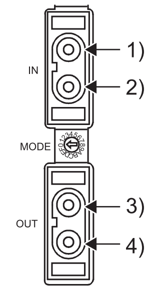
Setting	Description
0	Online (The mode selected by the network parameter will be enabled.)
1	Self-loopback test
2	Internal self-loopback test
3	Hardware test
4 to F	Use prohibited

(b) QJ71LP21-25, QJ71LP21S-25

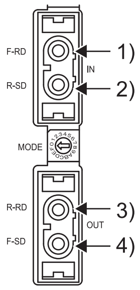
Setting	Description	
0	Online (The mode selected by the network parameter will be enabled.)	At 10Mbps
1	Self-loopback test	
2	Internal self-loopback test	
3	Hardware test	
4	Online (The mode selected by the network parameter will be enabled.)	At 25Mbps
5	Self-loopback test	
6	Internal self-loopback test	
7	Hardware test	
8 to F	Use prohibited	

(4) IN and OUT connectors
An optical fiber cable connector is connected. (Refer to Section 4.6.1.)

QJ71LP21,
QJ71LP21-25,
QJ71LP21S-25



QJ71LP21G,
QJ71LP21GE

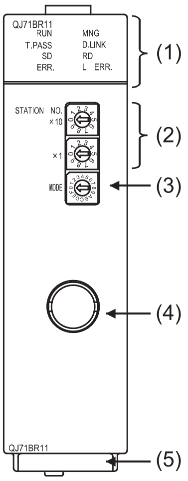


	Name
1)	IN Forward loop receiving
2)	IN Reverse loop sending
3)	OUT Reverse loop receiving
4)	OUT Forward loop sending

(5) External power supply terminal block
An external power supply is wired. (Refer to Section 4.6.1.)

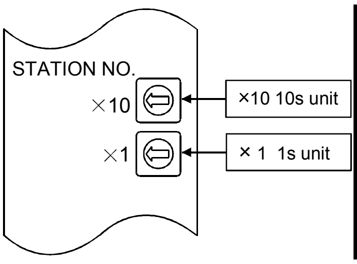
(6) Serial number plate display
This display indicates the serial number of the rating plate.

4.2.2 QJ71BR11



(1) Indicator LEDs
Same as the optical loop system. (Refer to Section 4.2.1.)

(2) Station number setting switch
Used to set the station number of the network module. (Factory default: 1)



Setting	Description
0	Setting error (The ERR. LED turns on.)
1 to 32	Station number 1 to 32
33 to 64	Setting error (The ERR.LED will not turn on.)
65 to 99	Setting error (The ERR. LED turns on.)

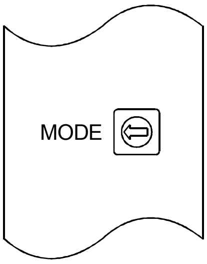
POINT

(1) Station numbers cannot be duplicated in the same network.
(2) Any station can be set as the control station as long as the station number is within the setting range.
(3) The station number can be set randomly. Note that stations with no number assignment must be set as reserved stations.
(4) When setting, use a station number within the range set to "Total stations" parameter of network parameter.

(3) Mode setting switch

Used to set the mode of the network module. (Factory default: 0)

Set the mode setting switches in the same position on all network modules.



Setting	Description
0	Online (The mode selected by the network parameter will be enabled.)
1	Self-loopback test
2	Internal self-loopback test
3	Hardware test
4 to F	Use prohibited

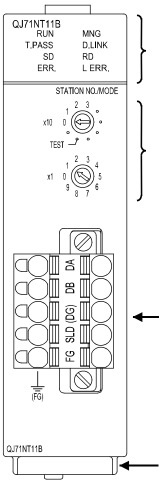
(4) Coaxial connector

An F-type connector for a coaxial cable is connected. (Refer to Section 4.6.2.)

(5) Serial number display

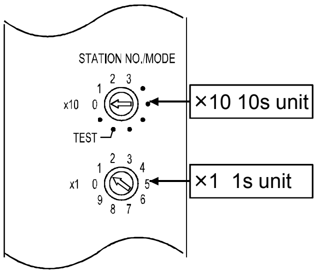
This display indicates the serial number of the rating plate.

4.2.3 QJ71NT11B



(1) Indicator LEDs
Same as the optical loop system. (Refer to Section 4.2.1.)

(2) Station number/mode setting switch
Used to set the station number and mode of the network module. (Factory default: 1)
Set the same operation mode to all network modules.



Setting		Description
×10	×1	
0	0	Setting error (The ERR. LED turns on.)
0	1	Station number 1 to 32 (online.)
to		
3	2	
3	3 to 9	Setting error (The ERR. LED turns on.) ＊1
•	0 to 9	
TEST	0 to 6	
TEST	7	Self-loopback test
TEST	8	Internal self-loopback test
TEST	9	Hardware test

＊1: The ERR. LED does not turn on in red if the station number is set equivalent to 33 to 64.

POINT

(1) Station numbers cannot be duplicated in the same network.
(2) Any station can be set as the control station as long as the station number is within the setting range.
(3) The station number can be set randomly. Note that stations with no number assignment must be set as reserved stations.
(4) When setting, use a station number within the range set to "Total stations" parameter of network parameter.

(3) Spring clamp terminal block
Used to connect a shielded twisted pair cable or CC-Link Ver. 1.10-compatible cable. (Refer to Section 4.6.3.)

(4) Serial number display
This display indicates the serial number of the rating plate.

4.3 Loading and Installation

This section provides the handling precautions, from unpacking to installation of the network module.
For details of the loading and installation of the network module, refer to QCPU User's Manual (Hardware Design, Maintenance and Inspection).

4.3.1 Handling precautions

This section describes precautions for handling the network module itself.

(1) Since the module case is made of resin, do not drop the module or apply a strong impact to it.

(2) Do not remove the printed-circuit board of the module from the case.
Doing so will cause failure.

(3) Prevent foreign matter such as dust or wire chips from entering the module.
Failure to do so may cause a fire, failure, or malfunction.

(4) A protective film is attached to the module top to prevent foreign matter such as wire chips from entering the module during wiring. Do not remove the film during wiring.
Be sure to remove it for heat dissipation before system operation.

(5) Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
Not doing so may cause a failure or malfunction of the module.

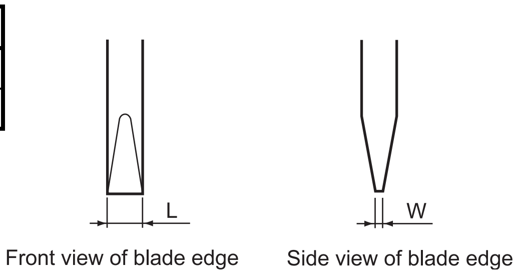
(6) Tighten the screws such as module fixing screws within the following ranges.

Screw location	Tightening torque range
Module fixing screw (M3 screw) ＊1	0.36 to 0.48 N • m
Terminal screw on external power supply terminal block (M3 screw)	0.42 to 0.58 N • m
Spring clamp terminal block fixing screw (M2.5 screw)	0.20 to 0.30 N • m

＊1: The module can be easily fixed onto the base unit using the hook at the top of the module. However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

(7) Use drivers, which match the following recommended driver dimensions, for the operation of the station number setting switch and the mode setting switch. Using drivers with unsuitable edge width or thickness may damage the switches.

Screw location	Tightening torque range
Edge width (L)	2.0 to 2.4 mm
Edge thickness (W)	0.5 to 0.6 mm



4.3.2 Installing and uninstalling the module

(1) Installing the module

Fully insert the module fixing latch into the module fixing hole in the base unit (exercise care not to allow the module fixing latch to separate from the module fixing hole).

↓

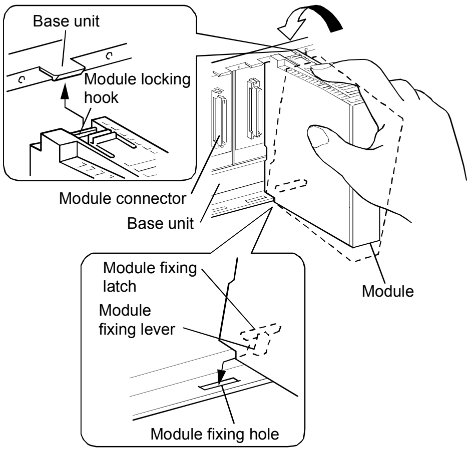
Using the module fixing hole as a fulcrum, push the module in the direction of arrow to mount it into the base unit.

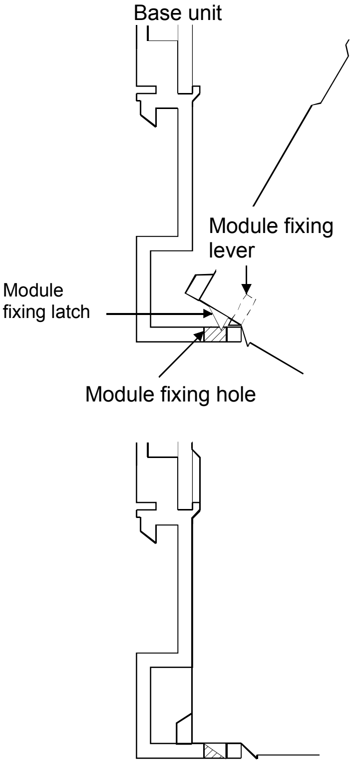
↓

Check that the module is securely fixed to the base unit

↓

Completed





(2) Uninstalling the module

Hold the module by both hands, and push the module locking hook on the top of the module until it stops.

↓

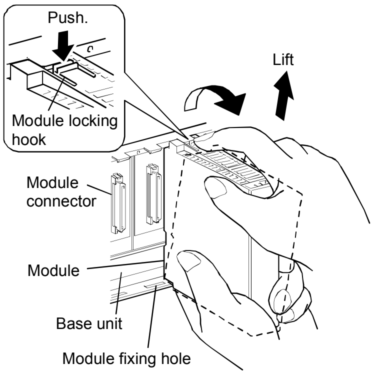
Pushing the module locking hook, pull the module downward.

↓

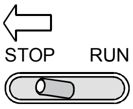
Lift the module to disengage the module fixing latch from the module fixing hole.

↓

Completed



4.3.3 Stopping the CPU module (unintentional output prevention)



Set the RUN/STOP switch *1 of the CPU module to STOP position.
*1: Use the RESET/STOP/RUN switch for the Basic model QCPU, Universal model QCPU, and safety CPU.

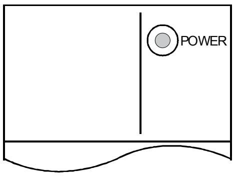
4.3.4 Checking the input power supply voltage

Check that the power voltage supplied to the power supply module is within the specifications.

4.4 Powering On

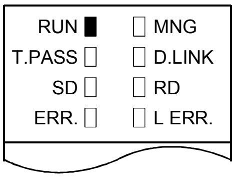
Check the power supply to the network module.

4.4.1 Checking the on status of the POWER LED of the power supply module



The POWER LED turns on at the same time when the programmable controller system is powered on.

4.4.2 Checking the on status of the RUN LED of the network module

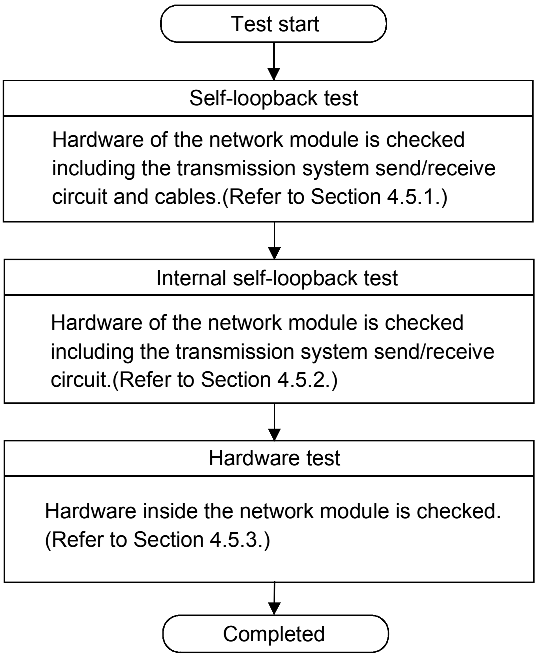


The RUN LED turns on in green when the network module is operating normally.
If this LED does not turn on, refer to Chapter 8, "Troubleshooting."

4.5 Standalone Check of the Network Module (Offline Tests)

Before executing the data link operation, check the network module and the cables. Conduct an offline test following the procedure below.

Flow of offline tests



Test start

Self-loopback test

Hardware of the network module is checked including the transmission system send/receive circuit and cables.(Refer to Section 4.5.1.)

Internal self-loopback test

Hardware of the network module is checked including the transmission system send/receive circuit.(Refer to Section 4.5.2.)

Hardware test

Hardware inside the network module is checked. (Refer to Section 4.5.3.)

Completed

REMARKS

- The data link operation cannot be executed normally if one station is in the test mode (Self-loopback test, Internal self-loopback test, and Hardware test) during data linking (online).
- For the test in offline mode, conduct by only the network module.

4.5.1 Self-loopback test

This test checks the hardware of a standalone network module, including the send/receive circuit and cable of the transmission system.

POINT

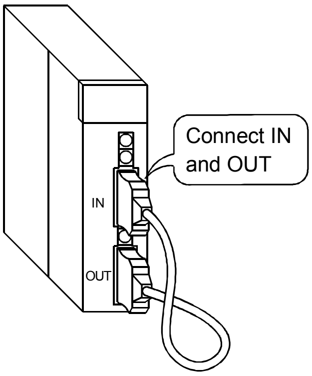
Do not connect or disconnect the cable or terminating resistor during execution of the test. (Doing so will result in test failure.)

(1) System configurations
   (a) Optical loop system
   Connect IN and OUT terminals of the network module with an optical fiber cable.

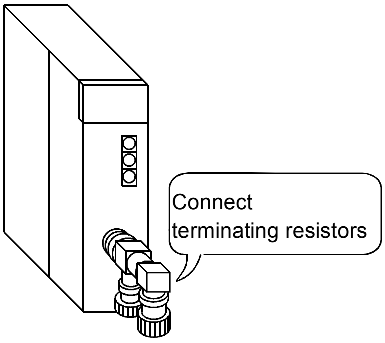
   (b) Coaxial bus system
   Connect terminating registers to both F-shaped connectors of the network module.

   (c) Twisted bus system
   Connect a terminating register between DA and DB of the network module.

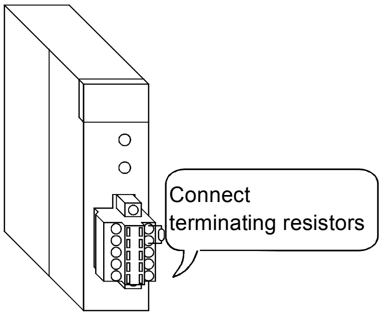
Optical loop system

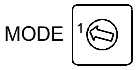


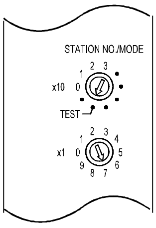
Coaxial bus system



Twisted bus system





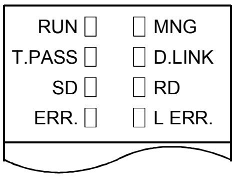


(2) Test mode settings
   (a) Optical loop system
   Set the mode setting switch of the network module to "1" and "5" for 10Mbps and 25Mbps respectively.

   (b) Coaxial bus system
   Set the mode setting switch of the network module to "1".

   (c) Twisted bus system
   Set the station number/mode setting switches of "×10" and "×1" to "TEST" and "7" respectively.

(3) Starting a test/checking the result
The self-loopback test is executed when the CPU module is powered on from off or reset.
Check the status by the indicator LED of the network module.
The T. PASS LED flashes during the test.
When the T. PASS LED flashes 20 times (approx. 10 seconds) or more and the ERR.LED does not flash, this condition indicates normal completion.
If the test is abnormally completed, the ERR. LED flashes.
Upon detection of an error, the test will be terminated (abnormal completion).



Before test		During test		Normal completion of test
T.PASS□: Off	⇒	◨: Flashing	⇒	◨: Flashing 20 times (approx. 10 seconds) or more
				Abnormal completion of test
			ERR.	◨: Flashing

If a test has completed abnormally, check the error detail by GX Developer and locate the error in the following method.

Network system	Checking method
Optical loop system	Replacing the cables
Coaxial bus system	Replacing the terminating registers
Twisted bus system	Replacing the module

REMARKS

Testing status and the result can be checked in the following link special registers.

Baton pass status (host)	SW0047	→ $1F_H$	: Offline test
Cause of baton pass interruption	SW0048	→ 2_H	: Offline test
Offline test execution item/faulty station (requesting side)	SW00AC	→ 7_H	: Self-loopback test
Offline test result (requesting side)	SW00AD	→ 0	: Normal
		1 or larger	: Error code

For details of how to check the error contents, refer to Chapter 8.

4.5.2 Internal self-loopback test

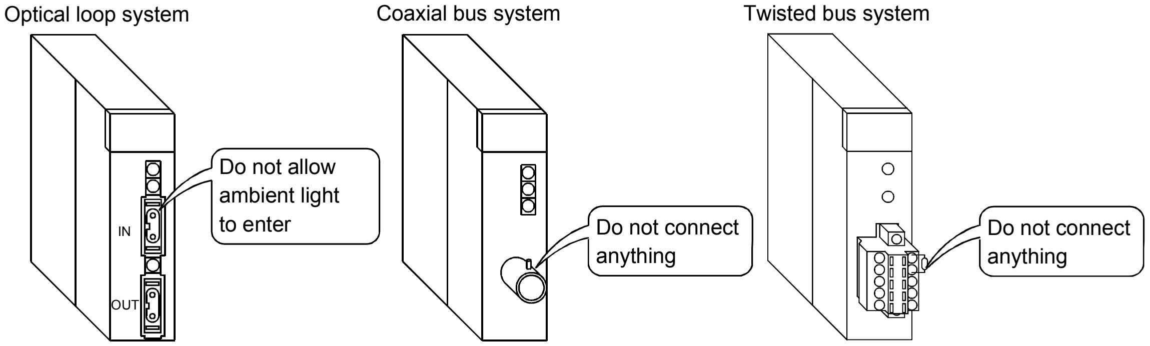
This test checks the hardware of a standalone network module, including the send/receive circuit of the transmission system.

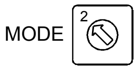
(1) System configurations

(a) Optical loop system
Do not connect optical fiber cable to the network module.
Ensure to prevent ambient light from entering the module through connectors.

(b) Coaxial bus system
Do not connect a cable and connector to the network module.

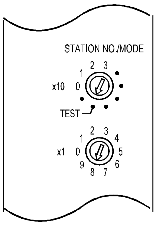
(c) Twisted bus system
Do not connect a cable and connector to the network module.





(2) Test mode settings

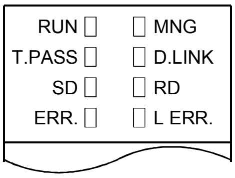
(a) Optical loop system
Set the mode setting switch of the network module to "2" and "6" for 10Mbps and 25Mbps respectively.



(b) Coaxial bus system
Set the mode setting switch of the network module to "2".

(c) Twisted bus system
Set the station number/mode setting switches of "×10" and "×1" to "TEST" and "8" respectively.

(3) Starting a test/checking the result
The internal self-loopback test is executed when the CPU module is powered on from off or reset.
Check the status by the indicator LED of the network module.
The T. PASS LED flashes during the test.
When the T. PASS LED flashes 20 times (approx. 10 seconds) or more and if the ERR.LED does not flash, this condition indicates normal completion.
If the test is abnormally completed, the ERR. LED flashes.
Upon detection of an error, the test will be terminated (abnormal termination).



Before test During test Normal completion of test

T.PASS☐: Off ⇒ ◨: Flashing ⇒ ◨: Flashing 20 times (approx. 10 seconds) or more

Abnormal completion of test

ERR. ◨: Flashing

When an error occurs, the error details must be checked with GX Developer. The faulty area can be examined by replacing the module.

REMARKS

Testing status and the result can be checked in the following link special registers.

Baton pass status (host)	SW0047	→ $1F_H$	: Offline test
Cause of baton pass interruption	SW0048	→ 2_H	: Offline test
Offline test execution item/faulty station (requesting side)	SW00AC	→ 8_H	: Internal self-loopback test
Offline test result (requesting side)	SW00AD	→ 0	: Normal
		1 or larger	: Error code

For details of how to check the error contents, refer to Chapter 8.

4.5.3 Hardware test

This test checks the hardware inside the network module.

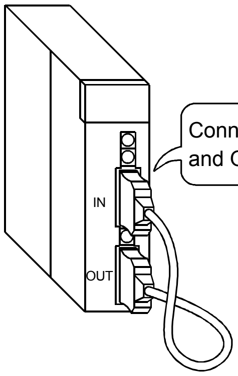
(1) System configurations

(a) Optical loop system
Connect IN and OUT terminals of the network module with an optical fiber cable.

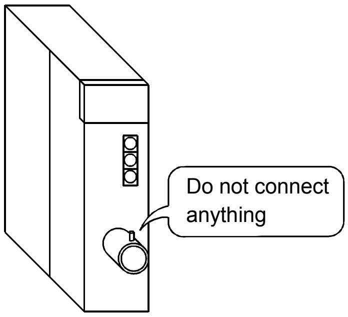
(b) Coaxial bus system
Do not connect a cable and connector to the network module.

(c) Twisted bus system
Do not connect a cable and connector to the network module.

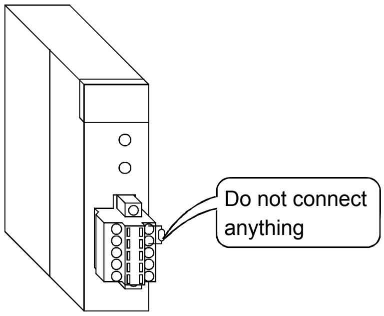
Optical loop system

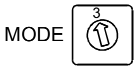


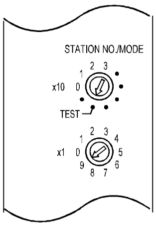
Coaxial bus system



Twisted bus system







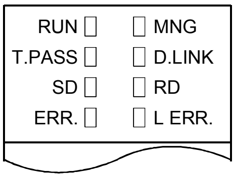
(2) Test mode settings

(a) Optical loop system
Set the mode setting switch of the network module to "3" and "7" for 10Mbps and 25Mbps respectively.

(b) Coaxial bus system
Set the mode setting switch of the network module to "3".

(c) Twisted bus system
Set the station number/mode setting switches of "×10" and "×1" to "TEST" and "9" respectively.

(3) Starting a test/checking the result
The hardware test is executed when the CPU module is powered on from off or reset.
Check the status by the indicator LED of the network module.
The T. PASS LED flashes during the test.
When the T. PASS LED flashes 20 times (approx. 10 seconds) or more and if the ERR.LED does not flash, this condition indicates normal completion.
If the test is abnormally completed, the ERR. LED flashes.
Upon detection of an error, the test will be terminated (abnormal termination).



Before test		During test		Normal completion of test
T.PASS☐: Off	⇒	◨: Flashing	⇒	◨: Flashing 20 times (approx. 10 seconds) or more
				Abnormal completion of test
			ERR.	◨: Flashing

When an error occurs, the error details must be checked with GX Developer. The faulty area can be examined by replacing the cable or module.

REMARKS

Testing status and the result can be checked in the following link special registers.

Baton pass status (host)	SW0047	→ $1F_H$	: Offline test
Cause of baton pass interruption	SW0048	→ 2_H	: Offline test
Offline test execution item/faulty station (requesting side)	SW00AC	→ 9_H	: Hardware test
Offline test result (requesting side)	SW00AD	→ 0	: Normal
		1 or larger	: Error code

For details of how to check the error contents, refer to Chapter 8.

4.6 Cable Connection

4.6.1 Optical loop system

(1) Precautions for connecting

(a) The types of optical fiber cables that can be used vary depending on the distance between stations.

Type		Distance between stations			
		QJ71LP21, QJ71LP21-25, QJ71LP21S-25: 10Mbps	QJ71LP21-25, QJ71LP21S-25: 25Mbps	QJ71LP21G	QJ71LP21GE
SI optical fiber cable (Old type: A-2P-□)	L type	500 m (1641 feet)	200 m (656 feet)	Must not be used	Must not be used
	H type	300 m (984 feet)	100 m (328 feet)		
SI optical fiber cable		500 m (1641 feet)	200 m (656 feet)		
H-PCF optical fiber cable		1000 m (3281 feet)	400 m (1312 feet)		
Broad-band H-PCF optical fiber cable		1000 m (3281 feet)	1000 m (3281 feet)		
QSI optical fiber cable		1000 m (3281 feet)	1000 m (3281 feet)		
GI-50/125 optical fiber cable		Must not be used	Must not be used	2000 m (6562 feet)	Must not be used
GI-62.5/125 optical fiber cable		Must not be used	Must not be used	Must not be used	2000 m (6562 feet)

(b) When connecting an optical fiber cable, check the specifications of the cable for restrictions on the bending radius.

(c) Maintain the bending radius of the optical fiber cable within the allowable range using a tool for securing the optical fiber cable bending radius.
Contact Mitsubishi Electric System Service, Inc, for the tool.

(d) When laying the optical fiber cables, do not touch the fiber core of the cable and module connectors, and avoid dust or particles.
If oil from hands, dust, or particles adhere to the cores, the accumulated transmission may be lost, resulting in malfunction in the data link.
Do not remove the cover from the module-side connector until the optical fiber cable is to be installed.

(e) When connecting or disconnecting an optical fiber cable, hold the connector part of the cable.

(f) Connect the cable and module connectors securely until it snaps.

(g) Shut off the external power supply for the system in all phases before connecting or disconnecting optical fiber cables.

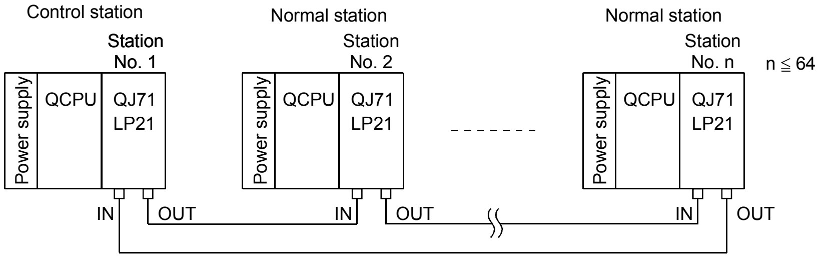
(2) Cable connection

(a) How to connect the cable

Connect the OUT and IN terminals with an optical fiber cables as shown below.

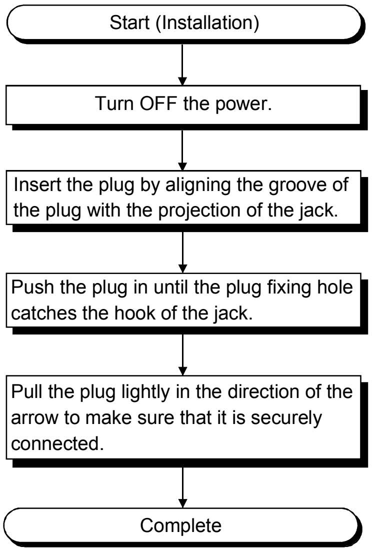
Note that there is no need to connect the cables in the order of station numbers.

Any station number can be assigned as the control station.



(b) Installing the optical fiber cable

The following shows how to install the optical fiber cable:


Start (Installation)

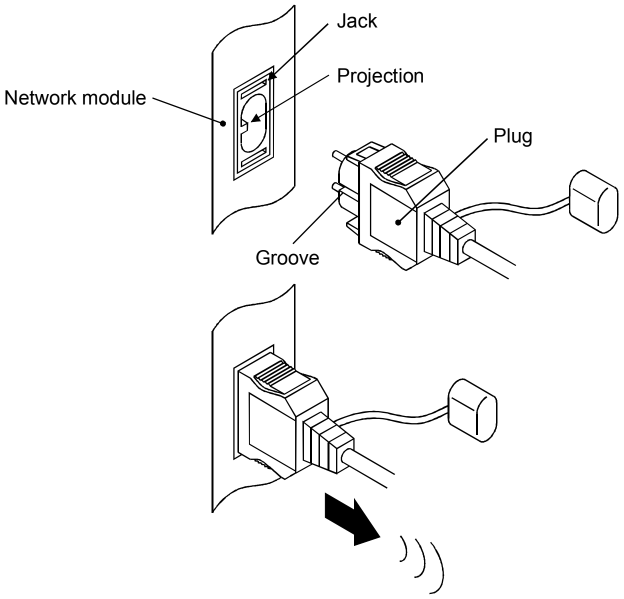
Turn OFF the power.

Insert the plug by aligning the groove of the plug with the projection of the jack.

Push the plug in until the plug fixing hole catches the hook of the jack.

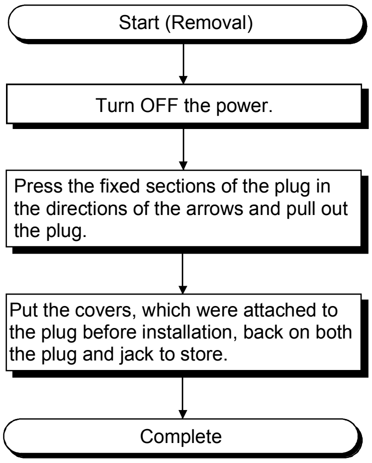
Pull the plug lightly in the direction of the arrow to make sure that it is securely connected.

Complete



(c) Removing the optical fiber cable

The following shows how to remove the optical fiber cable:

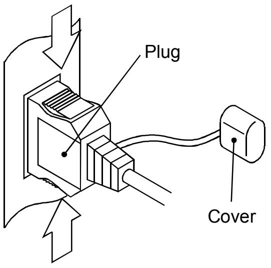

Start (Removal)

Turn OFF the power.

Press the fixed sections of the plug in the directions of the arrows and pull out the plug.

Put the covers, which were attached to the plug before installation, back on both the plug and jack to store.

Complete



POINT

Data link operation may be executed when IN and IN or OUT and OUT are connected with an optical fiber cable. Check that IN and OUT are connected otherwise the loopback function, the network diagnostic function, and some of other functions do not operate normally.
The wiring status can be checked by either of the following methods.

(1) When checking by halting data link
Conduct a loop test with the network diagnostics of GX Developer. (Refer to Section 4.8.1.)

(2) When checking without halting data link
Check the status of SW009C to 009F. (Refer to Section 8.2.10.)

4.6.2 Coaxial bus system

(1) Precautions for connecting

(a) Restrictions on the cable length between the stations

1) When connecting between the network modules, the cable lengths indicated in the table below must be used according to the number of stations connected.
A communication error may occur if a cable length is out of the following ranges.

Number of stations connected / Station-to-station cable length	2 to 9 stations			10 to 33 stations		
Cable type	3C – 2V	5C – 2V	5C-FB	3C – 2V	5C – 2V	5C-FB
0 to 1 m (3.28 feet)	× (cable less than 1m (3.28 feet) in length cannot be used.)					
1 (3.28 feet) to 5 m (16.41 feet)	○	○	○	○	○	○
5 (16.41 feet) to 13 m (42.65 feet)	○	○	○	×	×	×
13 (42.65 feet) to 17 m (55.78 feet)	○	○	○	○	○	○
17 (55.78 feet) to 25 m (82.03 feet)	○	○	○	×	×	×
25 (82.03 feet) to 300 m (984.3 feet)	○	○	○	○	○	○
300 (984.3 feet) to 500 m (1640.5 feet)	×	○	○	×	○	○

○: Allowed ×: Not allowed

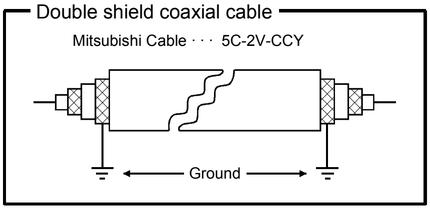
2) If there is a possibility of adding stations to extend the system, cables considering restriction 1) mentioned above.

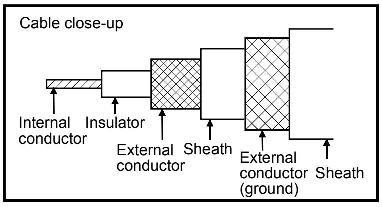
3) When using a repeater module (models A6BR10 or A6BR10-DC), only the length indicated in "10 to 33 stations" can be applied regardless of the number of stations connected or the number of repeater modules.

(b) Cable installation precautions

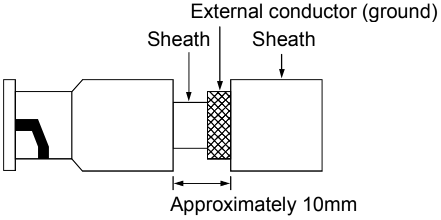
1) Install the coaxial cables at least 100 mm (3.94 inches) away from other power cables and control cables.

2) Consider to use double-shielded coaxial cables in locations where there is excessive noise.



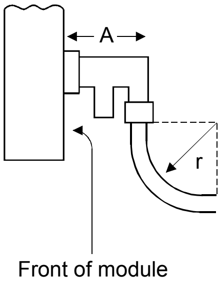


5C2V connector plug can be applied to double-shielded coaxial cable. Connect the plug to the coaxial cable inside the double-shielded coaxial cable.
Ground the shielded section, external part of the double-shielded coaxial cable, as shown above.
Locate external conductor (ground) of the double-shielded cable approximately 10mm away from the connector plug for 5C2V. (Do not contact them.)



(c) When connecting a coaxial cable, the following restrictions on the bending radius must be observed.

Cable type	Allowable bending radius r	Connector A
3C – 2V	23 mm (0.91 inches)	55 mm (2.17 inches)
5C – 2V	30 mm (1.18 inches)	
5C – FB	30 mm (1.18 inches)	



(d) Do not pull connected coaxial cables.
Doing so may cause poor contact, cable disconnection, and damage to the module.

(e) Connect a terminating resistor to both terminal stations in the coaxial bus type network system.

(f) Depending on a operating environment, some white oxidation deposits may be seen on the F type connector. Note that oxidation will not occur on the connection area, so there will be no problems with the function of the unit.

(g) Shut off the external power supply for the system in all phases before connecting or disconnecting coaxial cables.

(2) Cable connection

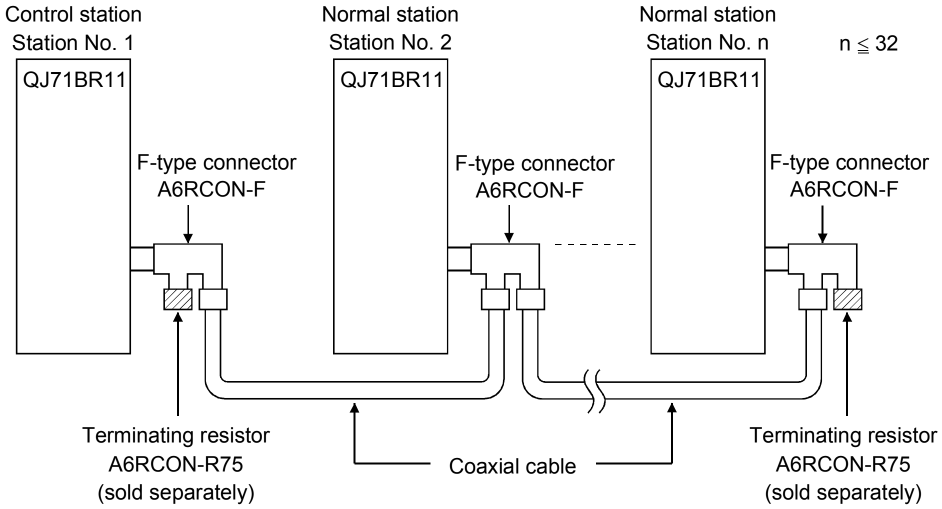
(a) Connection method

Connect the coaxial cable as shown below.

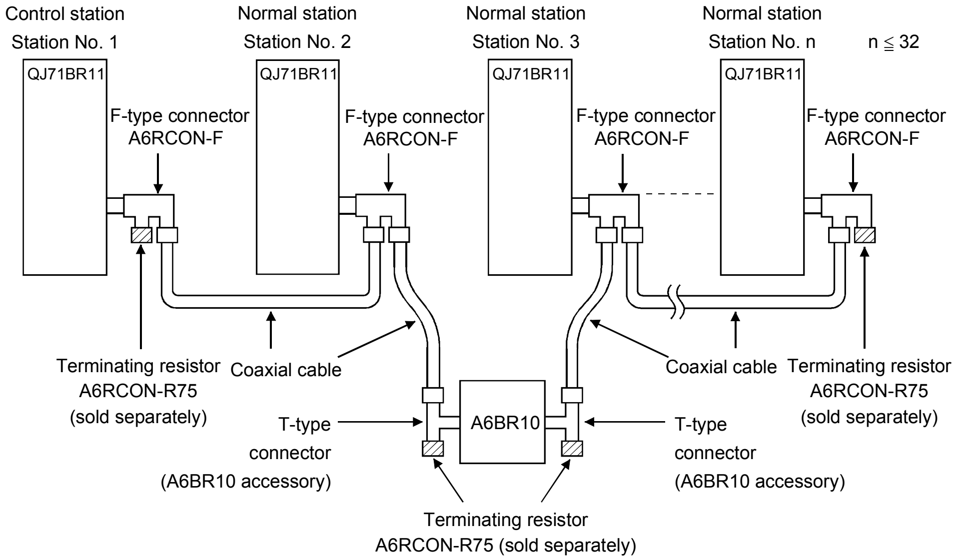
Install a terminating resistor (sold separately: A6RCON-R75) to the stations connected at both ends.

The F-type connector (A6RCON-F) comes with the module.

1) Without a repeater module



2) With a repeater module (series connection)

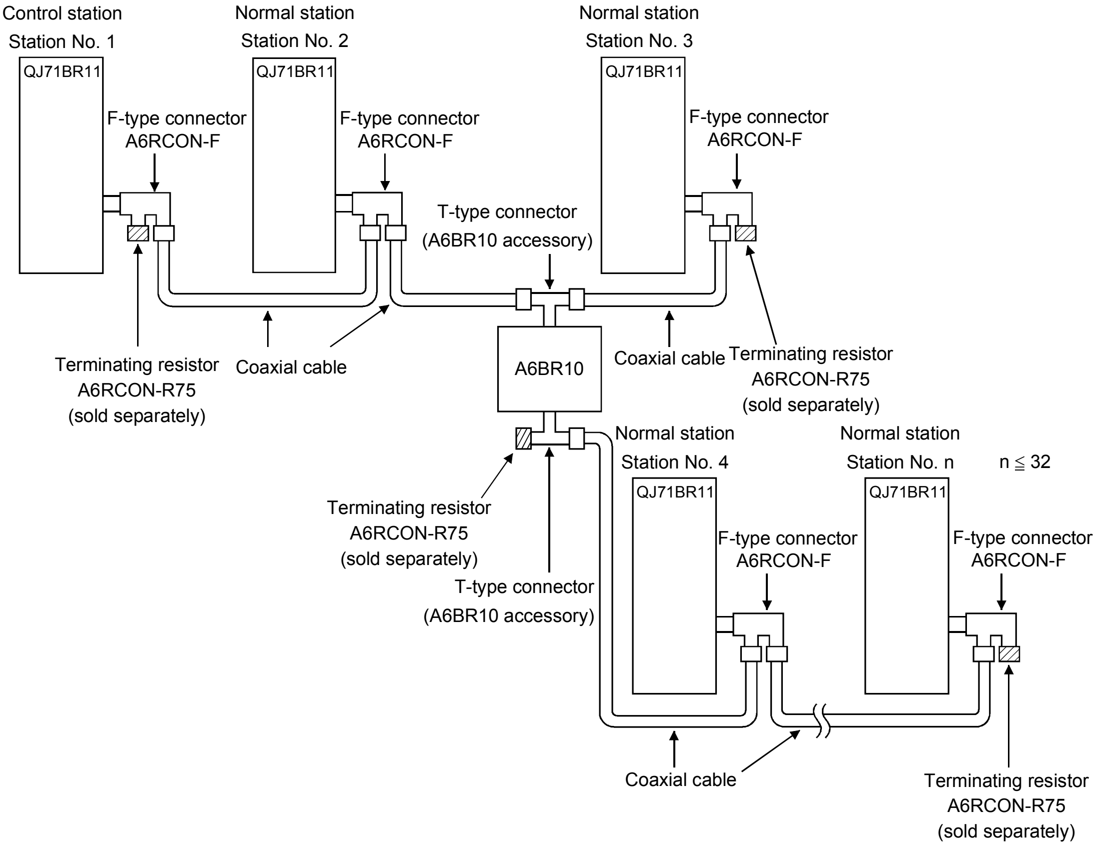


REMARKS

For details of the repeater module (A6BR10), refer to the following user's manual attached to the product:

Model A6BR10/A6BR10-DC MELSECNET/10 Coaxial Bus System Repeater Module User's Manual (IB-66499)

3) With a repeater module (branch connection)

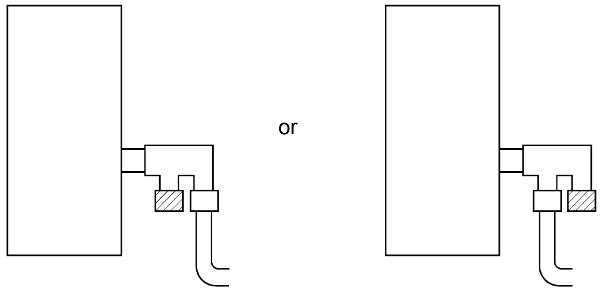


POINT

(1) By setting stations that will be connected in future (stations that are included in the number of stations but not actually connected) as reserved stations, a communication error can be prevented and the link scan time will not be affected.

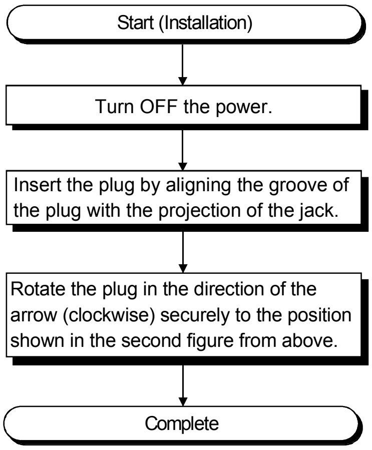
(2) The two connectors of the F-type connector are not dedicated to IN and OUT. A coaxial cable can be connected to either of them.

(3) A terminating resistor can be placed on either side of the F-type connector.



(b) Installing the coaxial cable

The following shows how to install the coaxial cable:

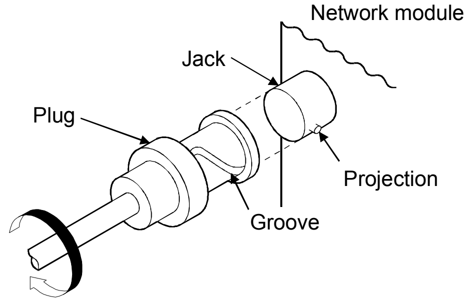

Start (Installation)

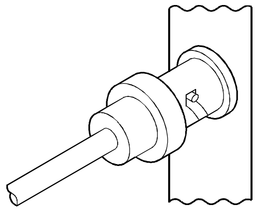
Turn OFF the power.

Insert the plug by aligning the groove of the plug with the projection of the jack.

Rotate the plug in the direction of the arrow (clockwise) securely to the position shown in the second figure from above.

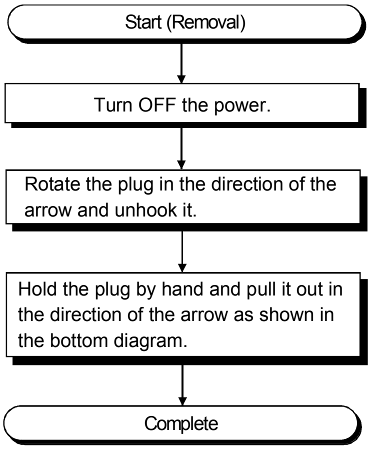
Complete





(c) Removing the coaxial cable

The following shows how to remove the coaxial cable:

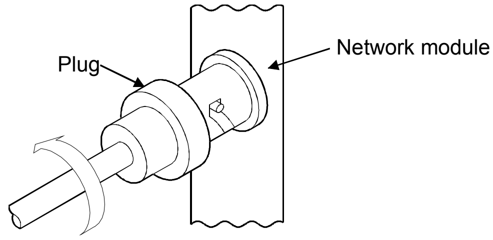

Start (Removal)

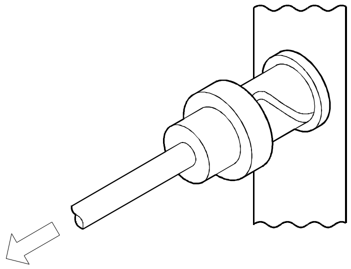
Turn OFF the power.

Rotate the plug in the direction of the arrow and unhook it.

Hold the plug by hand and pull it out in the direction of the arrow as shown in the bottom diagram.

Complete





4.6.3 Twisted bus system (when using a shielded twisted pair cable)

(1) Wiring precautions

(a) Wiring a shielded twisted pair cable
When wiring a shielded twisted pair cable, prevent the noise and surge induction, referring to the following.

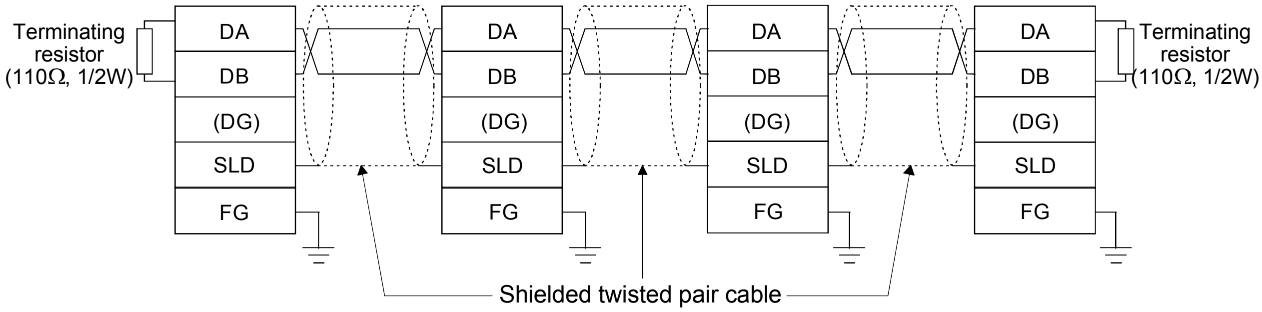
1) Do not install a shielded twisted pair cable together with the main circuit, high-voltage cable, or load line and also do not bring them close to each other. (Keep a distance of 100mm (3.94 inches) or more between them.)
2) Provide as much distance as possible between the shielded twisted pair cables and the power supply of the module or I/O signal cables.
3) Do not use any of shielded twisted pair cables (e.g. One pair among three pairs) for supplying power.

(b) Connecting terminating resistors
For the network modules at both ends, connect the DA and DB by a terminating resister (110Ω, 1/2W) provided with the module.

(c) Connecting/disconnecting a shielded twisted pair cable
Shut off the external power supply for the system in all phases.

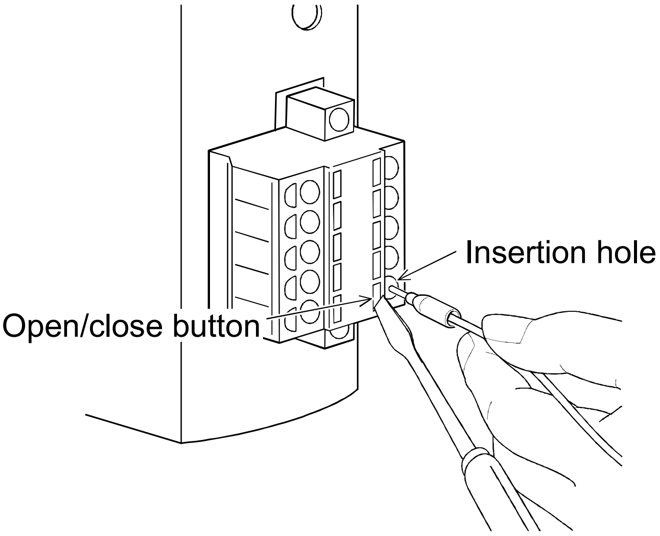
(2) Connection of cable

(a) Connection method
For connection between DAs and between DBs, use shielded twisted pair cables.
No cabling is required for (DG).
In addition, connect terminating resistors for stations at both ends.



(b) Connecting a cable to the spring clamp terminal block
The following explains connecting method of a cable to a spring clamp terminal block.
For the stripping method of the cable end, refer to Section 3.1.4. in this manual.
Use a recommended screwdriver or equivalent for connecting or disconnecting cables. (Refer to Appendix. 5)

1) Connecting the cable
Fully insert the cable into the correct opening with the open/close button pressed by a slotted screwdriver.
When using a bar terminal, the cable can be inserted without pressing the button.



2) Disconnecting the cable
Keep pressing the open/close button by a slotted screwdriver until the cable is completely pulled out.

4.6.4 Twisted bus system (when using CC-Link Ver.1.10-compatible cable)

(1) Wiring precautions

(a) Usage of CC-Link cables
The CC-Link Ver. 1.10-compatible cable cannot be used together with other CC-Link cables (CC-Link dedicated cable and CC-Link dedicated high-performance cable)
When used together, normal data communication cannot be expected.

(b) Branching of CC-Link cable
Connect network modules only with CC-Link cables.
Repeater hubs and connectors cannot be used.

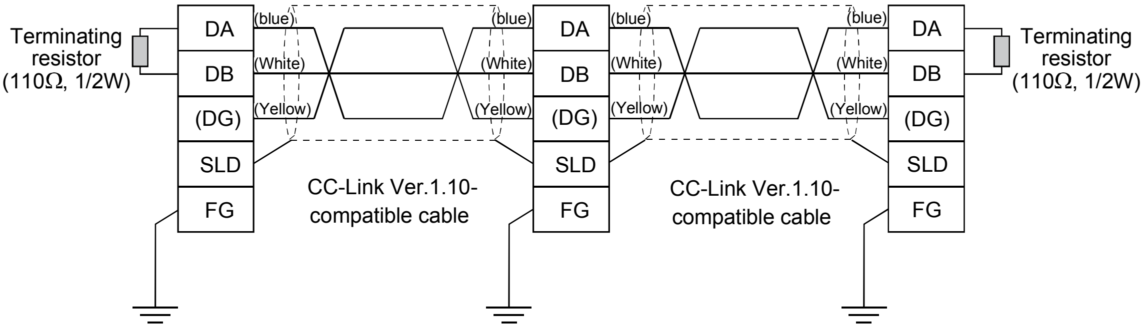
(c) Grounding of CC-Link cable
Ground both ends of the shielded wire of the CC-Link Ver. 1.10-compatible cable to the protective ground conductor by connecting to "SLD" of each network module via "FG".
The SLD and FG are connected within the module.

(d) Connecting a terminating resistor
For the network module at both ends, connect the DA and DB by a terminating resister (110Ω, 1/2W) provided with the module.

(e) Connecting/disconnecting CC-Link Ver. 1.10-compatible cable
Shut off the external power supply for the system in all phases.

(2) Connection of cable

(a) Connection method
Connect a blue, white, and yellow cable to the DA, DB, and (DG) respectively.
In addition, use terminating resistors for the stations at both ends.



(b) Wiring to spring clamp terminal block
For the wiring method of a cable to a spring clamp terminal block, refer to Section 4.6.3 (2) (b) in this manual.

4.7 Offline Tests from GX Developer

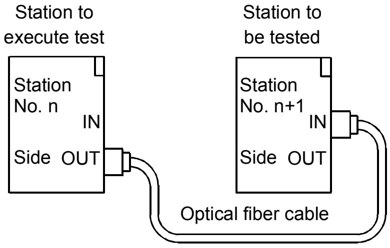
The offline tests check the cable connection status using the network parameters of GX Developer.

4.7.1 Station-to-station test

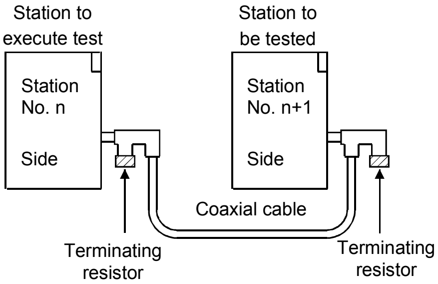
In the station-to-station test, the hardware of the network modules and cables between two adjacent stations can be checked.
The following explains how to conduct the station-to-station test:

(1) System configurations

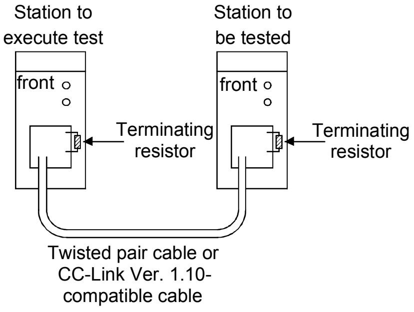
(a) [Optical loop system]
Connect IN and OUT of two network modules with an optical fiber cable.



(b) [Coaxial bus system]
Connect two network modules with a coaxial cable.

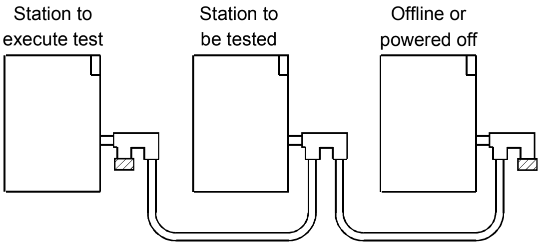


(c) [Twisted bus system]
Connect the network module with a shielded twisted pair cable or CC-Link Ver. 1.10-compatible cable.



REMARKS

Before conducting the station-to-station test when three or more stations are connected by the coaxial/twisted bus system, any stations that are not tested must be switched to offline or powered off.

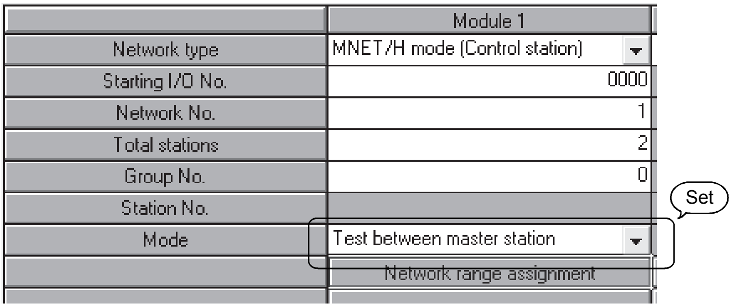


(2) Setting the test mode

(a) Mode setting for the station-to-station test on a non-redundant system station

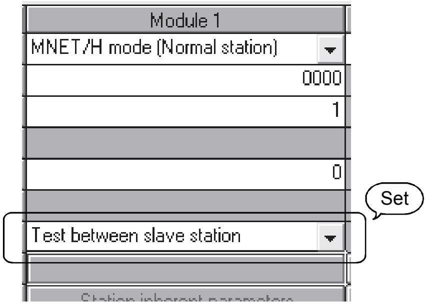
Set the mode network parameters for station number n and station number n + 1 to "Test between master station" and "Test between slave station" respectively, and write the parameter settings to the CPU module.

Station to execute test (station No. n)



Module 1
Network type: MNET/H mode (Control station)
Starting I/O No.: 0000
Network No.: 1
Total stations: 2
Group No.: 0
Station No.:
Mode: Test between master station

Station to be tested (station No. n + 1)



Module 1
Network type: MNET/H mode (Normal station)
Starting I/O No.: 0000
Network No.: 1
Group No.: 0
Mode: Test between slave station

(b) Mode setting for the station-to-station test in the redundant system

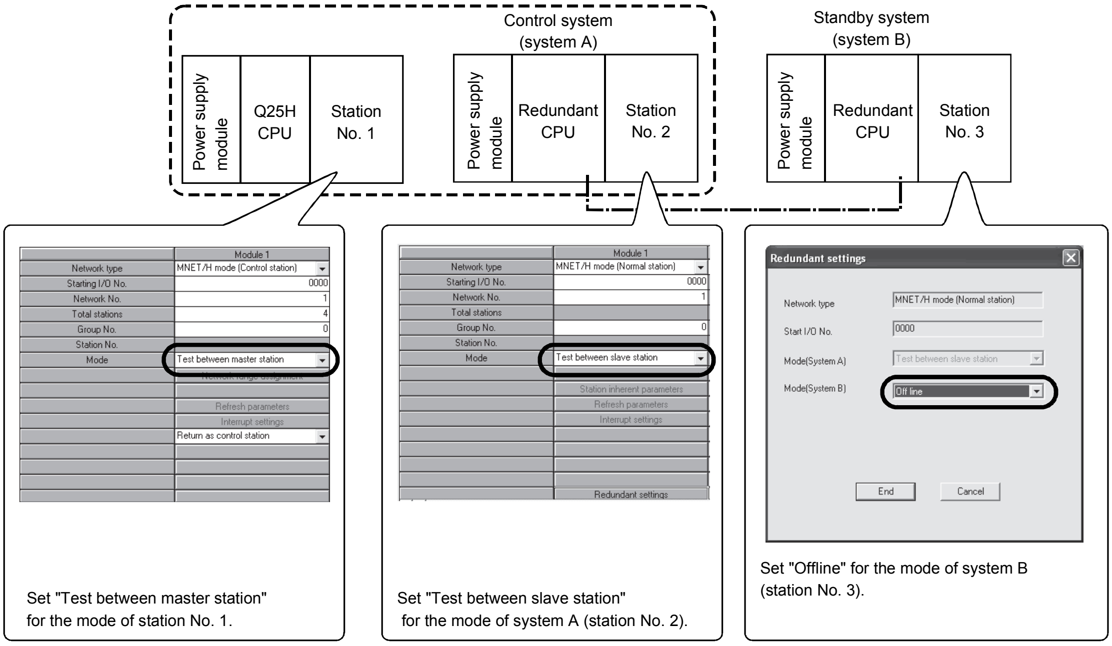
To perform the station-to-station test in the redundant system, set the operation mode of the redundant CPU to backup mode.

If the power to both systems cannot be turned on or off, perform the station-to-station test in separate mode.

The table below shows the mode settings available for the station-to-station test in the redundant system.

Set station		Description of setting
Station performing the test	In backup mode	Set "Test between master station" or "Test between slave station."
	In separate mode	
Station not performing the test	In backup mode	Set "Offline."
	In separate mode	Set "Online."

The following shows a case where a non-redundant system (station No. 1) is set as a testing station and system A (station No. 2) of the redundant system (in backup mode) is set as a tested station.



Module 1
Network type: MNET/H mode (Control station)
Starting I/O No.: 0000
Network No.: 1
Total stations: 4
Group No.: 0
Station No.:
Mode: Test between master station
Return as control station

Set "Test between master station" for the mode of station No. 1.

Module 1
Network type: MNET/H mode (Normal station)
Starting I/O No.: 0000
Network No.: 1
Total stations:
Group No.: 0
Station No.:
Mode: Test between slave station

Set "Test between slave station" for the mode of system A (station No. 2).

Redundant settings
Network type: MNET/H mode (Normal station)
Start I/O No.: 0000
Mode(System A): Test between slave station
Mode(System B): Off line

Set "Offline" for the mode of system B (station No. 3).

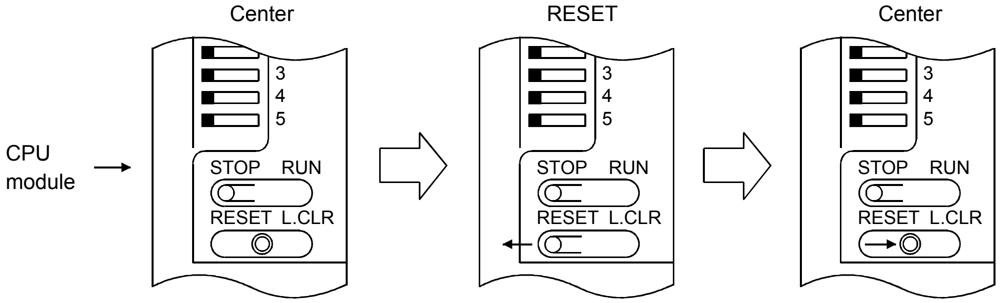
REMARKS

The QJ71NT11B does not support the Redundant CPU.

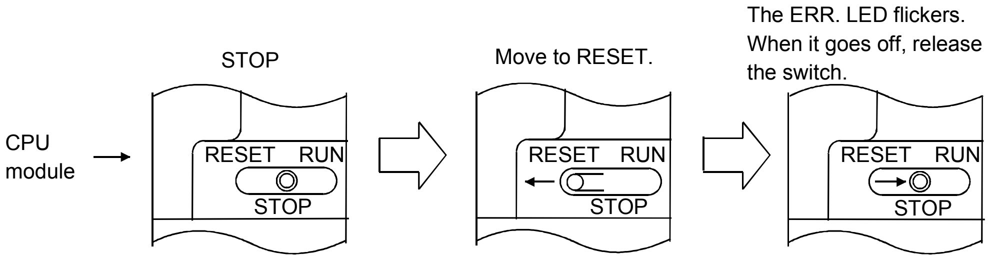
(3) Starting the test

Perform the following on the station to be tested first, and then the station executing the test.

(a) High Performance model QCPU, Process CPU, and Redundant CPU
Set the RUN/STOP switch to STOP position, and reset with the RESET/L.CLR switch.



(b) Basic model QCPU, Universal model QCPU, and safety CPU
Reset with the RESET/STOP/RUN switch.
Hold the switch in the RESET position until the ERR LED starts flashing, and release it after the LED turns off.



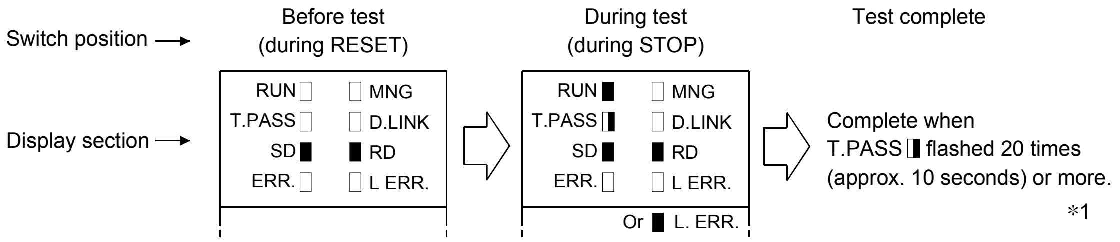
POINT

To execute the station-to-station test, connect the cable correctly to IN and OUT.
Do not connect or disconnect the cable during execution of the test. (Doing so will result in test failure.)

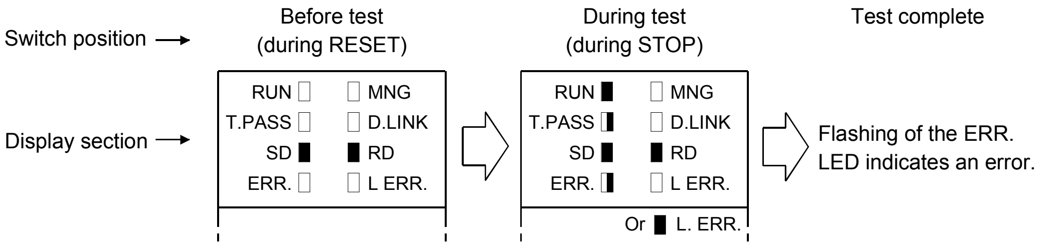
(4) Checking the test result

The T.PASS LED of the network module flashes at approximately 0.5 s intervals. When the T. PASS LED flashes 20 times (approx. 10 seconds) *1 or more and if the ERR.LED does not flash, this condition indicates normal completion.
When the test has failed, the ERR. LED flashes.

[Normal test result]



[Abnormal test result]



Upon detection of an error, the test will be terminated (abnormal termination).

*1: For the twisted bus system, the test is conducted at 156kbps and eight minutes is required for the test.
If the ERR. LED does not flash after the eight minutes, the test has completed normally.

(a) Possible causes of errors in the optical loop system
  1) Forward loop error
    - The cable of the forward loop is disconnected.
    - The sending and receiving stations of the forward loop are not connected with a cable.
    - The sending stations of the forward and reverse loops, or the receiving stations of the forward and reverse loops are connected.
  2) Reverse loop error
    - The cable of the reverse loop is disconnected.
    - The sending and receiving stations of the reverse loop are not connected with a cable.
  3) Defective cable
  4) The cable was disconnected or broken during the test
  5) Hardware error

(b) Possible causes of errors in the coaxial/twisted bus system
  1) The cable is broken or defective
  2) The cable was disconnected or broken during the test
  3) A terminating resistor was detached
  4) Hardware error
  5) Incorrect wiring (For the twisted bus system)

REMARKS

Testing status and the result can be checked in the following link special registers.

Baton pass status (host)	SW0047	→ $1F_H$	: Offline test
Cause of baton pass interruption	SW0048	→ 2_H	: Offline test
Offline test execution item/faulty station (requesting side)	SW00AC	→ 5_H or 6_H	: Station-to-station test
Offline test result (requesting side)	SW00AD	→ 0	: Normal
		1 or larger	: Error code

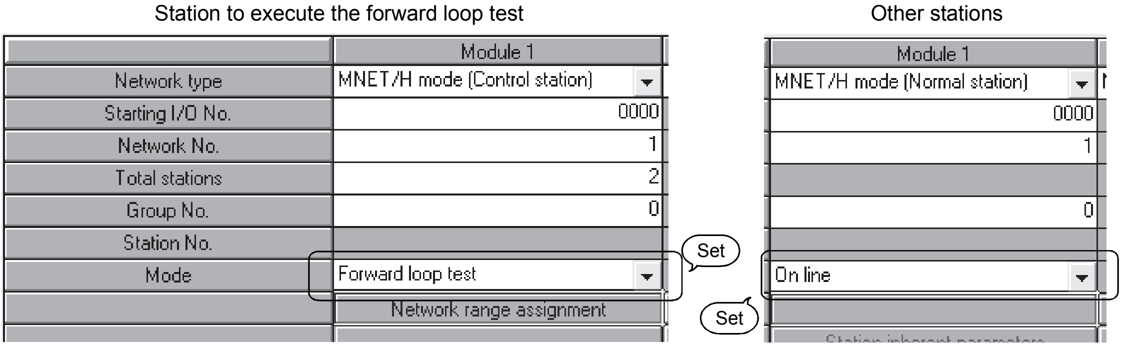
For details of how to check the error contents, refer to Chapter 8.

4.7.2 Forward loop/reverse loop test (optical loop system only)

The forward loop/reverse loop test checks the hardware of the network modules and cables after all stations are connected with optical fiber cables. It also checks whether the cables are connected between OUT and IN connections properly.
The following explains how to conduct the forward loop/reverse loop test:

(1) Setting the test mode

(a) Mode setting for the forward loop/reserve loop test on stations in other than the redundant system
When conducting the forward loop test, set the mode network parameter of the station that will be executing the forward loop test to "Forward loop test" with GX Developer and write the parameter setting to the CPU module.
Set the mode for all other stations than the testing station to "Online."
When conducting the reverse loop test, set the mode network parameter of the station that will be executing the reverse loop test to "Reverse loop test" with GX Developer and write the parameter setting to the CPU module.



Station to execute the forward loop test

	Module 1
Network type	MNET/H mode (Control station)
Starting I/O No.	0000
Network No.	1
Total stations	2
Group No.	0
Station No.	
Mode	Forward loop test
	Network range assignment

Other stations

Module 1
MNET/H mode (Normal station)
0000
1
0
On line

(b) Mode setting for the forward loop/reverse loop test on the redundant system

To perform the forward loop/reverse loop test on the redundant system, set the operation mode of the redundant CPU to backup mode.

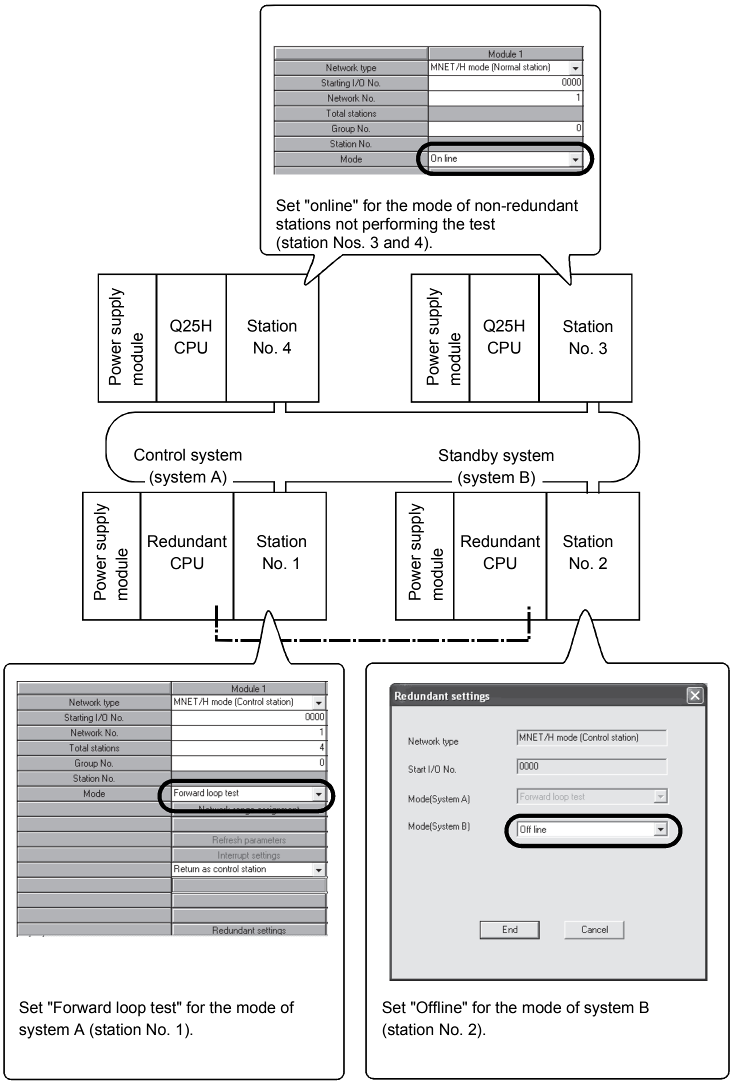
If the power to both systems cannot be turned on or off, perform the forward loop/reverse loop test in separate mode.

1) When designating the redundant system as the testing station

The table below shows the mode settings for the case where the redundant system is specified as a testing station.

Set station			Description of setting
Station performing the test	Redundant system	In backup mode	Set "Forward loop test" or "Reverse loop test."
		In separate mode	
Station not performing the test	Redundant system	In backup mode	Set "Offline."
		In separate mode	Set "Online."
	Non-redundant system station		Set "Online."

The following shows the setting where system A (station No. 1) of the redundant system (in backup mode) is specified as a station performing the forward loop test.



	Module 1
Network type	MNET/H mode (Normal station)
Starting I/O No.	0000
Network No.	1
Total stations	
Group No.	0
Station No.	
Mode	On line

Set "online" for the mode of non-redundant stations not performing the test (station Nos. 3 and 4).

	Module 1
Network type	MNET/H mode (Control station)
Starting I/O No.	0000
Network No.	1
Total stations	4
Group No.	0
Station No.	
Mode	Forward loop test
	Network range assignment
	Refresh parameters
	Interrupt settings
	Return as control station
	Redundant settings

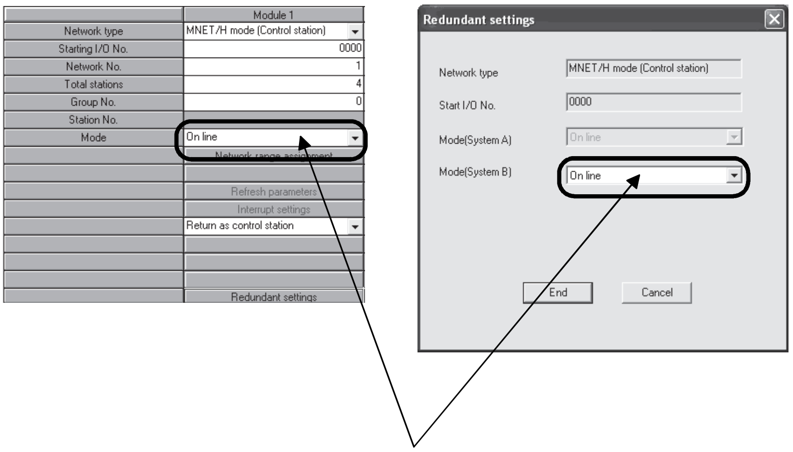
Set "Forward loop test" for the mode of system A (station No. 1).

Redundant settings

Network type: MNET/H mode (Control station)
Start I/O No.: 0000
Mode(System A): Forward loop test
Mode(System B): Off line

Set "Offline" for the mode of system B (station No. 2).

2) When designating a station in other than the redundant system as a testing station
The settings are the same as those for the usual forward loop/reverse loop test (refer to (1) (a) of this section).
Set "Online" to the redundant system modes of both systems A and B.



<Settings for system A>

	Module 1
Network type	MNET/H mode (Control station)
Starting I/O No.	0000
Network No.	1
Total stations	4
Group No.	0
Station No.	
Mode	On line
	Network range assignment
	Refresh parameters
	Interrupt settings
	Return as control station
	Redundant settings

<Settings for system B>

Redundant settings

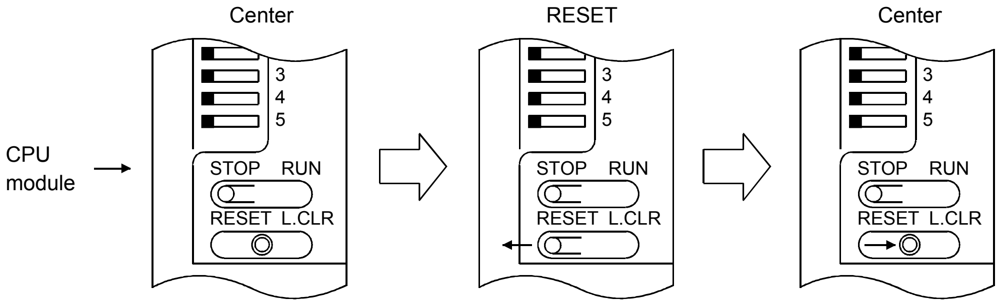
Network type: MNET/H mode (Control station)
Start I/O No.: 0000
Mode(System A): On line
Mode(System B): On line

Set "Online" for the mode of both systems A and B.

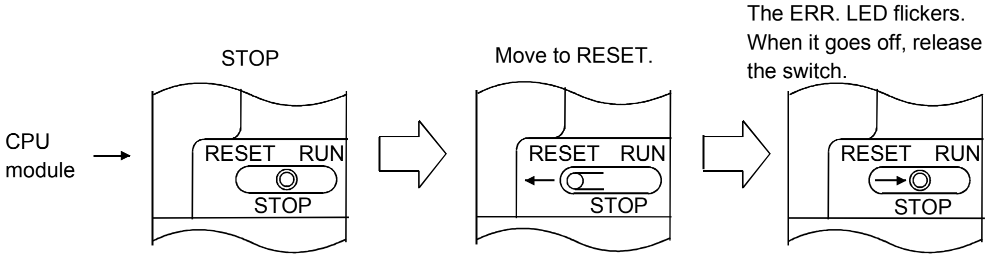
(2) Starting the test

Perform the following on the station to be tested first, and then the station executing the test.

(a) High Performance model QCPU, Process CPU, and Redundant CPU
Set the RUN/STOP switch to STOP position, and reset with the RESET/L.CLR switch.



(b) Basic model QCPU, Universal model QCPU, and Safety CPU
Reset with the RESET/STOP/RUN switch.
Hold the switch in the RESET position until the ERR. LED starts flashing, and release it after the LED turns off.



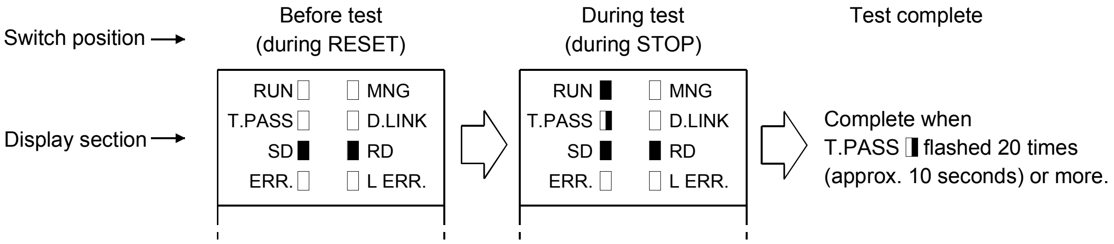
POINT

To execute the forward loop/reverse loop test, connect the cable correctly to IN and OUT. Do not connect or disconnect the cable during execution of the test. (Doing so will result in test failure.)

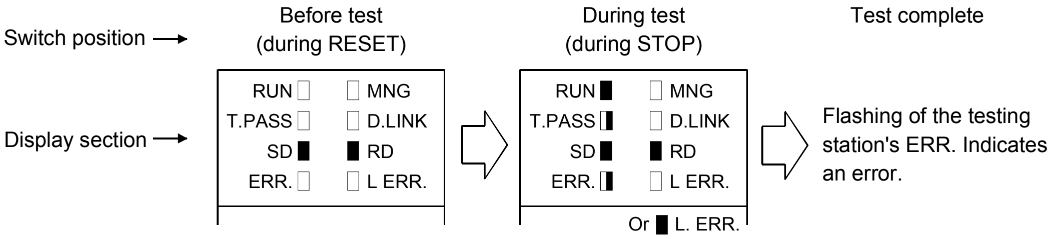
(3) Checking the test result

The T.PASS LED of the network module flashes at approximately 0.5 s intervals. When the T. PASS LED flashes 20 times (approx. 10 seconds) or more and if the ERR.LED does not flash, this condition indicates normal completion.
When the test has failed, the ERR. LED flashes.
Check the test result with the LEDs of the testing station.

[Normal test result]



[Abnormal test result]



Upon detection of an error, the test will be terminated (abnormal termination).

<Possible causes of errors>
A loopback was executed because of a wiring error, a faulty optical fiber cable or abnormality was detected in other station.

1) If wiring is incorrect
   Check the connections of IN and OUT connectors and other connectors.
   If an incorrect connection is found, connect properly.
2) If an optical fiber cable is faulty or other station is abnormal
   Replace the defective cable or module.

REMARKS

Testing status and the result can be checked in the following link special registers.

Baton pass status (host)	SW0047	→ $1F_H$	: Offline test
Cause of baton pass interruption	SW0048	→ 2_H	: Offline test
Offline test execution item/faulty station (requesting side)	SW00AC	→ □□03_H or □□04_H	: Loop test
Offline test result (requesting side)	SW00AD	→ 0	: Normal
		1 or larger	: Error code

For details of how to check the error contents, refer to Chapter 8.

4.8 Network Diagnostics from GX Developer (Online Tests)

With the network diagnostic function of GX Developer, the line status can easily be checked and diagnosed.
To conduct the network diagnostics, the network parameters (station number setting switch, mode setting switch, number of modules, network settings, and common parameters) must be set.
However, even if not all the parameters were set, the loop test can be performed while the T.PASS LED is on.
The network diagnostics function allows the diagnostics of the network module while maintaining it in the online status when a problem occurs during system operation.
The following table lists the tests that can be conducted for each network system:

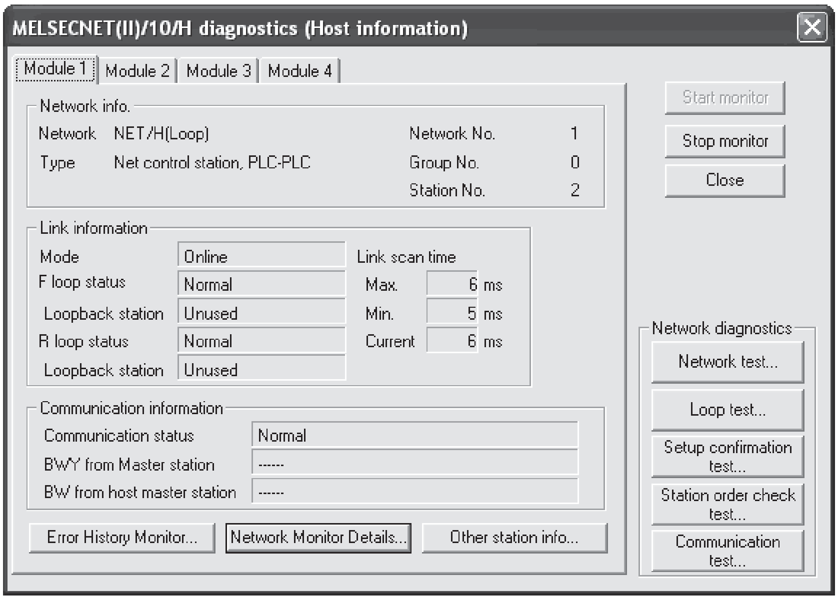
Test item	Optical loop system	Coaxial/twisted bus system	Data link status of cyclic and transient transmissions	Reference section
Network test	○	○	Continue	Section 7.8
Loop test	○	×	Pause	Section 4.8.1
Setup confirmation test	○	○＊1	Pause	Section 4.8.2
Station order check test	○	×	Pause	Section 4.8.3
Communication test	○	○	Continue	Section 4.8.4

○: Executable ×: Not executable

＊1: The setup confirmation test cannot be executed in the twist bus system.

For details of the operations of each function, refer to the GX Developer Operating Manual.

The following screen is displayed when the network diagnostics is selected with GX Developer. Click the button for the network diagnostic item to be conducted.



MELSECNET(II)/10/H diagnostics (Host information)

Module 1 | Module 2 | Module 3 | Module 4

Network info.
Network NET/H(Loop)
Type Net control station, PLC-PLC
Network No. 1
Group No. 0
Station No. 2

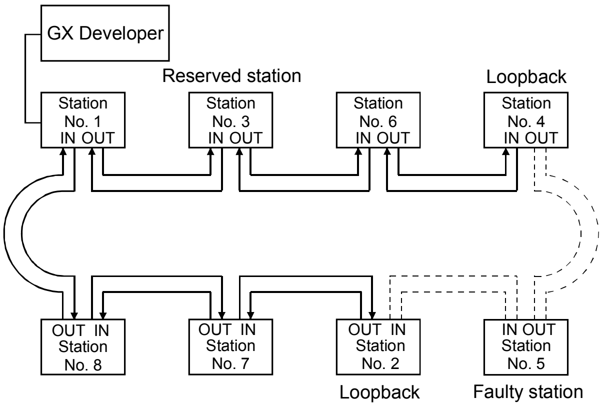
Link information
Mode: Online
F loop status: Normal
Loopback station: Unused
R loop status: Normal
Loopback station: Unused
Link scan time
Max. 6 ms
Min. 5 ms
Current 6 ms

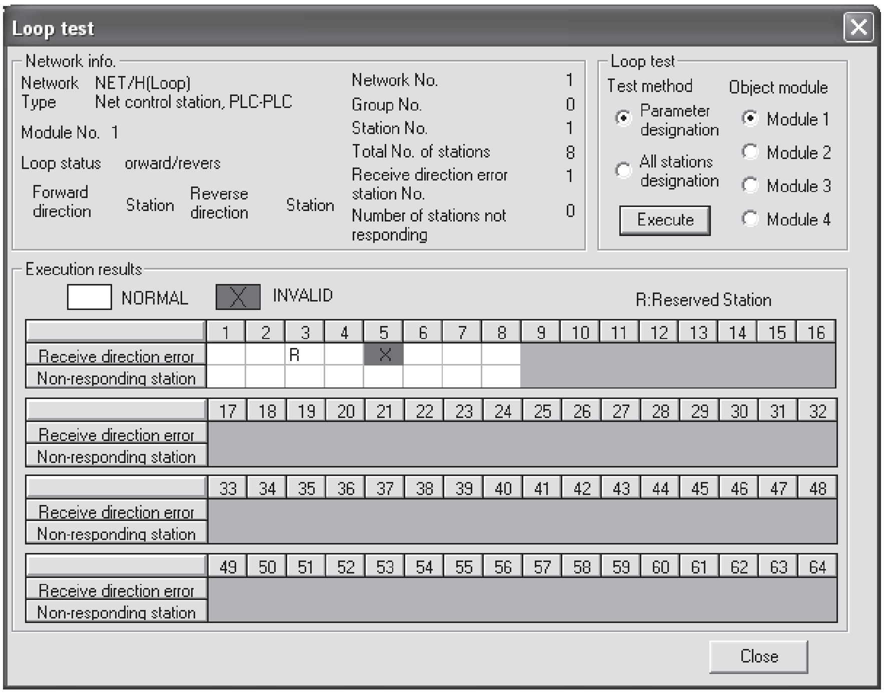
Communication information
Communication status: Normal
BWY from Master station: ------
BW from host master station: ------

Select a test.

4.8.1 Loop test (optical loop system only)

This test checks the line status of the forward and reverse loops upon completion of the wiring of the optical loop system. Also, when a loopback is being executed, it checks the station that executes the loopback.
For example, in the system shown below, where the IN/OUT connectors of station number 5 are connected in reverse, conduct a loop test using GX Developer connected to station number 1.
The monitor screen shown below appears after the loop test has been executed, and station No. 5 is detected as the station with a receiving direction error.





Network info.

Network Type NET/H(Loop) Net control station, PLC-PLC

Module No. 1

Loop status orward/revers

Forward direction Station Reverse direction Station

Network No.	1
Group No.	0
Station No.	1
Total No. of stations	8
Receive direction error station No.	1
Number of stations not responding	0

Loop test

Test method
● Parameter designation
○ All stations designation

Object module
● Module 1
○ Module 2
○ Module 3
○ Module 4

Execution results

☐ NORMAL ☒ INVALID R:Reserved Station

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Receive direction error			R		☒											
Non-responding station																

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Receive direction error																
Non-responding station																

	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Receive direction error																
Non-responding station																

	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
Receive direction error																
Non-responding station																

POINT

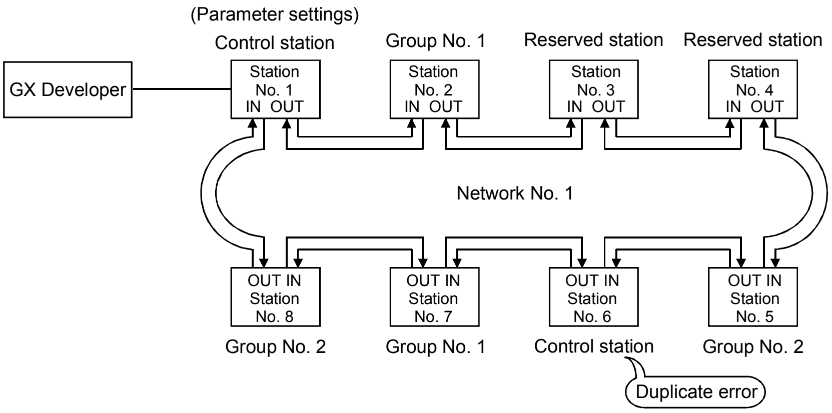
In the loop test, data link is stopped to check the wiring status.
To check the wiring status without stopping data link, check the status of SW009C to 009F.
Refer to Section 8.2.10 for details.

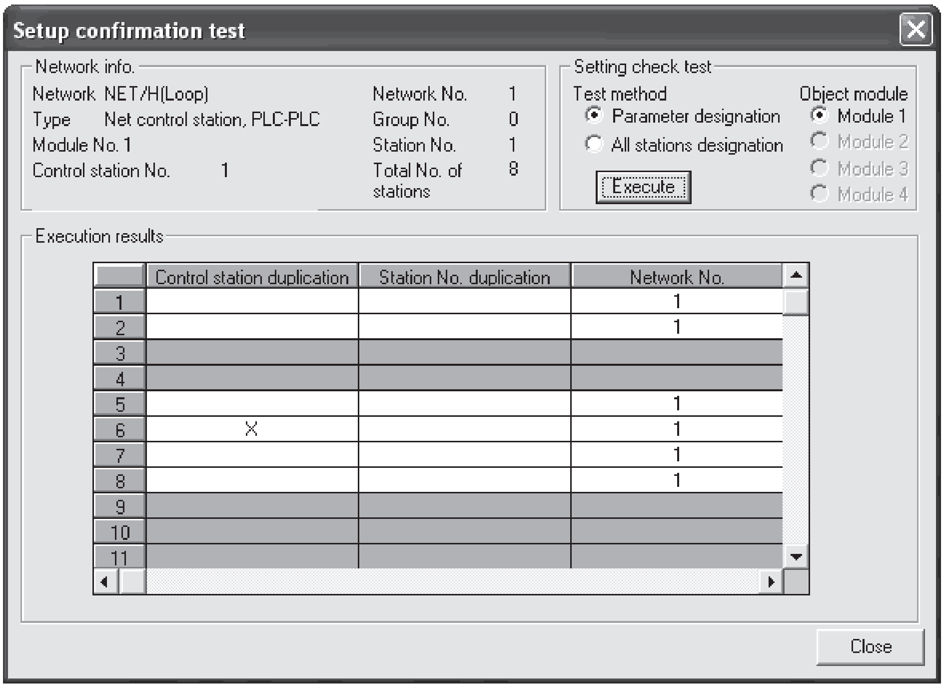
4.8.2 Setup confirmation test (optical loop, coaxial bus system only)

The switch settings of the network module can be checked with this test.
The following three types of items can be checked:

1) Control station duplication check
2) Station number duplication check
3) Matching between the network number set for the station to which GX Developer is connected and the network number set with a network parameter of the host

For example, in the following system, when the Setup confirmation test is conducted by GX Developer connected to station number 1, the monitor screen shown below is displayed and the setting status of each station can be checked.
Station number 6 displays a duplicate control station setting error, and station numbers 2, 5, 7, and 8 display the network numbers and group numbers because there are no setting errors.





Network info.
Network NET/H(Loop)
Type Net control station, PLC-PLC
Module No. 1
Control station No. 1
Network No. 1
Group No. 0
Station No. 1
Total No. of stations 8

Setting check test
Test method
● Parameter designation
○ All stations designation
Object module
● Module 1
○ Module 2
○ Module 3
○ Module 4

Execution results

	Control station duplication	Station No. duplication	Network No.
1			1
2			1
3			
4			
5			1
6	×		1
7			1
8			1
9			
10			
11			

POINT

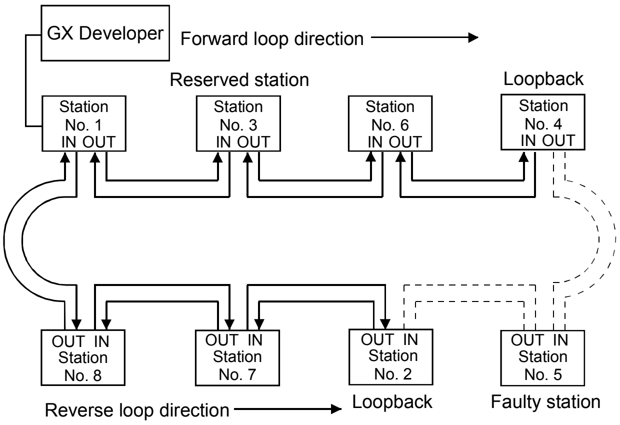
The setup confirmation test cannot be executed in the twist bus system.

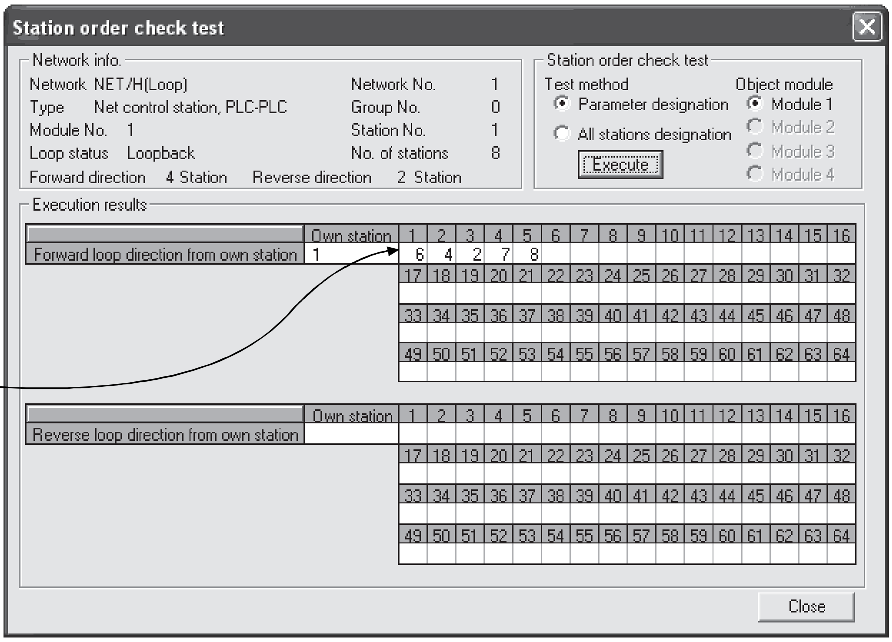
4.8.3 Station order check test (optical loop system only)

This test checks the connected station numbers in the optical loop system.
The following connection orders can be checked by the loop status (displayed on the station order check test result screen. Refer to the monitor screen below.) when this test is conducted.

Loop status	Display
Forward and reverse loops	The station numbers connected in the direction of the forward loop from the host as well as the station numbers connected to the direction of the reverse loop from the host
Forward loop	Only the station numbers connected in the direction of the forward loop from the host
Reverse loop	Only the station numbers connected in the direction of the reverse loop from the host
Loop back	Only the station numbers connected in the direction of the forward loop from the host

For example, in the following system, when the station order check test is conducted by GX Developer connected to station number 1, the monitor screen shown below is displayed to verify that a loopback is being executed between station numbers 4 and 2 that are connected in the direction of the forward loop.





Network info.
Network NET/H(Loop)
Type Net control station, PLC-PLC
Module No. 1
Loop status Loopback
Forward direction 4 Station Reverse direction 2 Station
Network No. 1
Group No. 0
Station No. 1
No. of stations 8

Station order check test
Test method
● Parameter designation
○ All stations designation
Execute
Object module
● Module 1
○ Module 2
○ Module 3
○ Module 4

Execution results

	Own station	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Forward loop direction from own station	1	6	4	2	7	8											
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

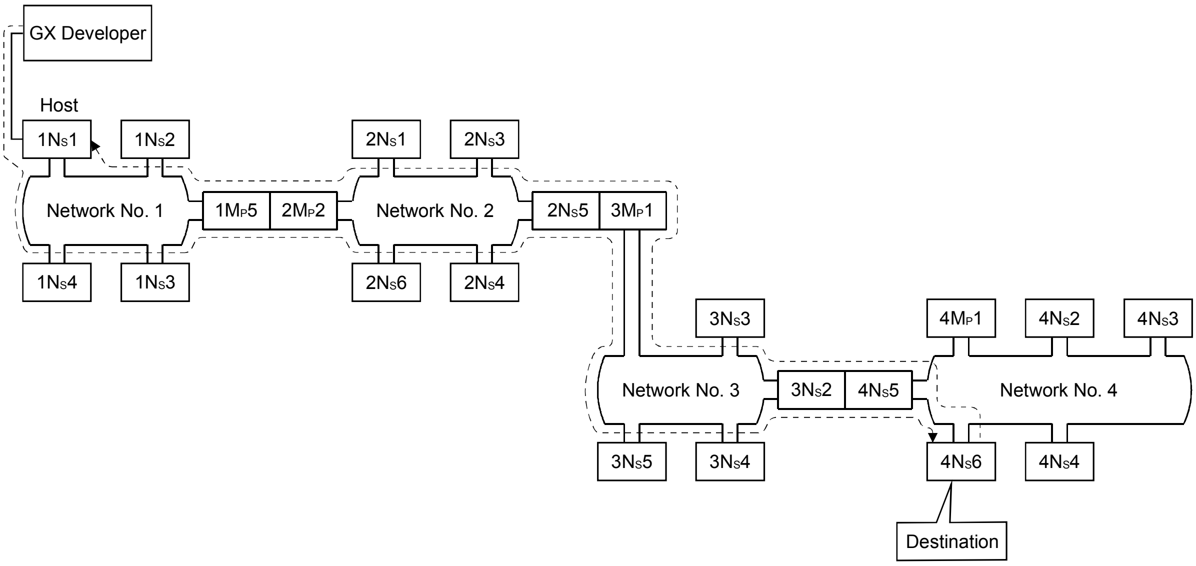
	Own station	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Reverse loop direction from own station																	
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

Station No. 3 is not displayed because it is a reserved station.

4.8.4 Communication test

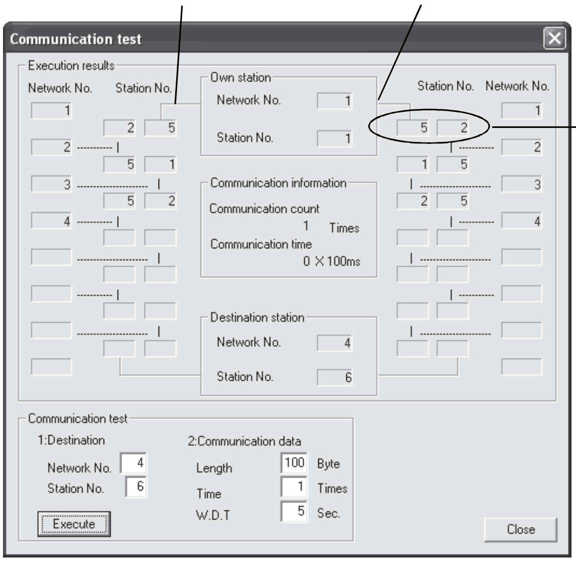
This test checks whether or not data communication can normally be performed between the host and a destination station (specified with network number and station number). Especially when the destination has another network number, the relay network and station numbers are displayed. So, make sure that the routing parameters are properly set.

In the following system, when the communication test is conducted to 4Ns6 of network number 4 by GX Developer connected to 1Ns1 of network number 1, the monitor screen shown below is displayed to verify that normal communication can be performed with the contents of the routing parameter settings.



Return path from the destination to the host

Forward path from the host to the destination



Station numbers of relay stations
5 is the station No. of network No. 1 side
2 is the station No. of network No. 2 side

Communication test

Execution results

Network No. 1 — Station No. 2, 5
Network No. 2 — Station No. 5, 1
Network No. 3 — Station No. 5, 2
Network No. 4

Own station
Network No. 1
Station No. 1

Station No. 5, 2 — Network No. 1
Station No. 1, 5 — Network No. 2
Station No. 2, 5 — Network No. 3
Network No. 4

Communication information
Communication count 1 Times
Communication time 0 X 100ms

Destination station
Network No. 4
Station No. 6

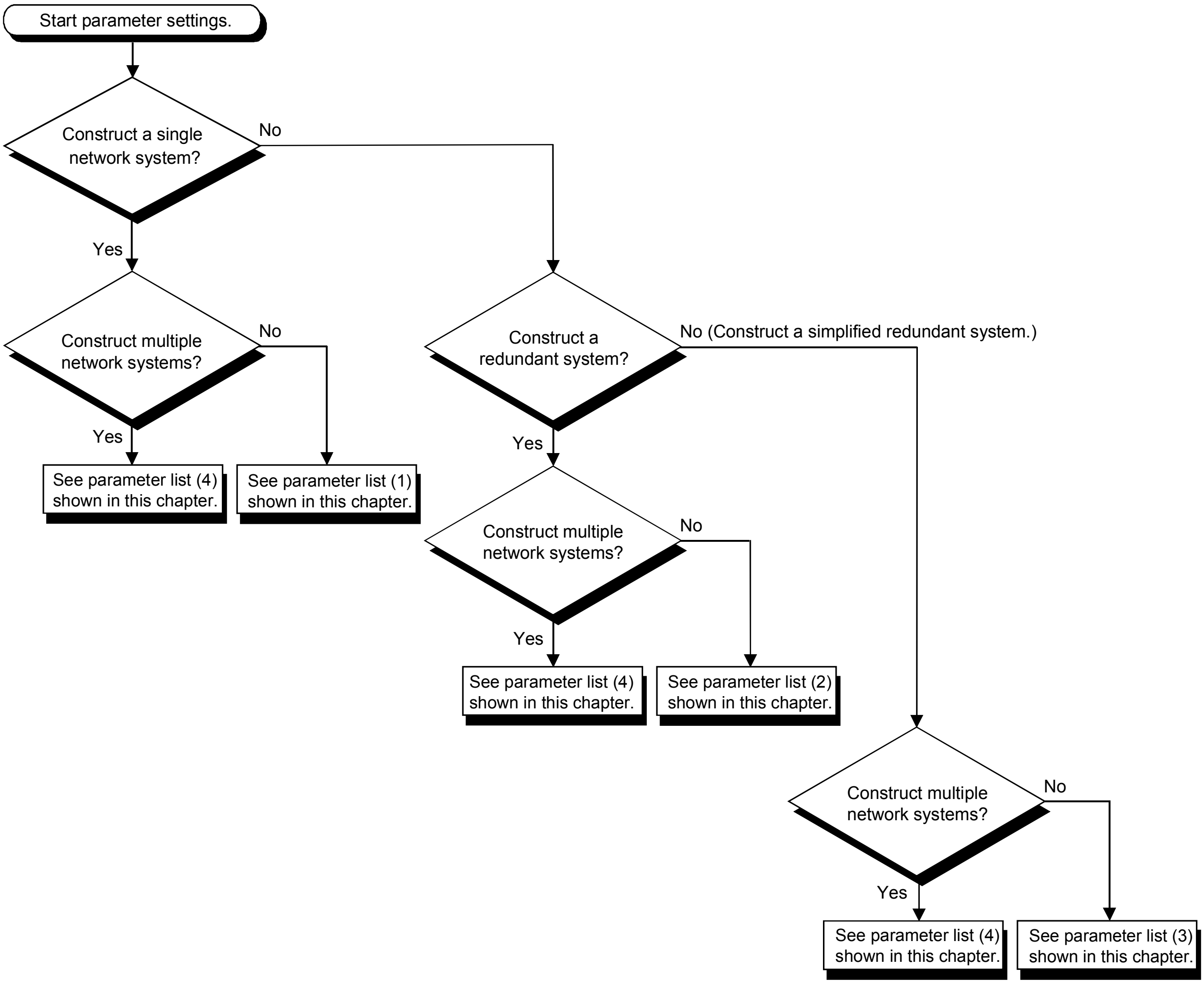
Communication test
1:Destination
Network No. 4
Station No. 6
2:Communication data
Length 100 Byte
Time 1 Times
W.D.T 5 Sec.

REMARKS

If the routing parameters are not properly set, the message "Cannot communicate with PLC" is displayed and the communication result is not displayed.

5 PARAMETER SETTINGS

To run the MELSECNET/H, the parameters for the network module mounted to the programmable controller CPU must be set with GX Developer.
Depending on the network configuration, some parameters must be set, some must be set as required, and some do not.
The following pages provide lists of parameter settings required for each network configuration.



(1) List of parameter settings for a single network system

Parameter setting item			Necessity for setting by station type		Reference section
			Control station	Normal station	
Network type			○ (MNET/H mode (control station), MNET/H EX (control station))	○ (MNET/H mode (normal station), MNET/H EX (normal station))	Section 5.1
Starting I/O No.			○	○	Section 5.2.1
Network No.			○	○	Section 5.2.2
Total stations			○	×	Section 5.2.3
Group No.			△	△	Sections 5.2.4 and 7.4.3
Mode			○	○	Section 5.2.5
Communication speed setting			●	×	Section 5.2.6
Network range assignment (common parameters)	Monitoring time		●	×	Section 5.4
	LB/LW settings	Send range of each station (LB/LW)	○	×	Section 5.3.1
		Send range of each station (low-speed LB/LW)	△	×	Section 7.3
		Pairing setting	×	×	Section 7.10.3
	LX/LY settings		△	×	Section 5.3.2
	I/O master station specification		△	×	Section 5.3.3
	Reserved station specification		△	×	Section 5.3.4
	Supplementary settings	Constant link scan	△	×	Section 5.4
		Maximum No. of returns to system stations in 1 scan.	●	×	Section 5.4
		Multiplex transmission specification	△	×	Section 5.4
		Control station shift setting	●	×	Section 5.4
		Block send data assurance per station	△ *1	×	Section 5.4
		Block receive data assurance per station	△ *1	×	Section 5.4
		Transient setting	●	×	Section 5.4
		Low-speed cyclic transmission specification	△	×	Section 5.4
Station specific parameters			△	△	Section 5.6
Refresh parameters			● *2 *3	● *2 *3	Section 5.7
Interrupt settings			△	△	Section 7.5.1
Control station return setting			○	×	Section 5.5
Standby station compatible module			×	×	Section 5.9
Redundant settings			×	×	Section 7.10.4
Interlink transmission parameters			×	×	Section 7.2
Routing parameters			×	×	Section 7.4.2
Valid module during other station access			△	△	Section 5.8

*1: In the MELSECNET/H Extended mode, the default check mark is displayed.

*2: Default values are not set for LX/LY. Set refresh parameters.

*3: Default values are preset for LB/LW.

Any CPU other than Universal model QCPU may operate even if refresh parameters have not been set.

For the operation and precautions, refer to Section 5.7.2 (3).

○: Set at all times (no default setting).

●: Set at all times (default setting provided).

△: Set as appropriate.

×: Setting unnecessary.

(2) List of parameter settings for a redundant system

Parameter setting item			Necessity for setting by station type		Reference section
			Control station	Normal station	
Network type			○ (MNET/H mode (control station), MNET/H EX (control station))	○ (MNET/H mode (normal station), MNET/H EX (normal station))	Section 5.1
Starting I/O No.			○	○	Section 5.2.1
Network No.			○	○	Section 5.2.2
Total stations			○	×	Section 5.2.3
Group No.			△	△	Sections 5.2.4 and 7.4.3
Mode			○	○	Section 5.2.5
Communication speed setting			×	×	Section 5.2.6
Network range assignment (common parameters)	Monitoring time		●	×	Section 5.4
	LB/LW settings	Send range of each station (LB/LW)	○	×	Section 5.3.1
		Send range of each station (low-speed LB/LW)	△	×	Section 7.3
		Pairing setting	○	×	Section 7.10.3
	LX/LY settings		△	×	Section 5.3.2
	I/O master station specification		△	×	Section 5.3.3
	Reserved station specification		△	×	Section 5.3.4
	Supplementary settings	Constant link scan	△	×	Section 5.4
		Maximum No. of returns to system stations in 1 scan.	●	×	Section 5.4
		Multiplex transmission specification	△	×	Section 5.4
		Control station shift setting	●	×	Section 5.4
		Block send data assurance per station	△	×	Section 5.4
		Block receive data assurance per station	△	×	Section 5.4
		Transient setting	●	×	Section 5.4
		Low-speed cyclic transmission specification	△	×	Section 5.4
Station inherent parameters			△	△	Section 5.6
Refresh parameters			● ＊2＊3	● ＊2＊3	Section 5.7
Interrupt settings			△	△	Section 7.5.1
Control station return setting			○	×	Section 5.5
Standby station compatible module			×	×	Section 5.9
Redundant settings			△ ＊1	△ ＊1	Section 7.10.4
Interlink transmission parameters			×	×	Section 7.2
Routing parameters			×	×	Section 7.4.2
Valid module during other station access			△	△	Section 5.8

＊1: This setting is necessary when the CPU module installed with a network module is a Redundant CPU.

＊2: Default values are not set for LX/LY. Set refresh parameters.

＊3: Default values are preset for LB/LW.

The system may operate even if refresh parameters have not been set.

For the operation and precautions, refer to Section 5.7.2 (3).

○: Set at all times (no default setting).

●: Set at all times (default setting provided).

△: Set as appropriate.

×: Setting unnecessary.

(3) List of parameter settings for a simplified redundant system

Parameter setting item			Necessity for setting by station type			Reference section
			Control station	Normal station	Standby station	
Network type			○ (MNET/H mode (control station), MNET/H EX (control station))	○ (MNET/H mode (normal station), MNET/H EX (normal station))	○ (MNET/H standby station)	Section 5.1
Starting I/O No.			○	○	○	Section 5.2.1
Network No.			○	○	○	Section 5.2.2
Total stations			○	×	×	Section 5.2.3
Group No.			△	△	○	Sections 5.2.4 and 7.4.3
Mode			○	○	○	Section 5.2.5
Communication speed setting			●	×	×	Section 5.2.6
Network range assignment (common parameters)	Monitoring time		●	×	×	Section 5.4
	LB/LW settings	Send range of each station (LB/LW)	○	×	×	Section 5.3.1
		Send range of each station (low-speed LB/LW)	△	×	×	Section 7.3
		Pairing setting	×	×	×	Section 7.10.3
	LX/LY settings		△	×	×	Section 5.3.2
	I/O master station specification		△	×	×	Section 5.3.3
	Reserved station specification		△	×	×	Section 5.3.4
	Supplementary settings	Constant link scan	△	×	×	Section 5.4
		Maximum No. of returns to system stations in 1 scan.	●	×	×	Section 5.4
		Multiplex transmission specification	△	×	×	Section 5.4
		Control station shift setting	●	×	×	Section 5.4
		Block send data assurance per station	△ ＊1	×	×	Section 5.4
		Block receive data assurance per station	△ ＊1	×	×	Section 5.4
		Transient setting	●	×	×	Section 5.4
		Low-speed cyclic transmission specification	△	×	×	Section 5.4
Station inherent parameters			△	△	×	Section 5.6
Refresh parameters			● ＊2＊3	● ＊2＊3	×	Section 5.7
Interrupt settings			△	△	×	Section 7.5.1
Control station return setting			○	×	×	Section 5.5
Standby station compatible module			×	×	○	Section 5.9
Redundant settings			×	×	×	Section 7.10.4
Interlink transmission parameters			×	×	×	Section 7.2
Routing parameters			×	×	×	Section 7.4.2
Valid module during other station access			△	△	△	Section 5.8

＊1: In the MELSECNET/H Extended mode, the default check mark is displayed.

＊2: Default value is not set in LX/LY. Set refresh parameters.

＊3: Default values are preset for LB/LW.

The system may operate even if refresh parameters have not been set.

For the operation and precautions, refer to Section 5.7.2 (3).

○: Set at all times (no default setting).

●: Set at all times (default setting provided).

△: Set as appropriate.

×: Setting unnecessary.

(4) List of parameter settings for multiple network systems

Parameter setting item			Necessity for setting by station type			Reference section
			Control station	Normal station	Standby station ＊1	
Network type			○ (MNET/H mode (control station), MNET/H EX (control station))	○ (MNET/H mode (normal station), MNET/H EX (normal station))	○ (MNET/H standby station)	Section 5.1
Starting I/O No.			○	○	○	Section 5.2.1
Network No.			○	○	○	Section 5.2.2
Total stations			○	×	×	Section 5.2.3
Group No.			△	△	○	Sections 5.2.4 and 7.4.3
Mode			○	○	○	Section 5.2.5
Communication speed setting			●	×	×	Section 5.2.6
Network range assignment (common parameters)	Monitoring time		●	×	×	Section 5.4
	LB/LW settings	Send range of each station (LB/LW)	○	×	×	Section 5.3.1
		Send range of each station (low-speed LB/LW)	△	×	×	Section 7.3
		Pairing setting	△ ＊2	×	×	Section 7.10.3
	LX/LY settings		△	×	×	Section 5.3.2
	I/O master station specification		△	×	×	Section 5.3.3
	Reserved station specification		△	×	×	Section 5.3.4
	Supplementary settings	Constant link scan	△	×	×	Section 5.4
		Maximum No. of returns to system stations in 1 scan.	●	×	×	Section 5.4
		Multiplex transmission setting	△	×	×	Section 5.4
		Control station shift designation	●	×	×	Section 5.4
		Block send data assurance per station	△ ＊3	×	×	Section 5.4
		Block receive data assurance per station	△ ＊3	×	×	Section 5.4
		Transient setting	●	×	×	Section 5.4
		Low-speed cyclic transmission specification	△	×	×	Section 5.4
Station inherent parameters			△	△	×	Section 5.6
Refresh parameters			● ＊4＊5	● ＊4＊5	×	Section 5.7
Interrupt settings			△	△	×	Section 7.5.1
Control station return setting			○	×	×	Section 5.5
Standby station compatible module			×	×	○	Section 5.9
Redundant settings			△ ＊6	△ ＊6	×	Section 7.10.4
Interlink transmission parameters			△	△	△	Section 7.2
Routing parameters			△	△	△	Section 7.4.2
Valid module during other station access			△	△	△	Section 5.8

＊1: This setting is necessary to configure multiple networks using a simplified redundant system.

＊2: This setting is necessary to configure multiple networks using a redundant system.

＊3: In the MELSECNET/H Extended mode, the default check mark is displayed.

＊4: Default value is not set in LX/LY. Set refresh parameters.

＊5: Default values are preset for LB/LW.

Any CPU other than Universal model QCPU may operate even if refresh parameters have not been set.

For the operation and precautions, refer to Section 5.7.2 (3).

＊6: This setting is necessary when the CPU module installed with a network module is a Redundant CPU.

○: Set at all times (no default setting).

●: Set at all times (default setting provided).

△: Set as appropriate.

×: Setting unnecessary.

(5) When parameters have not been set (other than a safety CPU)

For network modules, parameters must be set.
If parameters have not been set, data link will be executed as described below.

(a) Operation

When network parameters have not been set

Item	Description
Network type	Data link is executed with the setting as any of the following: • Normal station in MELSECNET/H mode • Normal station in MELSECNET/10 mode Data link is not executed in the following cases: • No control station exists on the network. • The control station is in MELSECNET/H Ext. mode. (LINK PARA ERROR will occur.)
Network No.	Network No.1
Group No.	0 (No group)
Station No.	Station No. set with the station number setting switches ＊1 on the network module
Mode	Mode set with the mode setting switch ＊1 on the network module
Refresh parameters	Refer to the following ＊2.

＊1: The QJ71NT11B operates with the station No. and in the mode set by the station number/mode setting switch.

＊2: Refresh parameters are assigned as shown below.

Devices and points assigned to one network module

Network module side device		LB	LW	SB	SW
Refresh target CPU side devices		B	W	SB	SW
Number of network modules mounted	1	8192 (2048)	8192 (2048)	512 (512)	512 (512)
	2	4096	4096	512	512
	3	2048	2048	512	512
	4	2048	2048	512	512

The values in parentheses are the points applied to the use of the Basic model QCPU.
The same assignments are given for the cases of three network modules and four network modules.

(b) Precautions

When B/W points less than the following are set in [Device] parameter [PLC parameter], set refresh parameters accordingly. Or, increase the B/W points to the following value or more in [Device].

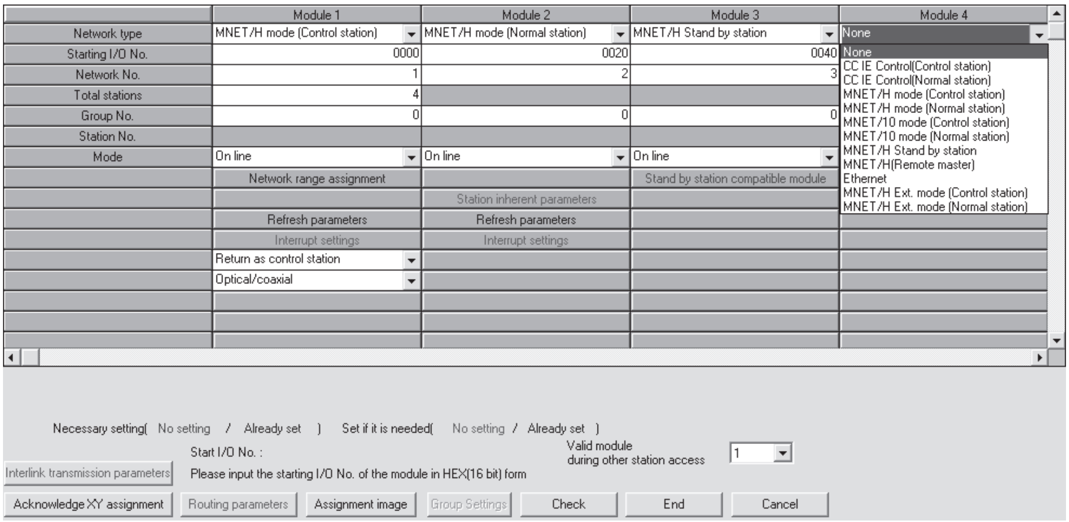
Number of B/W points refreshed when parameters have not been set

No. of modules	Device points in [Device]	
	B	W
1	8K points (2K points)	8K points (2K points)
2	8K points	8K points
3	6K points	6K points
4	8K points	8K points

The values in parentheses are the points applied to the use of the Basic model QCPU.

5.1 Setting the Number of Modules (Network Type)

Set the network type and the station type for each module.
Up to four modules can be set for a combination of MELSECNET/H and CC-Link IE Controller Network.
Note that, however, there are restrictions on the number of modules mounted for one programmable controller CPU depending on the CPU model used. (Refer to the user's manual for the CPU module used.)
For the MELSECNET/H network system, select control station, normal station, or standby station.



	Module 1	Module 2	Module 3	Module 4
Network type	MNET/H mode (Control station)	MNET/H mode (Normal station)	MNET/H Stand by station	None
Starting I/O No.	0000	0020	0040	
Network No.	1	2	3	
Total stations	4			
Group No.	0	0	0	
Station No.				
Mode	On line	On line	On line	
	Return as control station			
	Optical/coaxial			

Start I/O No. :
Please input the starting I/O No. of the module in HEX(16 bit) form

Valid module during other station access: 1

(1) Selection type

Select from the following items:

Item	Description
MNET/H mode (Control station)	Set this item for a control station of the MELSECNET/H mode.
MNET/H mode (Normal station)	Set this item for a normal station of the MELSECNET/H mode.
MNET/10 mode (Control station) ＊1	Set this item for a control station of the MELSECNET/10 mode.
MNET/10 mode (Normal station) ＊1	Set this item for a normal station of the MELSECNET/10 mode.
MNET/H mode Stand by station	Set this item for a standby station of a simplified redundant system.
MNET/H EX (Control station)	Set this item for a control station of the MELSECNET/H Extended mode.
MNET/H EX (Normal station)	Set this item for a normal station of the MELSECNET/H Extended mode.

＊1: The QJ71NT11B does not support MESECNE/10 mode.

(2) Precautions

(a) Network type within the same network

Set all network modules within the same network to the same network type. If there are different network types within the same network, some of the network modules may be disconnected from the system, for example, and normal data link is not executed.
Refer to Section 8.2.11 for details.

(b) When the MELSECNET/H Extended mode is set

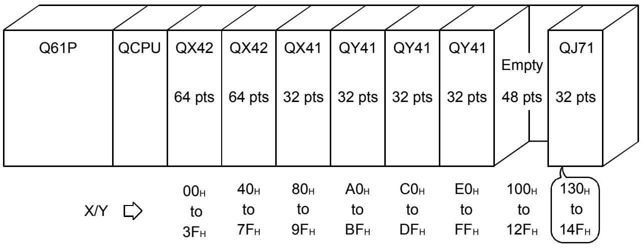
When using MELSECNET/H Extended mode, use the compatible network module and GX Developer.
For the compatible versions of the module, refer to Section 2.2.

5.2 Network Settings

These parameters are used to configure the MELSECNET/H network.
Set the start I/O No., network No., total stations, group No. and mode for each of the module model names set in the number of modules settings.

5.2.1 Starting I/O No.

Set the start I/O No. to which the module is mounted in 16-point units in hexadecimal for each applicable network module.
For example, set 130 when the network module is mounted onto X/Y130 to 14F.



(1) Valid setting range

0_H to $0FE0_H$ (The I/O point range of the CPU module)

(2) Precaution

Unlike the setting method for the AnUCPU (only first two digits of the 3-digits are used for setting), all three digits are used for setting.

5.2.2 Network No.

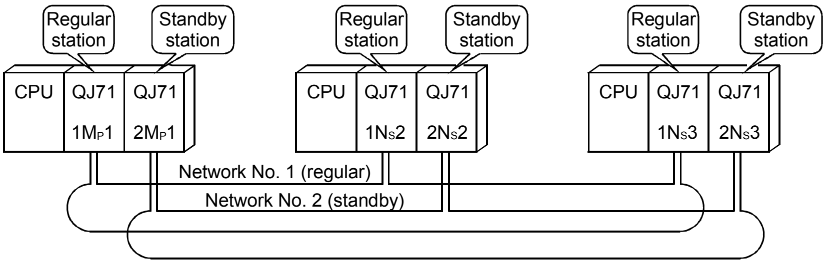
Set the network number to which the applicable network module is connected.

(1) Setting range

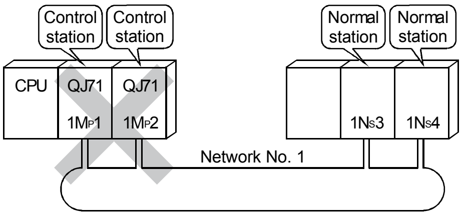
1 to 239

(2) Precautions

(a) For standby stations, set the network numbers that are differently from regular stations.

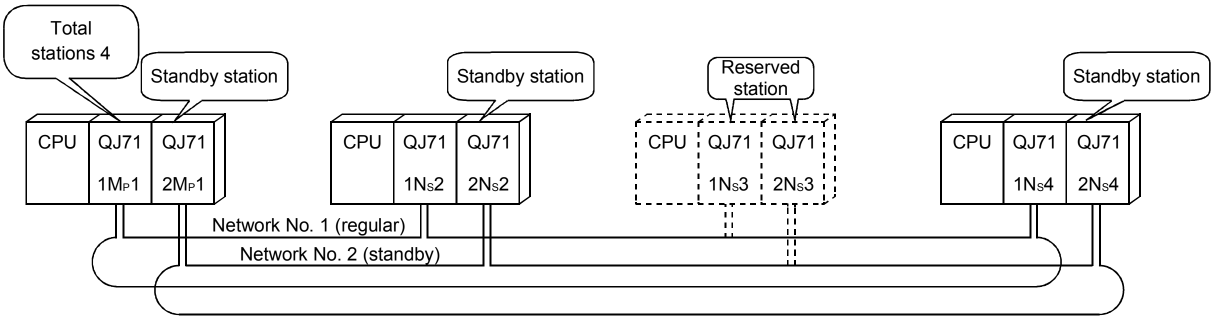


(b) The same network number can be set for normal stations.



5.2.3 Total stations

Set the total number of stations including the control station, normal stations and reserved stations in one network.
This setting is required only when "MNET/H mode (control station)" is selected.



(1) Valid setting range

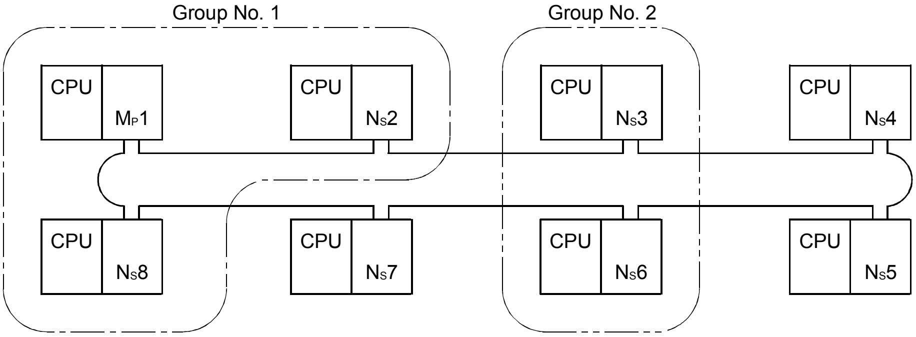
2 to 64

(2) Precaution

Do not include standby station in the total number because their network numbers are different.

5.2.4 Group No.

In the group number specification, set the group number for sending data to multiple stations at the same time in transient transmission.
For more details, refer to Section 7.4.3.



(1) Valid setting range

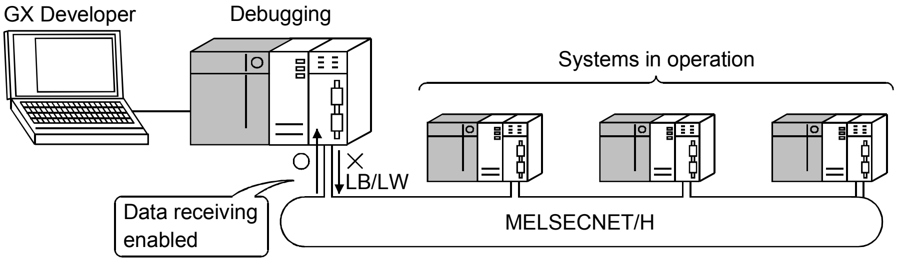
0 : No group specification (default)
1 to 32 : Group No.

(2) Precaution

The difference from the message sending function using logical channel numbers (Refer to Section 7.4.4) is that the groups can be changed by modifying the parameters from GX Developer. Note that only one group number can be set per station.

5.2.5 Mode

Set the operation mode of the network module.
The set parameters take effect when the switch setting of the network module is set to "online".
For the switch setting of each network module, refer to Section 4.2.

<table>
<tr><th>Selection item</th><th>Description</th></tr>
<tr><td>Online
(Default)</td><td>This mode performs normal operations (the station returns to the network).
Starts data communication at startup and executes automatic return operation. etc.</td></tr>
<tr><td>Online debug mode</td><td>This mode places the online station in the send stop status.
The station is recognized as a normal station from other stations and data communication is performed as follows: ○: Allowed ×: Not allowed
<table>
<tr><th></th><th>Send</th><th>Receive</th></tr>
<tr><td>Cyclic data (LY/LB/LW)</td><td>×</td><td>○</td></tr>
<tr><td>Transient data</td><td>○</td><td>○</td></tr>
</table>
When a programmable controller is being added to the system as shown in the figure below, the debugging can be executed without stopping the system operation. When the debugging is completed, cancel the debug mode to execute data linking. This function is convenient when performing the system expansion while running the system.

</td></tr>
<tr><td>Offline</td><td>This mode stops operations (disconnecting the station).
Baton pass and data communication with other stations are not executed.</td></tr>
<tr><td>Forward loop test
(optical loop system only)</td><td>This mode is to select the hardware test operation that checks the connection status and the optical fiber cables on the forward loop side.
For details of how to conduct the hardware test, refer to Section 4.7.2.</td></tr>
<tr><td>Reverse loop test
(optical loop system only)</td><td>This mode is to select the hardware test operation that checks the connection status and the optical fiber cable on the reverse loop side.
For details of how to conduct the hardware test, refer to Section 4.7.2.</td></tr>
<tr><td>Station-to-station test
(station to execute test)</td><td>This mode selects the station to execute the hardware test for checking a line between two stations.
For details of how to conduct the station-to-station test refer to Section 4.7.1.</td></tr>
<tr><td>Station-to-station test
(station to be tested)</td><td>This mode selects the station on which the hardware test for checking a line between two stations is executed.
For details of how to conduct the station-to-station test refer to Section 4.7.1.</td></tr>
</table>

REMARKS

The mode set in the network parameters for the redundant system must be the same as the operation mode of the network module mounted on system A.
Set the operation mode of the network module mounted on system B in the mode selection of the redundant settings (system B).
For details of the redundant settings, refer to Section 7.10.4.

5.2.6 Communication speed setting (twisted bus system only)

Set communication speed for the twisted bus system.
The communication speed can be selected in the Network parameter of the control station.
Normal stations operate according to the communication speed set in the control station. Therefore the communication speed setting in normal stations is not necessary.

(1) Selection type

Select from the following items:

Item	Description
Optical/coaxial	Set when the optical loop or coaxial bus system is used.
Twist [156kbps]	Set when the twisted bus system at 156kbps to 10Mbps is used.
Twist [312kbps]	
Twist [625kbps]	
Twist [1.25Mbps]	
Twist [2.5Mbps]	
Twist [5Mbps]	
Twist [10Mbps]	

REMARKS

The communication speed can be checked in the communication speed setting value (SW0069).
For details of SW, refer to Appendix 4.

(2) Precautions

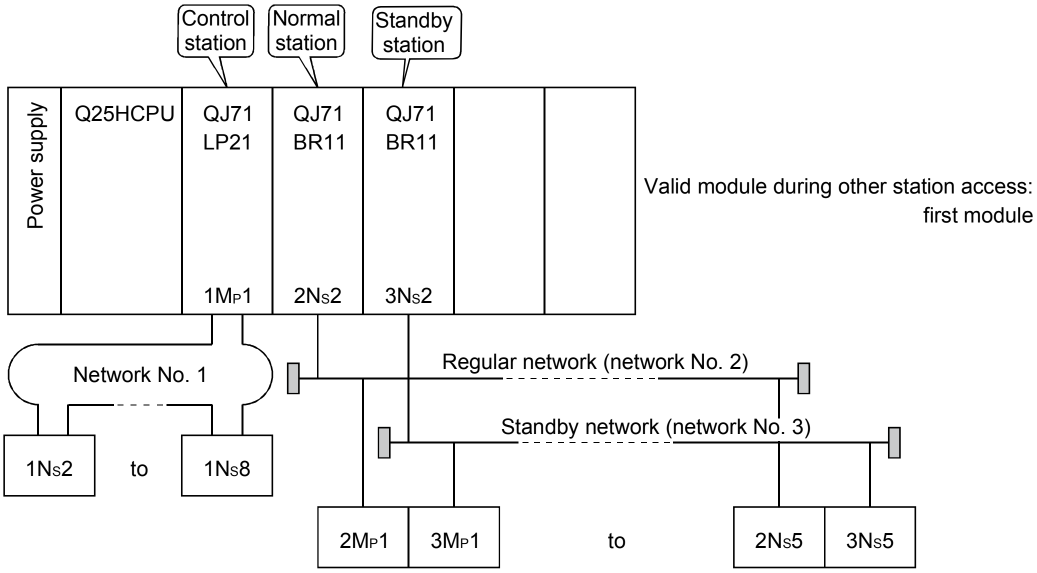
(a) Total connection cable length must be within the range given in the specifications. (Refer to Section 3.1.)
If the length is exceeded the range, the following problem may occur.
- Frequent communication error
- Continuous data link connection and disconnection
- No data link

(b) When "Optical/coaxial" is selected in the communication speed setting parameter of the network parameter data link is performed at 156kbps.

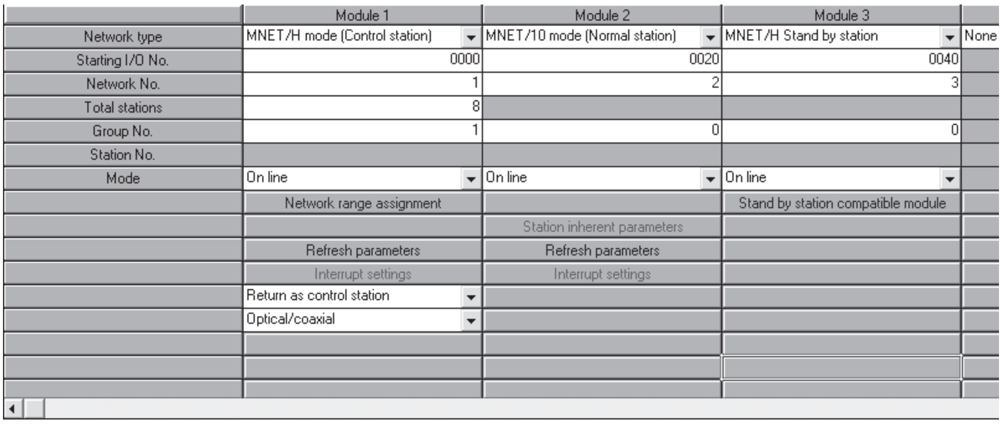
5.2.7 Example of parameter settings

The following example shows the parameter settings for a system that include a control station, a normal station, and a standby station.

[System configuration]



[Screen settings]



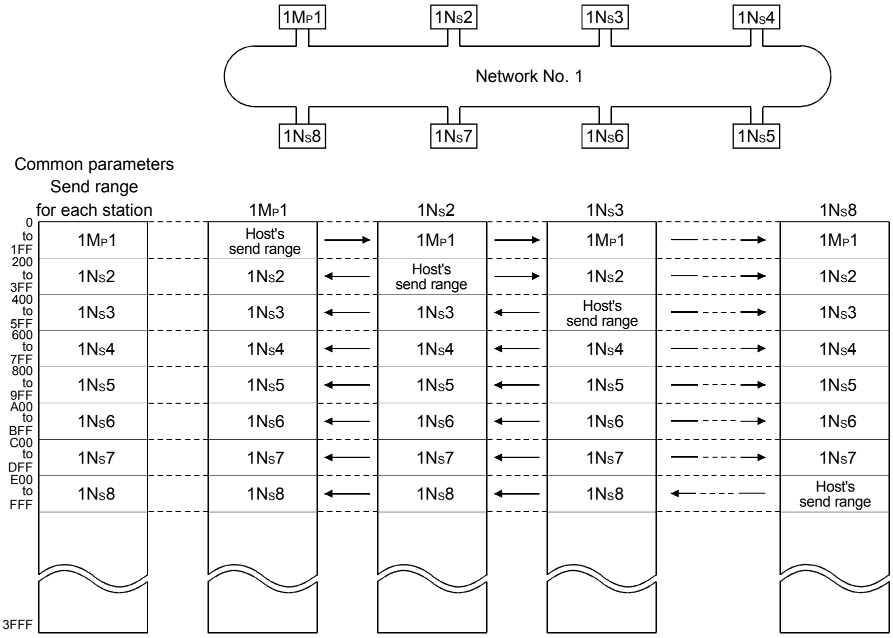
	Module 1	Module 2	Module 3	
Network type	MNET/H mode (Control station)	MNET/10 mode (Normal station)	MNET/H Stand by station	None
Starting I/O No.	0000	0020	0040	
Network No.	1	2	3	
Total stations	8			
Group No.	1	0	0	
Station No.				
Mode	On line	On line	On line	
	Network range assignment		Stand by station compatible module	
		Station inherent parameters		
	Refresh parameters	Refresh parameters		
	Interrupt settings	Interrupt settings		
	Return as control station			
	Optical/coaxial			

5.3 Common Parameters (Network Range Assignment Screen)

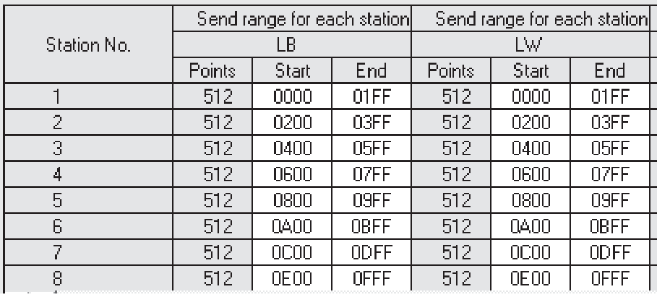
The common parameters are used to set the cyclic transmission ranges of LB, LW, LX and LY that can be sent by each station in a single network. The common parameter settings are required only for the control station. The data of the common parameters are sent to the normal stations when the network starts up.

5.3.1 Send range for each station (LB/LW settings)

Assign the send ranges of the link devices (LB/LW) for each station in 16-point units for LB (start □□□ 0 to end □□□ F) and in one-point unit for LW.
The following example shows send range for each station (LB/LW settings) when each of 512 points is assigned to station numbers 1 to 8.



[Screen settings]



Station No.	Send range for each station			Send range for each station		
	LB			LW		
	Points	Start	End	Points	Start	End
1	512	0000	01FF	512	0000	01FF
2	512	0200	03FF	512	0200	03FF
3	512	0400	05FF	512	0400	05FF
4	512	0600	07FF	512	0600	07FF
5	512	0800	09FF	512	0800	09FF
6	512	0A00	0BFF	512	0A00	0BFF
7	512	0C00	0DFF	512	0C00	0DFF
8	512	0E00	0FFF	512	0E00	0FFF

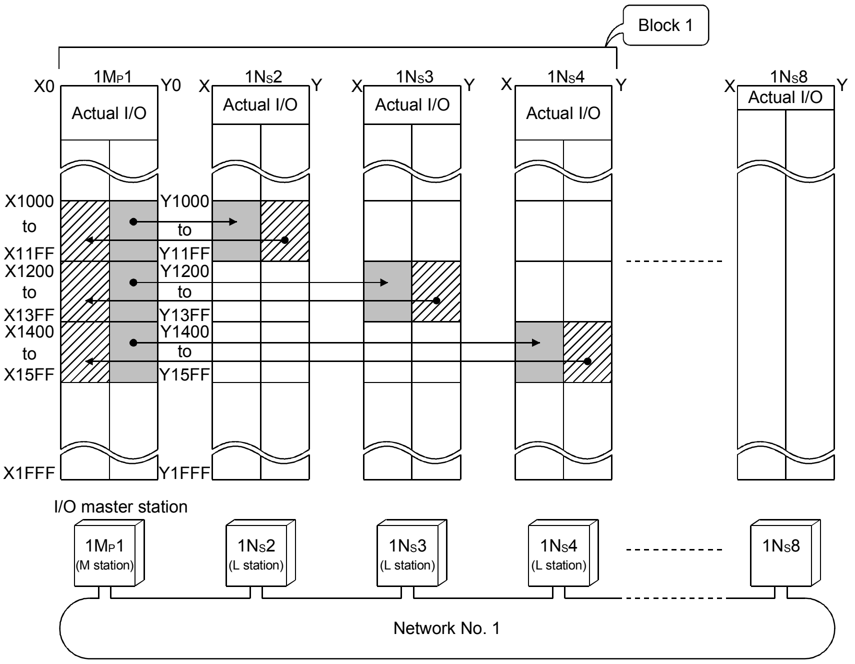
POINT

(1) In order to enable 32-bit data assurance, it is necessary to set the number of points of send range for each station in such a way that LB is a multiple of 20_H and LW is multiple of 2. Also, each station's head device number must be set in a similar way so that LB is a multiple of 20_H and LW is a multiple of 2. (For details of the 32-bit data assurance, refer to Section 6.2.1.)

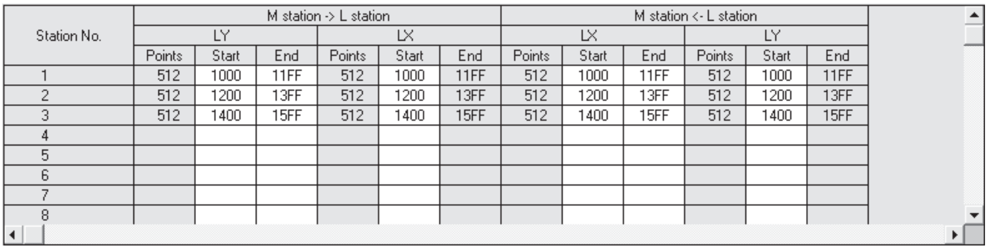
(2) For the assignment of the same points only to LB and LW, use the identical point assignment setting. For the identical point assignment to LBs and LWs, including low-speed LB and low-speed LW, use equal assignment.

5.3.2 Send range for each station (LX/LY settings)

Set send ranges for each station of LX/LY, which represent the amount of data that can be sent by each station in a single network in one (two) block units.
The link devices (LX/LY) between the I/O master station (M station) and other station (L station) are assigned 1:1.
The following example shows send ranges for each station (LX/LY settings) when each of 512 points of link devices (LX/LY) is assigned to station numbers 2 to 4, using station number 1 (host) as the I/O master station of block 1.

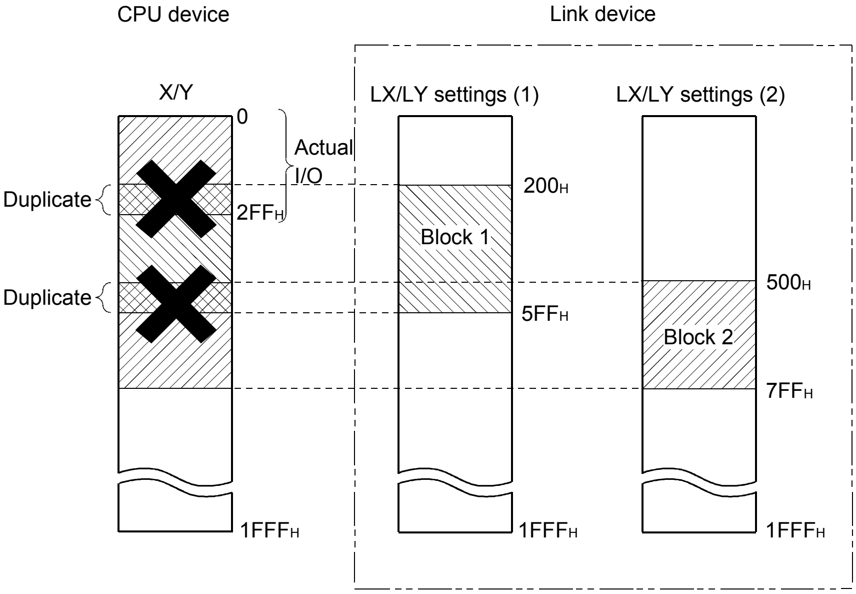


[Screen settings]



Station No.	M station -> L station						M station <- L station					
	LY			LX			LX			LY		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
1	512	1000	11FF	512	1000	11FF	512	1000	11FF	512	1000	11FF
2	512	1200	13FF	512	1200	13FF	512	1200	13FF	512	1200	13FF
3	512	1400	15FF	512	1400	15FF	512	1400	15FF	512	1400	15FF
4												
5												
6												
7												
8												

[Precaution]
Duplicate link device ranges cannot be assigned to each station between block 1 and block 2.
In addition, they must be different from the actual I/O (the range of input/output numbers to which the actual module is installed).



5.3.3 Specification of the I/O master station

The master station (the control station) can be set in each block for 1:1 communication using LX/LY regardless of the station type (either the control station or the normal station).
Each of block 1 and block 2 has one I/O master station, which is set by the send range (LX/LY) of each station in each block.

5.3.4 Specification of the reserved station

The reserved station specification function is used to prevent stations to be connected in future (stations that are not actually connected but included in the total stations of a network) from being treated as faulty stations.
The reserved stations do not affect the link scan time; they do not slow down the network even if used as reserved stations.

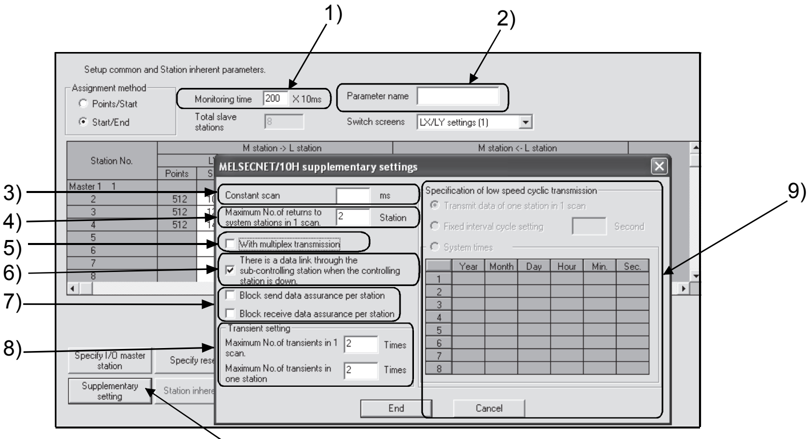
5.3.5 Pairing setting

In the pairing setting, set a combination of network module station numbers comprising the redundant system.
For details of the pairing setting, refer to Section 7.10.3.

5.4 Supplementary Settings

The supplementary settings are included in the common parameter settings. They can be used when more specific applications are required. The default settings should normally be used.

The supplementary settings (common parameter settings) are required only for the control station. The parameters are sent from the control station to normal stations when the network starts up.



Monitoring time 200 X10ms

Total slave stations 8

Parameter name

Switch screens LX/LY settings (1)

Constant scan ms

Maximum No.of returns to system stations in 1 scan. 2 Station

☐ With multiplex transmission

☑ There is a data link through the sub-controlling station when the controlling station is down.

☐ Block send data assurance per station

☐ Block receive data assurance per station

Transient setting

Maximum No.of transients in 1 scan. 2 Times

Maximum No.of transients in one station 2 Times

Supplementary setting screen select button

[Setting item]

1) Monitoring time

This is used to monitor the status of the cyclic transmission between the control station (sub-control station) and normal stations. Set the time to determine whether or not the cyclic transmission is performed normally.

Set a smaller value if the control time is short, the cyclic data error detection is shorter than the default (2 s) monitoring time, and the actual link scan time is sufficient.

Set a larger value if there are large amounts of cyclic data and the link scan time is more than the default monitoring time due to the effect of noise.

Set a value greater than the link scan time in 10 ms units.

If a value smaller than the link scan time is set, the data link is disabled; thus, check the current value and set a sufficient value without making it unnecessarily shorter.

- Valid setting time : 1 to 200 × 10 ms
- Default : 200 × 10 ms (2 s)

2) Parameter name

The parameter name function is used to register the names of parameters to make it easy to understand for which system each parameter is used.

Choose the names in such a way that the parameter to be set can easily be recognized later.

- Number of input characters: Up to eight alphabetic characters

3) Constant scan

The constant link scan function is used to maintain the link scan time constant.

Set a value in the following range to use a constant scan time:

Setting time	Constant scan
Blank	Not executed (default)
1 to 500 ms	Executed using the set time

4) Maximum No. of return to system stations in 1 scan (Refer to Section 3.2.2)

Set the number of faulty stations that can return to the network in one link scan.

• Valid number of stations	: 1 to 64 stations
• Default	: 2 stations

5) With multiplex transmission (Refer to Section 7.6)

Set this item when executing the multiplex transmission function.

The multiplex transmission function is used when both the forward and reverse loops are in the normal status to speed up the transmission rate using both loops at the same time.

- Default: No multiplex transmission

6) There is a data link through the sub-controlling station when the controlling station is down (Refer to Section 3.2.2)

Set this item to enable other normal station in the network to continue cyclic transmission as a substitute station (sub control station) (control station shift function) if the specified control station is cut off from the network due to an error.

- Default: Control station switch function enabled

7) Block send data assurance per station/Block receive data assurance per station (Refer to Section 6.2.2)

Set these items when executing the link data separation prevention per station in the cyclic transmission.

This allows multiple word data manipulation without interlocks.

However, the separation prevention ＊1 is valid only for the refresh processing between the CPU module and the network module.

The default varies depending on the network type.

Network type	Default
MELSECNET/H mode	"No" for both send and receive
MELSECNET/10 mode	
MELSECNET/H Extended mode	"Yes" for both send and receive

＊1: The separation prevention refers to a prevention of link data with double word precision (32 bits), such as the current value of the positioning module, from being separated into new data and old data in one word (16 bits) units due to the cyclic transmission timing.

8) Transient setting (Refer to Section 7.4.1)

Set the execution conditions for the transient transmission.

"Maximum no. of transients in 1 scan"

Set the number of transients (total for one entire network) that a single network can execute in one link scan.

- Valid setting count : 1 to 255 times
- Default : 2 times

"Maximum no. of transients in one station"

Set the number of transients that a single station can execute in one link scan.

- Valid setting count : 1 to 10 times
- Default : 2 times

9) Specification of low-speed cyclic transmission (Refer to Section 7.3)

Set the execution conditions under which the link data (LB/LW) is sent at a low frequency (low-speed cyclic transmission) separately from the normal cyclic transmission.

The following selections can be made when the send ranges (low-speed LB, low-speed LW) of each station are set for the low-speed cyclic transmission.

"Transmit data of one station in 1 scan"

Set this item when sending data to be communicated in a batch mode to other stations at the rate of one station per link scan.

- Default: Disabled

"Fixed term cycle interval setting"

The low-speed cyclic transmission is executed at the set frequency.

- Valid setting frequency : 1 to 65535 s
  (18 hours, 12 minutes and 15 second)
- Default : Disabled

"System times"

The low-speed cyclic transmission is executed according to the set time.

Hour/minute/second of the system timer cannot be omitted.

- Setting : 1 to 8 points (year/month/date/hour/minute/second)
- Default : Disabled

POINT

Low-speed cyclic transmission cannot be set on the Basic model QCPU, Q00UJCPU, Q00UCPU, Q01UCPU and safety CPU. Hence, low-speed cyclic transmission cannot be executed.

5.5 Control Station Return Setting

This parameter is used to specify the type of station used by the control station when returning to the network in the control station return control function (Refer to Section 3.2.2).
Select this parameter to make the control station return as a normal station without stopping the baton pass in the system in operation.
The control station return setting is required only for the control station.

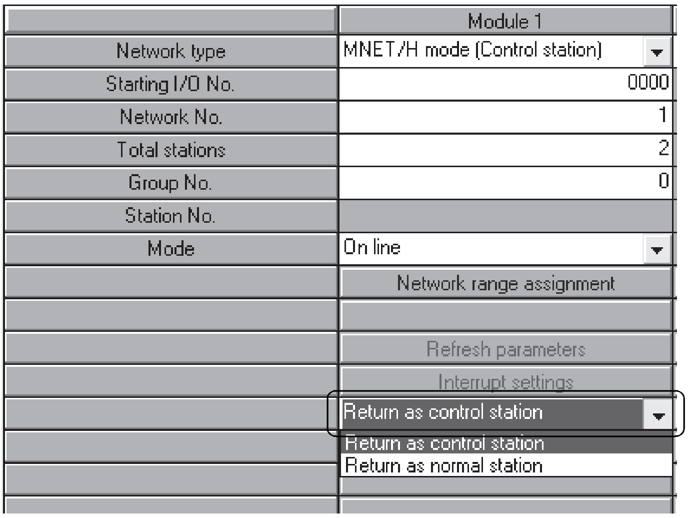
(1) When "Return as control station" is selected (default)

The baton pass (cyclic transmission, transient transmission, etc.) temporarily stops because the control station sends the parameters to the normal stations and returns to the network.

(2) When "Return as normal station" is selected

The control station returns to the network as a normal station, without stopping the baton pass in the network.

[Setting screen]



	Module 1
Network type	MNET/H mode (Control station)
Starting I/O No.	0000
Network No.	1
Total stations	2
Group No.	0
Station No.	
Mode	On line
	Network range assignment
	Refresh parameters
	Interrupt settings
	Return as control station
	Return as control station Return as normal station

REMARKS

- When "Return as control station" is selected, the network stop time becomes longer because the baton pass is stopped, but the common parameters can easily be changed only by resetting the CPU of the control station.
- If "Return as normal station" is selected, the network does not stop because the control station returns to the network without stopping the baton pass.
  However, it is necessary to reset the CPUs of all the stations after changing the common parameters of the control station while the network is in operation. If only the CPU of the control station is reset, a parameter mismatch error is detected in the control station and it is disconnected from the network.

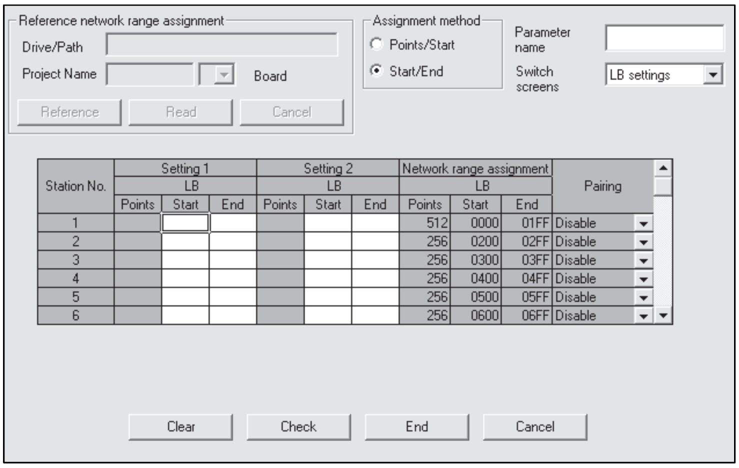
5.6 Station Inherent Parameters (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU)

The station inherent parameters are used for rearranging each station's transmission ranges (LB, LW).
Rearrangement of the each station transmission ranges (LB, LW) eliminates the need for program modification even if link device settings are expanded during operation.
Also, it can remove unnecessary transmission ranges, keeping only necessary ranges.

(1) Setting items

(a) Display of the setting screen

1) For the control station
Click the Station inherent parameters button on the [Network assignment] screen (common parameters) to display to display the following screen.
The settings assigned with common parameters are shown in the Network range assignment area.



Reference network range assignment
Drive/Path
Project Name
Board

Assignment method
○ Points/Start
● Start/End

Parameter name

Switch screens: LB settings

Station No.	Setting 1			Setting 2			Network range assignment			Pairing
	LB			LB			LB			
	Points	Start	End	Points	Start	End	Points	Start	End	
1							512	0000	01FF	Disable
2							256	0200	02FF	Disable
3							256	0300	03FF	Disable
4							256	0400	04FF	Disable
5							256	0500	05FF	Disable
6							256	0600	06FF	Disable

2) For the normal station
The screen appears when the Station inherent parameters button is clicked.
From [Reference network range assignment], common parameters of the control station can be read. (Reference -> Select project -> Read)
This is useful for setting station inherent parameters with the control station's network range assignments being viewed.
Values can be set even if no values are displayed in the network range assignment fields.
The network range assignment fields are merely used as a reference for Setting 1 and Setting 2.

(b) Setting items

1) Parameter name

Set the parameter name to make it easy to understand for which system each parameter is used.

- Number of input characters: Up to eight alphabetic characters

2) Switch screens

The windows can be switched using the selection dialogue box (LB settings, LW settings).


LB settings
LB settings
LW settings

3) Setting 1 and setting 2

- The send ranges of all station numbers can be divided into two: Setting 1 and Setting 2.
- Any values can be set as long as they are within the network assignment range (including all stations) of the common parameters.
- Note that even if the ranges are set with the common parameters, the assigned ranges become invalid for the station numbers for which nothing is set with Setting 1 and Setting 2 of the station inherent parameters.

4) Reference network range assignment (Normal station only)

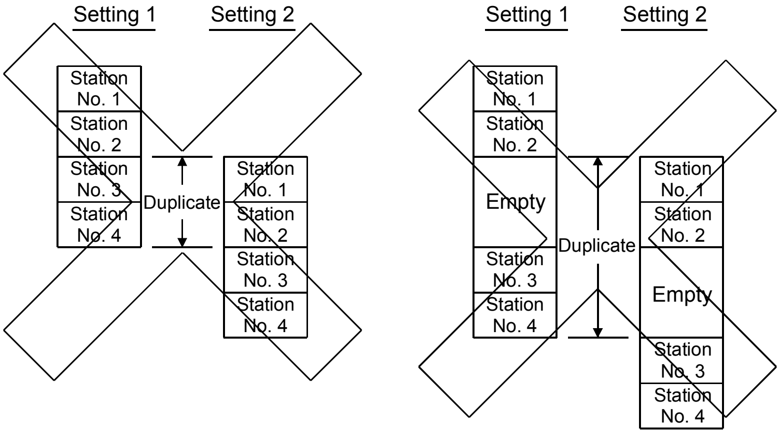
This is used when station inherent parameters are set with the control station's network range assignments being viewed.
With the Reference button, select the project of the control station.
In the Project Name box, select the position of the control station.
A click on the Read button displays the control station's network range assignments in the Network range assignment area.

POINT

(1) Set values for Setting 1 and Setting 2 within the device range specified with a common parameter.

If a value outside the range is selected, a mismatch error occurs.

Also, duplicate ranges cannot be specified for Setting 1 and Setting 2.



(2) The station without setting 1 cannot be set setting 2.

(3) The setting number for setting 2 must be larger than the last number in the whole station of setting 1.

(4) For low-speed cyclic transmission, station inherent parameters cannot be set.

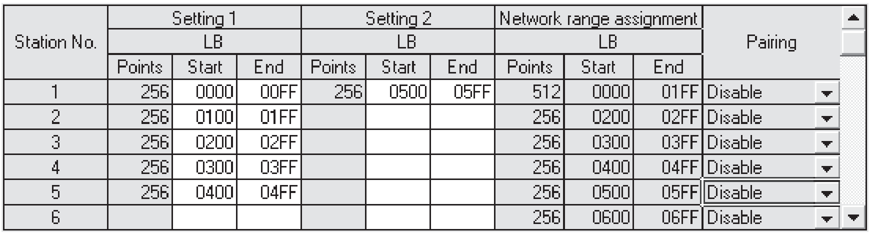
(5) The station inherent parameters cannot be set on the Basic model QCPU and safety CPU.

(2) Example of settings

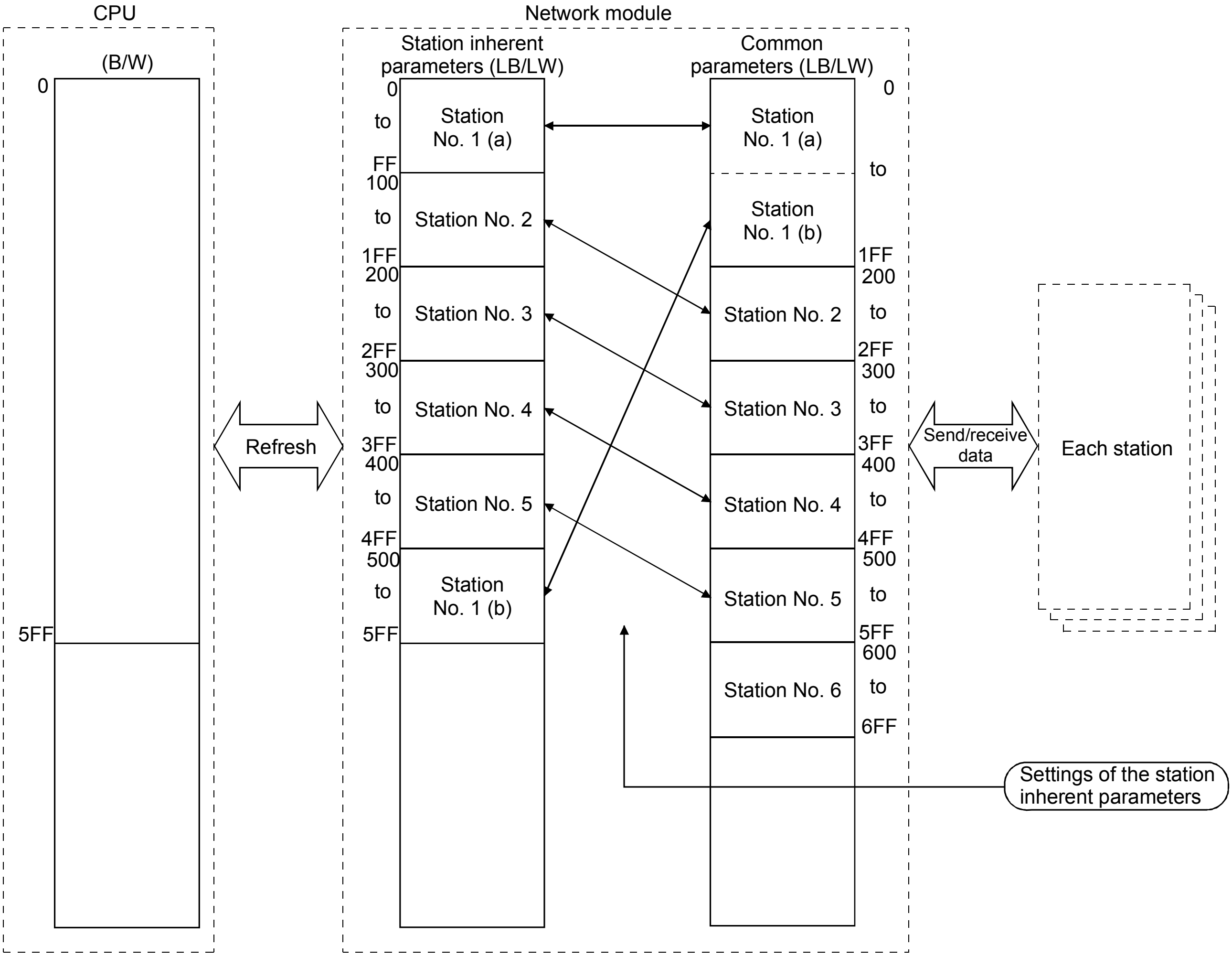
The settings shown below are displayed on the screen when the common parameters (network range assignments) are changed as follows:

1) Move the devices of station number 1. B100 to B1FF → B500 to B5FF
2) Lump the devices of station number 2 to 5 together so that they are contiguous.
3) Cancel the assignments of station number 6.

[Example of station inherent parameter settings]



Station No.	Setting 1			Setting 2			Network range assignment			Pairing
	LB			LB			LB			
	Points	Start	End	Points	Start	End	Points	Start	End	
1	256	0000	00FF	256	0500	05FF	512	0000	01FF	Disable
2	256	0100	01FF				256	0200	02FF	Disable
3	256	0200	02FF				256	0300	03FF	Disable
4	256	0300	03FF				256	0400	04FF	Disable
5	256	0400	04FF				256	0500	05FF	Disable
6							256	0600	06FF	Disable



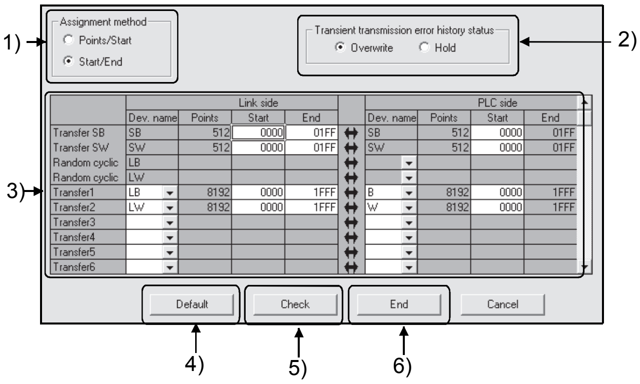
5.7 Refresh Parameters

The refresh parameters are used to transfer the link device data (LB, LW, LX, LY) of the network module to the devices (X, Y, M, L, T, B, C, ST, D, W, R, ZR) of the CPU module for operation of the sequence programs.
By eliminating the network refresh of those link devices that are not used by the sequence programs, the scan time can also be reduced.
Because it is not necessary to transfer the link devices to different devices with the sequence programs, the number of program steps is reduced and easy-to-understand programs can be created.

Refresh parameters

↓

[Refresh parameter setting screen]

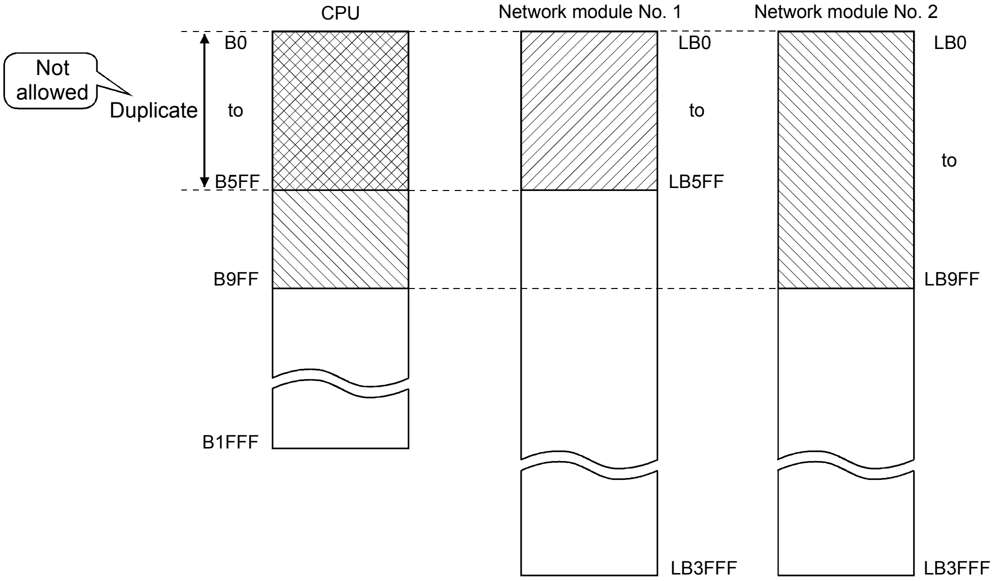


Assignment method
○ Points/Start
● Start/End

Transient transmission error history status
● Overwrite ○ Hold

	Link side					PLC side			
	Dev. name	Points	Start	End		Dev. name	Points	Start	End
Transfer SB	SB	512	0000	01FF	⟷	SB	512	0000	01FF
Transfer SW	SW	512	0000	01FF	⟷	SW	512	0000	01FF
Random cyclic	LB				⟷				
Random cyclic	LW				⟷				
Transfer1	LB	8192	0000	1FFF	⟷	B	8192	0000	1FFF
Transfer2	LW	8192	0000	1FFF	⟷	W	8192	0000	1FFF
Transfer3					⟷				
Transfer4					⟷				
Transfer5					⟷				
Transfer6					⟷				

The assignment status of the above refresh parameters can be checked with the assignment image diagram.
The assignment image diagram shows the device assignments made between the CPU module and the modules set for the No. of module setting.
The refresh parameters cannot be duplicated in the CPU's device settings.

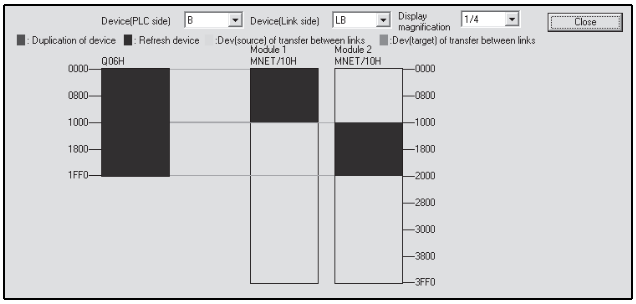


Using the assignment image diagram, assignment errors and duplicate settings between the modules can also be checked.
It is a convenient tool to view the assignment status when setting or changing the network refresh parameters.
It also displays the interlink transmission parameters; thus, complicated settings among the network modules can be verified.

Assignment image

↓

[Link refresh assignment image]



Device(PLC side) B
Device(Link side) LB
Display magnification 1/4

POINT

(1) The assignment image diagram can display schematic images of CC-Link IE Controller Network, CC-Link IE Field Network and MELSECNET/H (network modules on controller networks, PLC to PLC networks, and remote I/O networks).

(2) Avoid any duplicate settings of the programmable-controller-side devices that are used for the following.
- Auto refresh parameters of CC-Link modules
- Refresh parameters of network modules
- I/O numbers used for I/O modules and intelligent function module
- Auto refresh parameters of intelligent function modules
- Auto refresh using the CPU shared memory in the multiple CPU system

(3) Do not set the link refresh range that does not exceed the range of the internal user devices to the extended data register(D) or to extended link register(W) respectively.

1) Assignment method
Select the device range input method from either Points/Start or Start/End.
- Default: Start/End

2) Transient transmission error history status
Select whether to overwrite or retain the error history.
- Default: Overwrite

3) Transfer settings on the Link side and the PLC side
Select the device names from the following:

Link side : LX, LY, LB. LW
PLC side : X, Y, M, L, T, B, C, ST, D, W, R, ZR

However, if the link side is LX, any of C, T and ST cannot be selected on the CPU side.
Set the values for Points/Start/End in 16-point units.

4) Default button

Select this button to automatically assign the default link devices according to the number of installed modules.

5) Check button

Select this button to check if there are any duplicate parameter data settings.

6) End setup button

Click this button to return to the network setting screen after completing the data settings.

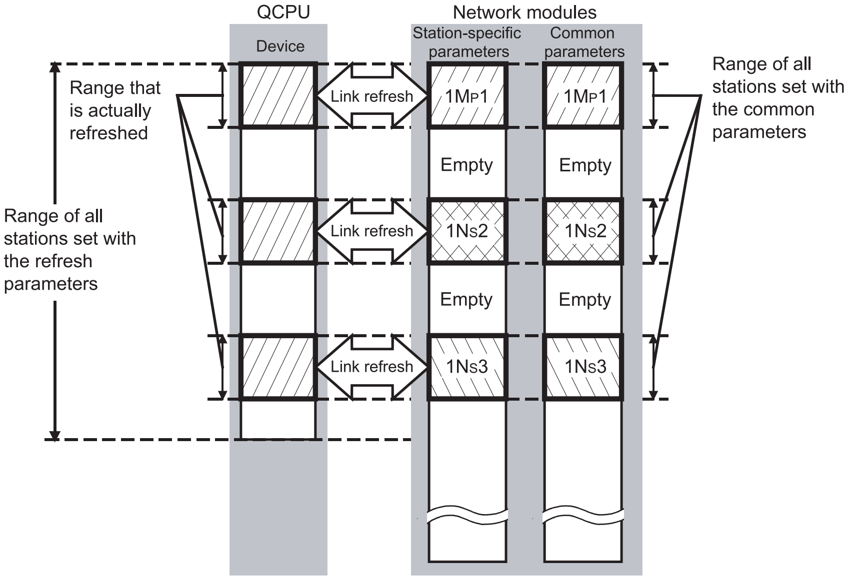
REMARKS

[Random cyclic] is for future use. An error will not occur even if it is selected, but no processing will be performed.

5.7.1 Concept of the link refreshing

(1) Link refresh ranges

The ranges that are set in Refresh parameters and that are set with common parameters are refreshed.



(2) Devices for which link refreshing can be executed

The following table indicates the devices for which link refreshing can be executed.

Setting item	Devices for which transfer is allowed		
	Link side device	⟺	PLC side device
SB transfer	SB	⟺	SB
SW transfer	SW	⟺	SW
Transfer 1	LX, LY, LB, LW	⟺	X, Y, M, L, B, T, C, ST, D, W, R, ZR
:	:	⟺	:
Transfer 64	LX, LY, LB, LW	⟺	X, Y, M, L, B, T, C, ST, D, W, R, ZR

REMARKS

The number of refresh parameter settings per module is shown below.

Item	Number of settings		
	Basic model QCPU Safety CPU	Q00UJCPU Q00UCPU Q01UCPU	High Performance model QCPU Process CPU Redundant CPU Universal model QCPU other than listed in the left columns
Link device transfer	8	16	64
SB/SW transfer	1 for each		

POINT

To use the entire device range (16K points) of LB/LW, either of the following settings must be made:

1) Change the number of device points of B/W.
2) In the refresh parameters, use devices other than B/W for the refresh target device of LB/LW.

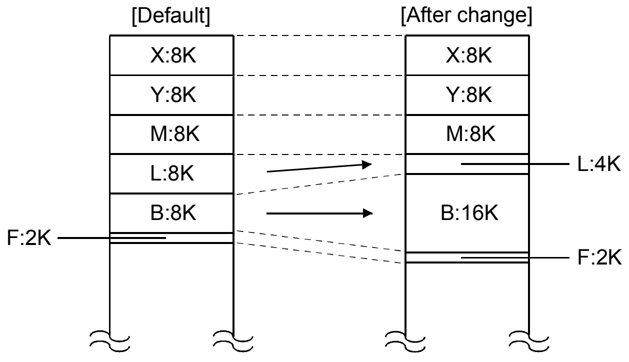
[Example]

To change [Device] of [PLC parameter] in order to use all 16K points of the LB and LW device range

For the Universal model QCPU, 16.4K words in word device and 64K bits in bit device can be assigned.
Setting ranges vary depending on the CPU module used.
For details, refer to the user's manual (Function Explanation, Program Example) for the CPU module used.

[In the case of Q25HCPU]

	[Default]	[After change]
Input relay	X 8K	8K
Output relay	Y 8K	8K
Internal relay	M 8K	8K
Latch relay	L 8K	4K
Link relay	B 8K	16K
Annunciator	F 2K	2K
Link special relay	SB 2K	2K
Edge relay	V 2K	2K
Step relay	S 8K	8K
Timer	T 2K	2K
Retentive timer	ST 0K	0K
Counter	C 1K	1K
Data register	D 12K	4K
Link register	W 8K	16K
Link special register	SW 2K	2K
Device total	28.8K	29.0K
Word device total	26.0K	26.0K
Bit device total	44.0K	48.0K

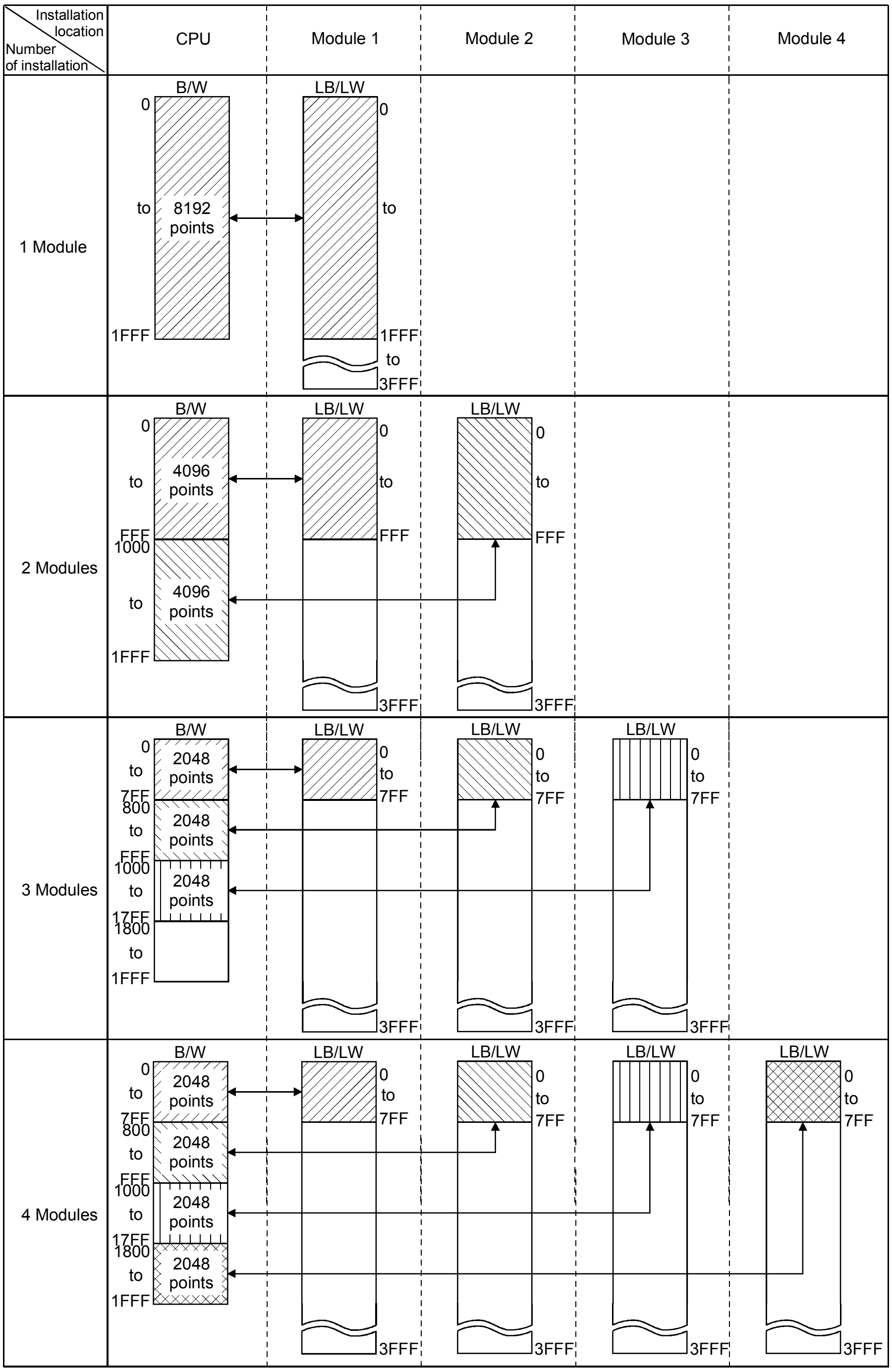


5.7.2 How to set the refresh parameters

(1) Automatic setting with the Default button

(a) High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU

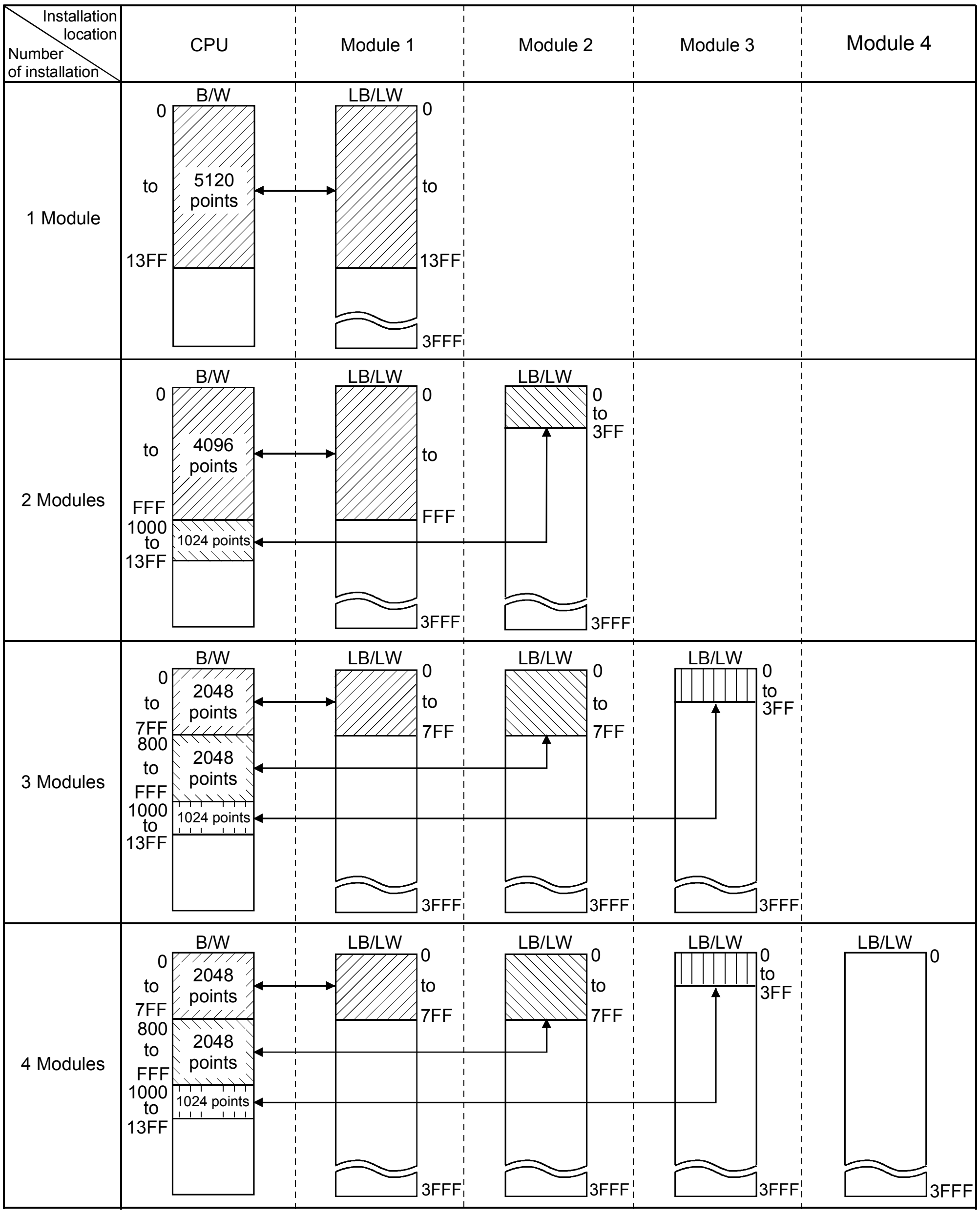
1) When B/W points set in [Device] under [PLC parameter] are 8K points or more (6K points or more when three modules are mounted)
Link devices are assigned as shown below.



2) When B/W points set in [Device] under [PLC parameter] are less than 8K points (less than 6K points when three modules are mounted) Link devices equivalent to the B/W points set in [Device] are assigned, up to the following points for each module.

No. of modules	Maximum points assignable per module
1	B/W points set in [Device]
2	4K points
3	2K points
4	

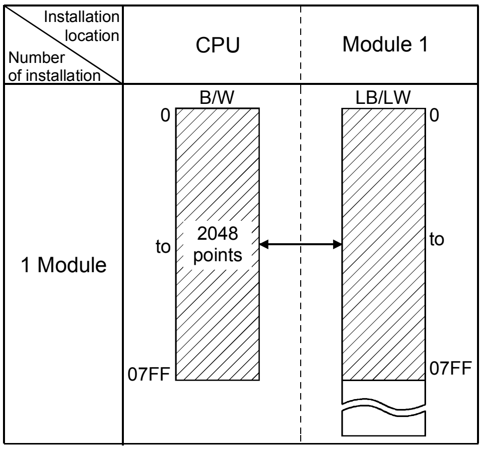
Example: When B/W points set in [Device] are 5K points



(b) Basic model QCPU and safety CPU

1) When B/W points set in [Device] under [PLC parameter] are 2K points or more

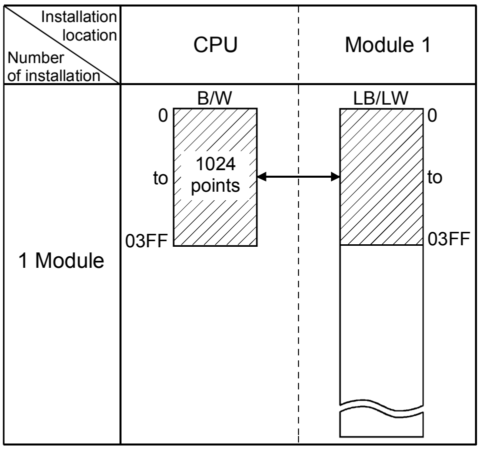
Link devices are assigned as shown below.



2) When B/W points set in [Device] under [PLC parameter] are less than 2K points

The B/W points set in [Device] are assigned.

Example: When B/W points set in [Device] are 1K points

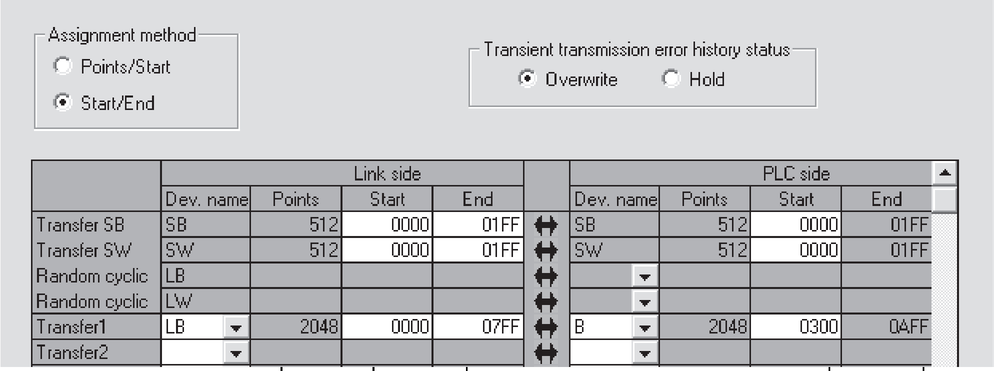


(2) Manual setting by direct input

1) Select "Assignment method".
Select "Points/Start" when entering link device points and start addresses.
Select "Start/End" when entering start and end addresses of link devices.

2) Configure the settings for the link side and CPU side devices.

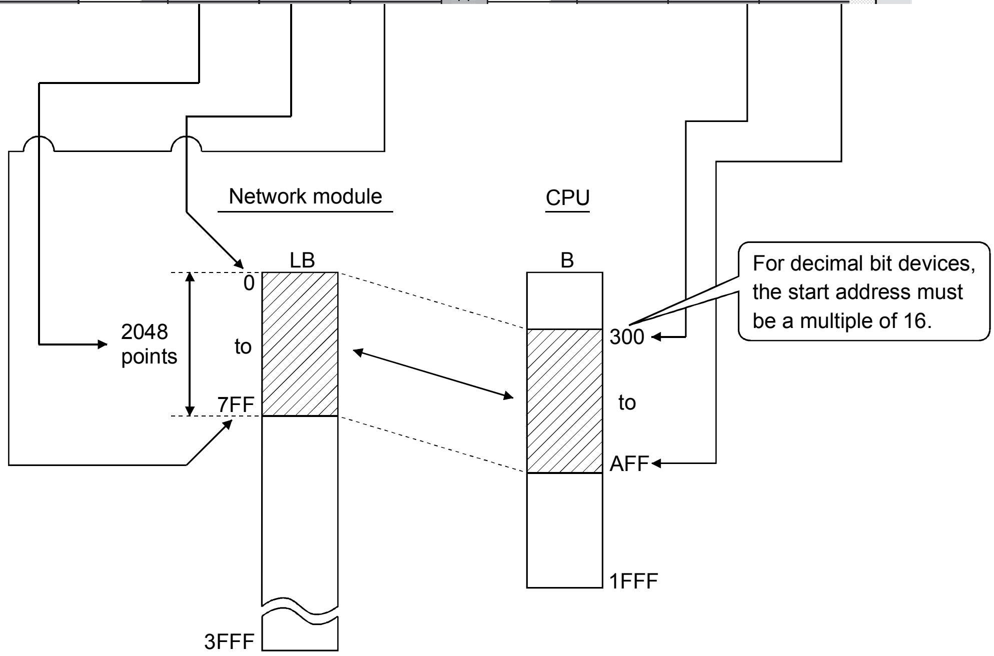
Example: When "Start/End" is selected



Assignment method
○ Points/Start
● Start/End

Transient transmission error history status
● Overwrite ○ Hold

	Link side					PLC side			
	Dev. name	Points	Start	End		Dev. name	Points	Start	End
Transfer SB	SB	512	0000	01FF	↔	SB	512	0000	01FF
Transfer SW	SW	512	0000	01FF	↔	SW	512	0000	01FF
Random cyclic	LB				↔				
Random cyclic	LW				↔				
Transfer1	LB	2048	0000	07FF	↔	B	2048	0300	0AFF
Transfer2					↔				

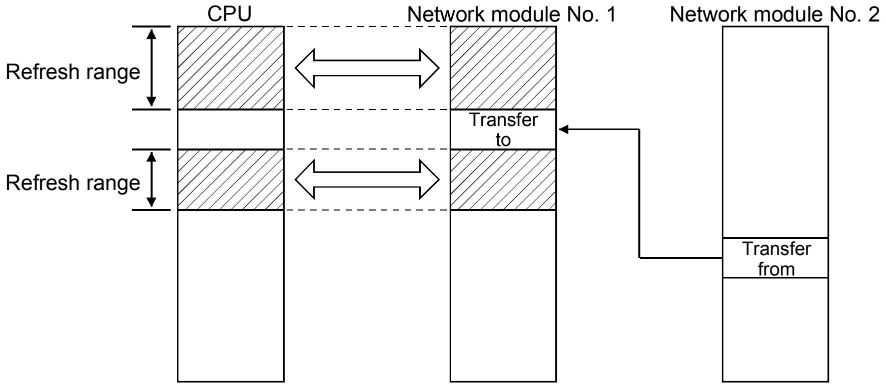


For decimal bit devices, the start address must be a multiple of 16.

POINT

(1) When setting the CPU side device range, check if:
- The refresh range does not overlap with any other range (e.g. actual I/O).
- The CPU side device range is within the range set in [Device] of [PLC parameter].
  Device ranges can be checked by selecting [Tools] – [Check parameters] in GX Developer.

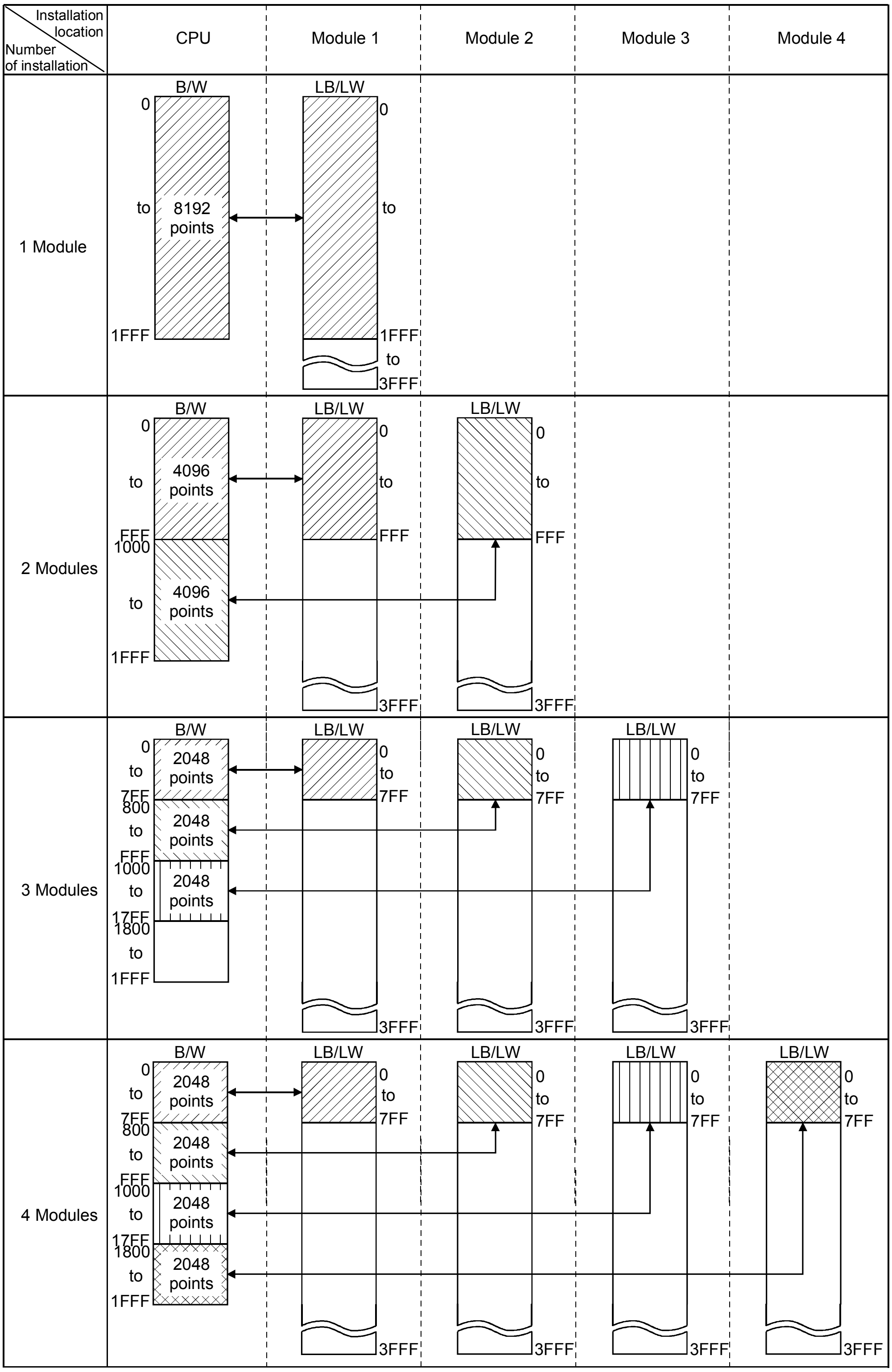
(2) When the interlink transmission parameters are set, do not set the device range of the transfer destination in a refresh range. Otherwise, the correct data cannot be sent to other stations.



(3) When no refresh parameters are set (Other than Universal model QCPU and safety CPU)

(a) High Performance model QCPU, Process CPU, and Redundant CPU

Link devices are assigned as shown below.



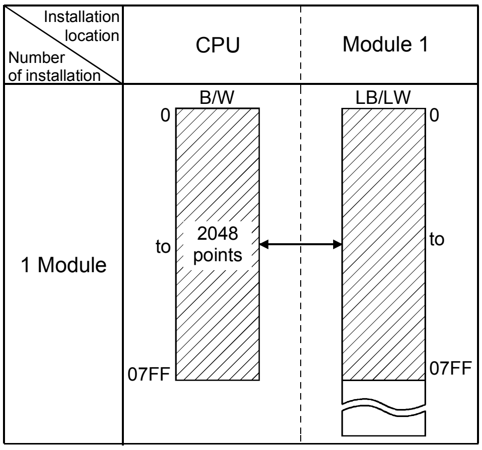
POINT

When B/W points less than the following are set in [Device] under [PLC parameter], set refresh parameters accordingly. Or, increase the B/W points to the following value or more in [Device].

No. of modules	Device points in [Device]	
	B	W
1	8K points	8K points
2	8K points	8K points
3	6K points	6K points
4	8K points	8K points

(b) Basic model QCPU

Link devices are assigned as shown below.



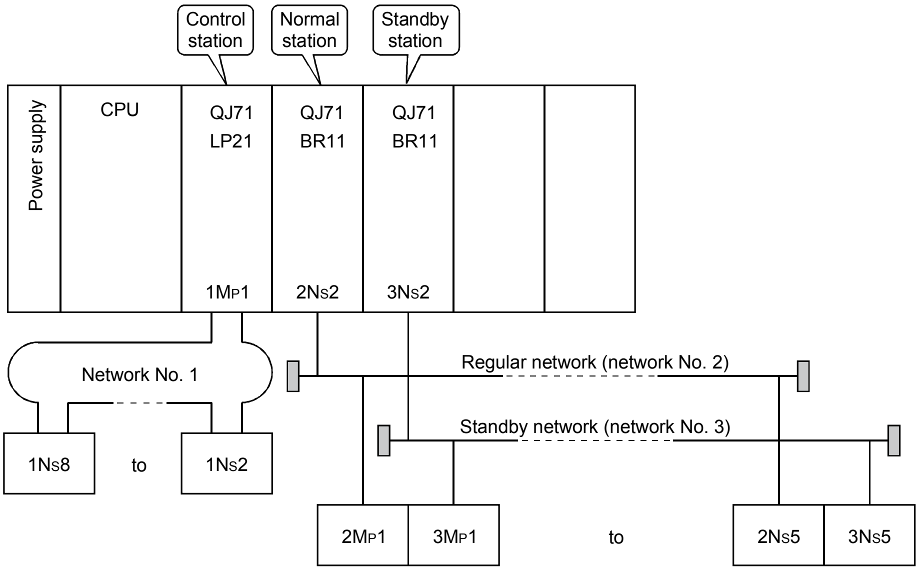
POINT

When B/W points set in [Device] under [PLC parameter] are less than 2K points, set refresh parameters accordingly. Or, increase the B/W points to 2K points or more in [Device].

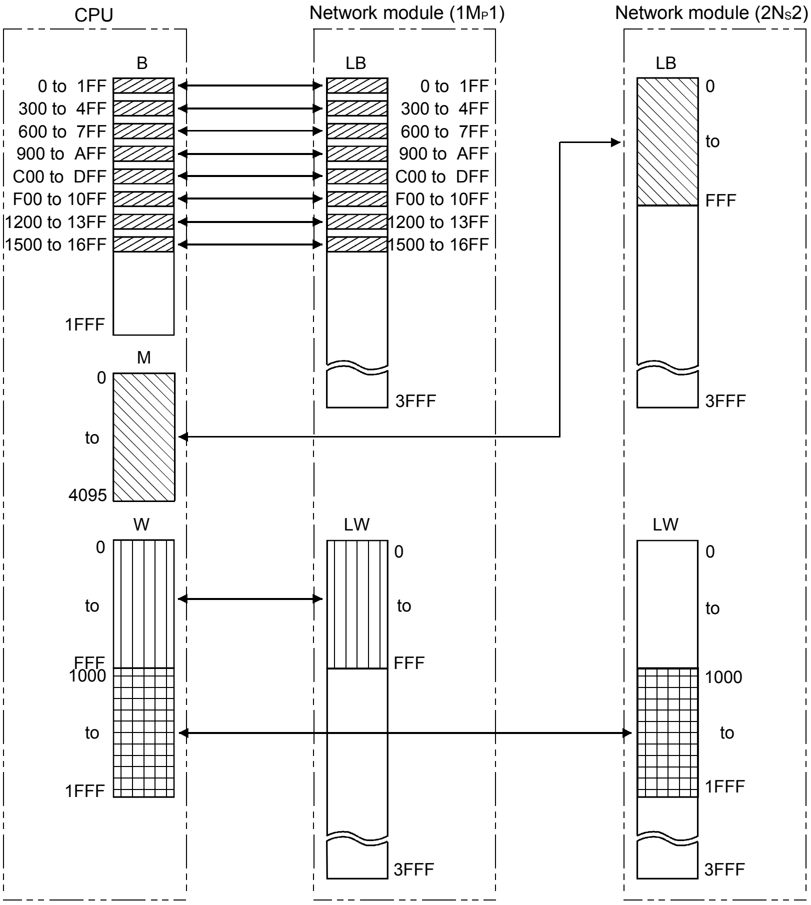
(4) Setting example

The following shows an example of the refresh parameter settings:

[System configuration]

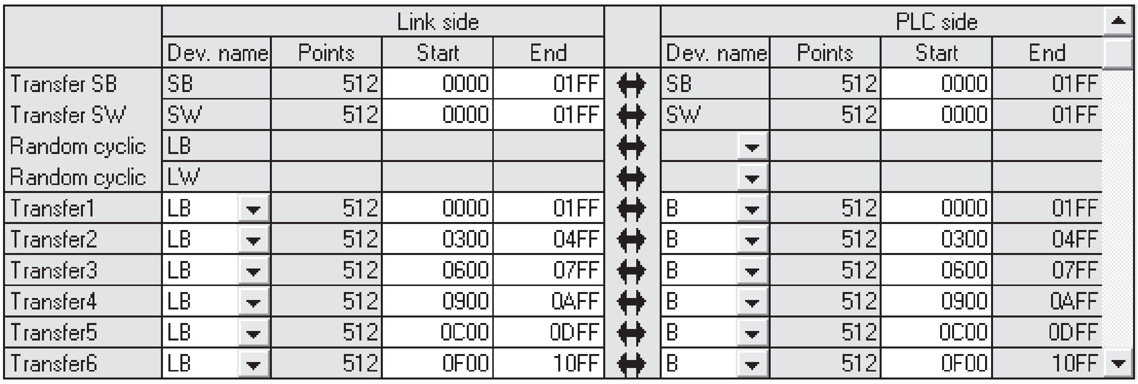


[Parameter assignments]



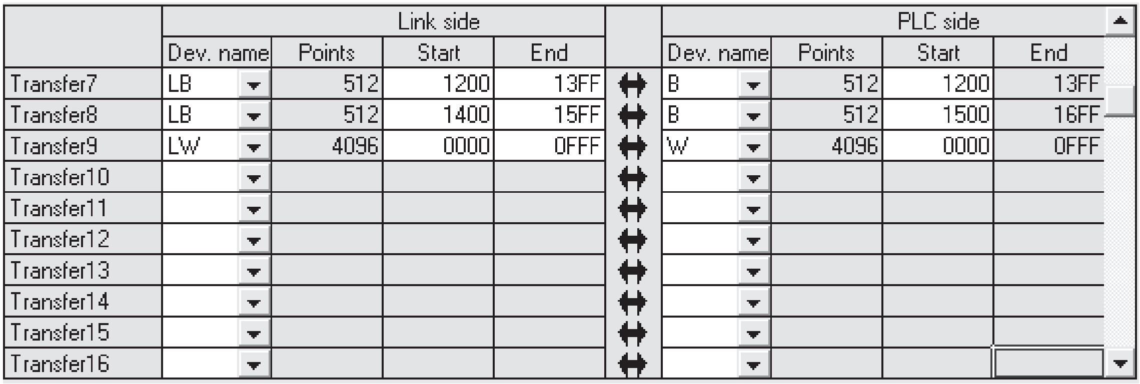
[Setting screen]
The following shows the settings of the refresh parameters for each module that are displayed on the screen.

Settings of module 1 (1MP1) (transfer SB, transfer SW, transfers 1 to 6)



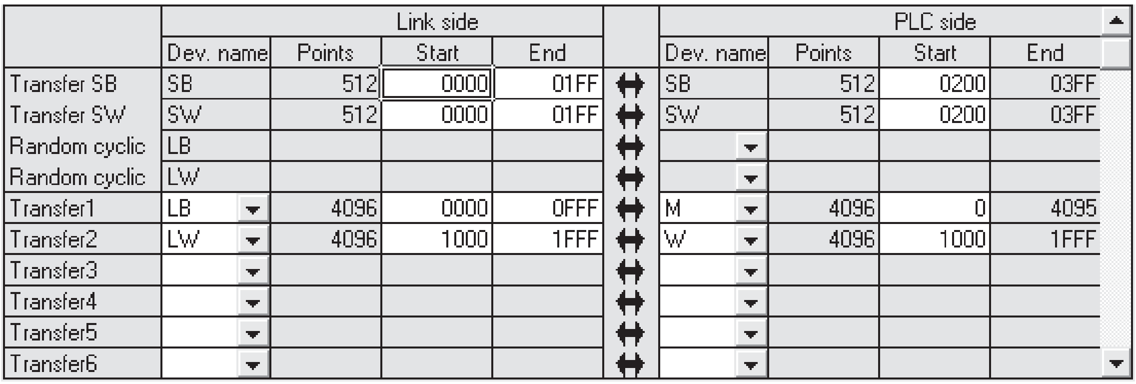
	Link side					PLC side			
	Dev. name	Points	Start	End		Dev. name	Points	Start	End
Transfer SB	SB	512	0000	01FF	⇔	SB	512	0000	01FF
Transfer SW	SW	512	0000	01FF	⇔	SW	512	0000	01FF
Random cyclic	LB				⇔				
Random cyclic	LW				⇔				
Transfer1	LB	512	0000	01FF	⇔	B	512	0000	01FF
Transfer2	LB	512	0300	04FF	⇔	B	512	0300	04FF
Transfer3	LB	512	0600	07FF	⇔	B	512	0600	07FF
Transfer4	LB	512	0900	0AFF	⇔	B	512	0900	0AFF
Transfer5	LB	512	0C00	0DFF	⇔	B	512	0C00	0DFF
Transfer6	LB	512	0F00	10FF	⇔	B	512	0F00	10FF

(Transfers 7 to 9)



	Link side					PLC side			
	Dev. name	Points	Start	End		Dev. name	Points	Start	End
Transfer7	LB	512	1200	13FF	⇔	B	512	1200	13FF
Transfer8	LB	512	1400	15FF	⇔	B	512	1500	16FF
Transfer9	LW	4096	0000	0FFF	⇔	W	4096	0000	0FFF
Transfer10					⇔				
Transfer11					⇔				
Transfer12					⇔				
Transfer13					⇔				
Transfer14					⇔				
Transfer15					⇔				
Transfer16					⇔				

Settings of module 2 (2NS2) (transfer SB, transfer SW, transfers 1 and 2)



	Link side					PLC side			
	Dev. name	Points	Start	End		Dev. name	Points	Start	End
Transfer SB	SB	512	0000	01FF	⇔	SB	512	0200	03FF
Transfer SW	SW	512	0000	01FF	⇔	SW	512	0200	03FF
Random cyclic	LB				⇔				
Random cyclic	LW				⇔				
Transfer1	LB	4096	0000	0FFF	⇔	M	4096	0	4095
Transfer2	LW	4096	1000	1FFF	⇔	W	4096	1000	1FFF
Transfer3					⇔				
Transfer4					⇔				
Transfer5					⇔				
Transfer6					⇔				

5.8 Valid Module During Other Station Access

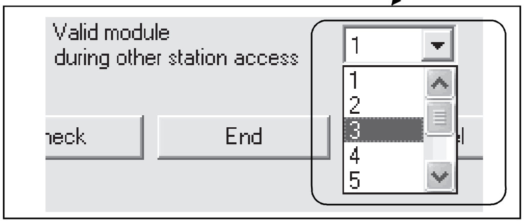
This parameter is used to specify any of the following modules to be relayed when a data communication request for which the network number of the access target programmable controller station cannot be specified from the host (access from the serial communication module (A compatible 1C frame), the Ethernet module (A compatible 1E frame), etc. to other stations) is issued.

- CC-Link IE Controller Network, CC-Link IE Field Network, MELSECNET/H, MELSECNET/10 module
- Ethernet module

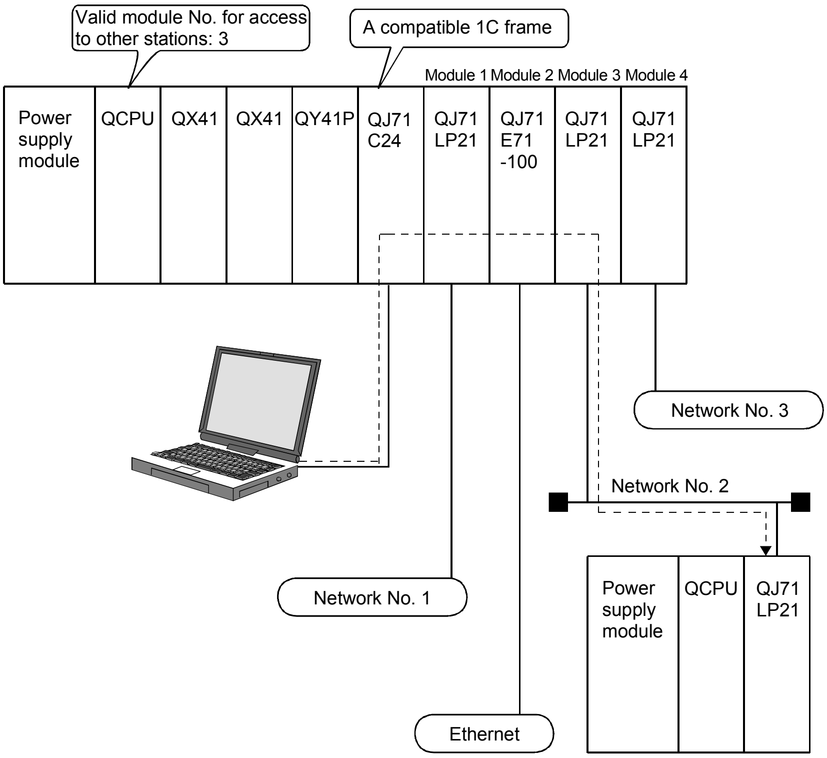
This setting is not required when a data communication request for which the network number can be specified, such as the serial communication module (QnA compatible 3C frame, QnA compatible 4C frame) or Ethernet module (QnA compatible 3E frame), is used. Leave it as the default (1) setting.
For details of the serial communication module or Ethernet module protocol, refer to the MELSEC-Q/L MELSEC Communication Protocol Reference Manual.

[Screen settings]

Select from the selection dialogue box.



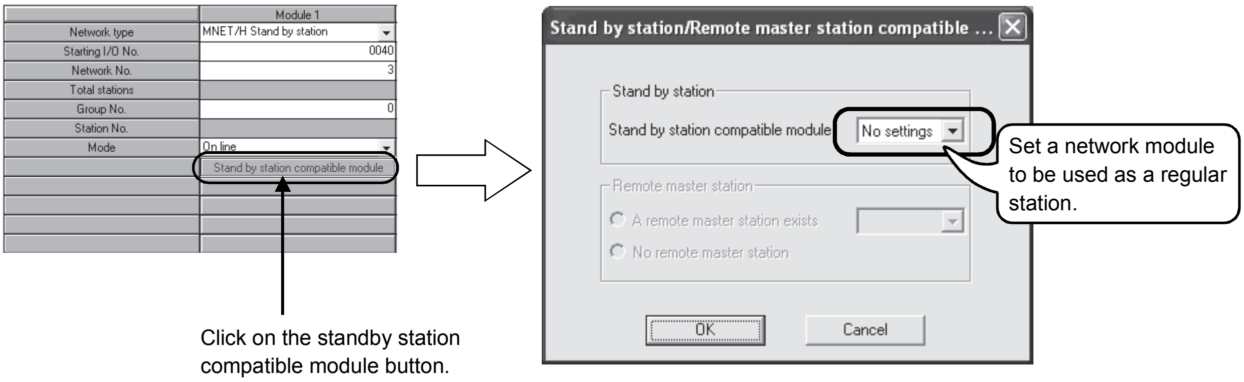
(Example)
In the example below, the personal computer connected to the serial communication module (QJ71C24) can communicate with the station on network number 2 where the network module 3 is connected.



5.9 Standby Station Compatible Module (High Performance model QCPU and Process CPU)

This parameter is set to configure a simple dual-structured system.
Specify a regular station to be paired with the standby station.
If the set regular network is down, the network of the wait station (standby station) is enabled.
Click the Standby station compatible module button to display the "Stand by station /Remote master station compatible module" window, and select the corresponding module.

- Default: No setting



	Module 1
Network type	MNET/H Stand by station
Starting I/O No.	0040
Network No.	3
Total stations	
Group No.	0
Station No.	
Mode	On line
	Stand by station compatible module

Stand by station/Remote master station compatible ...

Stand by station

Stand by station compatible module: No settings

Remote master station

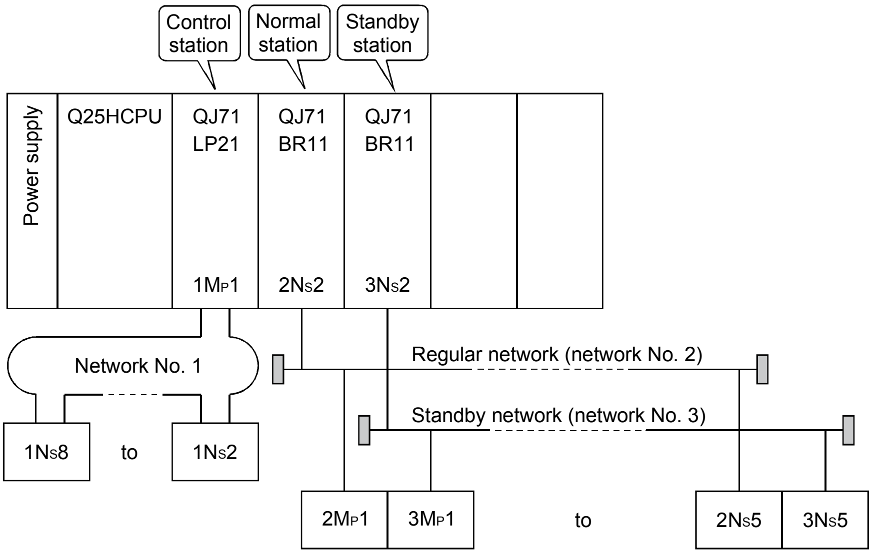
○ A remote master station exists

○ No remote master station

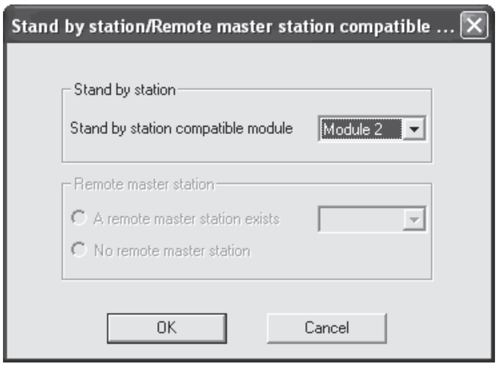
Set a network module to be used as a regular station.

Click on the standby station compatible module button.

[Setting example]



To use the 3NS2 station as the standby station for the normal station 2NS2 as shown in the figure above, select "Module 2" in the "Standby station compatible module" window below.



Stand by station/Remote master station compatible ...

Stand by station

Stand by station compatible module: Module 2

Remote master station

○ A remote master station exists

○ No remote master station

POINT

Since the Basic model QCPU, Redundant CPU, Universal model QCPU, and safety CPU are not compatible with a simple dual-structured system, this setting is not available.

5.10 Writing Parameters to the CPU

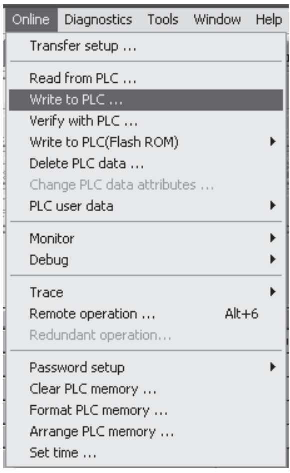
To enable the network parameter settings, they must be written to the CPU using the Write to PLC function of GX Developer.

The PLC parameters are written as well when the network parameters are written.

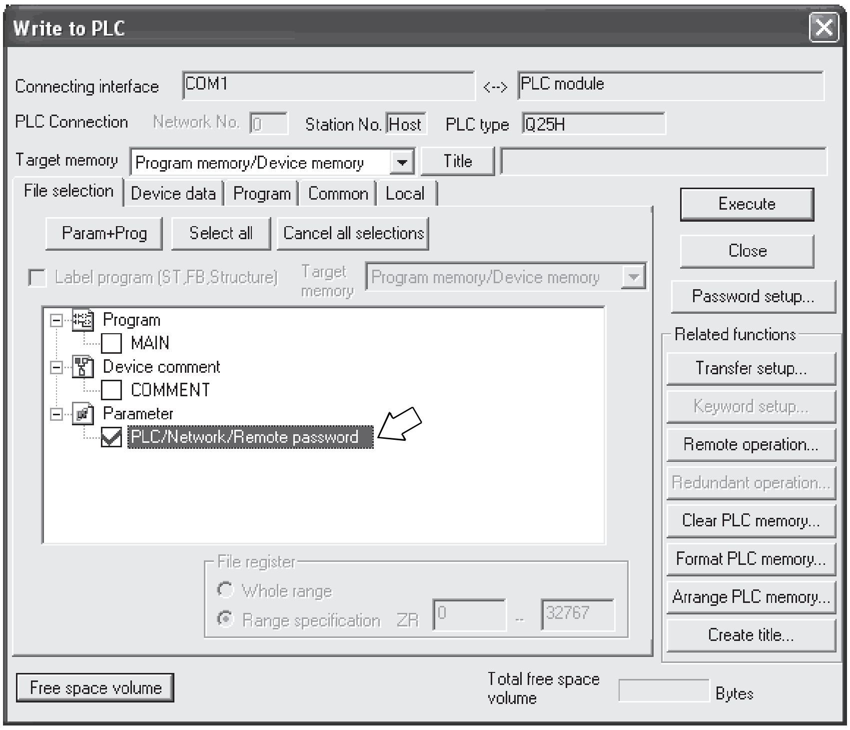
To write the parameters to a programmable controller of other station than the one that connects GX Developer via the MELSECNET/H, change the specification of the connection destination of GX Developer.

For more information on how to use this function, refer to the GX Developer Operating Manual.

(1) Select the Write to PLC function



(2) Select the parameter as a file to be written, and then execute.



Connecting interface: COM1 <--> PLC module

PLC Connection: Network No. 0, Station No. Host, PLC type Q25H

Target memory: Program memory/Device memory

☐ Label program (ST,FB,Structure) Target memory: Program memory/Device memory

- Program
  - ☐ MAIN
- Device comment
  - ☐ COMMENT
- Parameter
  - ☑ PLC/Network/Remote password

File register: ○ Whole range ● Range specification ZR 0 -- 32767

Total free space volume: Bytes

6 PROGRAMMING

When applying any of the program examples introduced in this chapter to the actual system, verify the applicability and confirm that no problems will occur in the system control.

6.1 Programming Precautions

This section explains the precautions in creating programs using data on the network.

6.1.1 Interlock related signals

A list of the interlock signal devices used in the sequence programs is provided below.
For other explanations, such as the operation status and setting status of the host and other stations, refer to Appendix 3, "List of the Link Special Relays (SB)" and Appendix 4, "List of the Link Special Registers (SW)".
When multiple network modules are installed, the interlock signal devices are refreshed to the devices on the CPU side at 512 points (0_H to $1FF_H$) intervals according to the default settings as shown below.

POINT

The Q series uses the link special relays (SB) and the link special registers (SW) in the entire intelligent function module. Therefore, it is important to manage SB/SW properly so that duplicate SBs and SWs are not used in a program.

Assignments of the link special relay (SB) and the link special register (SW) when multiple modules are installed

Mounting Position / Device	1st module	2nd module	3rd module	4th module
SB	0_H to $1FF_H$	200_H to $3FF_H$	400_H to $5FF_H$	600_H to $7FF_H$
SW	0_H to $1FF_H$	200_H to $3FF_H$	400_H to $5FF_H$	600_H to $7FF_H$

List of Interlock Devices

<table>
<tr><th rowspan="3">No.</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="8">Use permitted/prohibited</th></tr>
<tr><th colspan="2">Control station</th><th colspan="2">Normal station</th><th colspan="2">Remote master station</th><th colspan="2">Remote I/O station</th></tr>
<tr><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th></tr>
<tr><td>SB0020
(32)</td><td>Module status</td><td>Indicates the communication status between the network module and CPU module.
Off: Normal
On: Abnormal</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>SB0047
(71)</td><td>Baton pass status (host)</td><td>Indicates the host's baton pass status (transient transmission enabled).
Off: Normal
On: Abnormal
When an error is identified, the cause of the error can be checked in Baton pass status (host) (SW0047) and Cause of baton pass interruption (SW0048).</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SB0049
(73)</td><td>Host data link status</td><td>Indicates the host's data link operation status.
Off: Normal
On: Abnormal
When an error is identified, the cause of the error can be checked in Cause of data link stop (SW0049).</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊1
SB0070
(112)</td><td>Baton pass status of each station</td><td>Indicates the baton pass status of each station. (Not applicable to reserved stations and the station with the maximum station number or higher)
Off: All stations normal
On: Faulty station exists
When any faulty station exists, each station status can be checked in Baton pass status of each station (SW0070 to SW0073).
Depending on the timing of the link refresh, Baton pass status of each station (SW0070 to SW0073) and the update may be offset by one sequence scan.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊1
SB0074
(116)</td><td>Cyclic transmission status of each station</td><td>Indicates the cyclic transmission status of each station. (Not applicable to reserved stations and the station with the maximum station number or higher)
Off: All stations are executing data linking
On: Stations that are not executing data linking exist
When any non-executing station exists, each station status can be checked in Cyclic transmission status of each station (SW0074 to SW0077).
Depending on the timing of the link refresh, Cyclic transmission status of each station (SW0074 to SW0077) and the update may be offset by one sequence scan.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊1
SW0070
(112)/
SW0071
(113)/
SW0072
(114)/
SW0073
(115)</td><td>Baton pass status of each station</td><td>Stores the baton pass status of each station (Including the host).
<Online>
0: Normal (including the stations with the maximum station number and smaller numbers as well as reserved stations)
1: Abnormal
<Offline test>
0: Normal
1: Abnormal (including the stations with the maximum station number and smaller numbers as well as reserved stations)
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0070</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0071</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0072</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0073</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
</table>

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊1: Valid only when SB0047 is off. When it turns on (error), the last data are retained.

List of Interlock Devices (Continued)

<table>
<tr><th rowspan="3">No.</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="8">Use permitted/prohibited</th></tr>
<tr><th colspan="2">Control station</th><th colspan="2">Normal station</th><th colspan="2">Remote master station</th><th colspan="2">Remote I/O station</th></tr>
<tr><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th></tr>
<tr><td>＊1
SW0074
(116)/
SW0075
(117)/
W0076
(118)/
SW0077
(119)</td><td>Cyclic transmission status of each station</td><td>Stores the cyclic transmission status of each station (including the host).
0: Executing cyclic transmission (including the station with the maximum station number and smaller number as well as reserved stations)
1: Cyclic transmission not executed
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0074</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0075</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0076</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0077</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.
If a CPU module installed together with QJ71LP21S-25 is turned OFF, detection of a data link error may take more time than usual. For immediate detection of a data link error, program an interlock using the link relay (LB) in each station's send range. (Refer to Section 6.2.3.)</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊1
SW01FC
(508)/
SW01FD
(509)/
SW01FE
(510)/
SW01FF
(511)</td><td>Redundant system status (3)</td><td>Indicates the operation status of each station's CPU (control system/standby system).
0: The host station CPU is on the control system (including the single CPU system) (including stations exceeding the maximum station number and reserved stations).
1: The host system CPU is on the standby system.
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW01FC</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW01FD</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW01FE</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW01FF</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
</table>

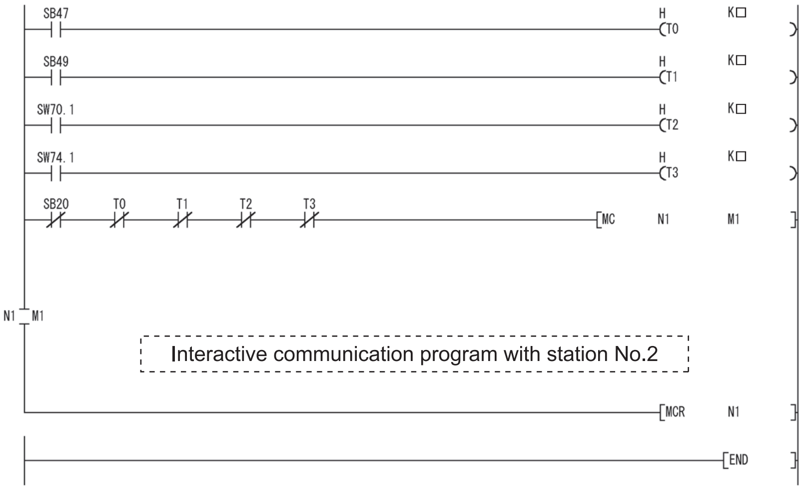
[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊1: Valid only when SB0047 is off. When it turns on (error), the last data are retained.

6.1.2 Program example

Provide interlocks in programs according to the link status of the host and other stations.
The following example shows an interlock in the communication program that uses the link status of the host (SB0047, SB0049) and the link status of station number 2 (SW0070 bit 1, SW0074 bit 1).

(Example)



SB0047: Baton pass status (host)
SB0049: Host data link status
SW0070: Baton pass status of each station
SW0074: Cyclic transmission status of each station
SB0020: Module status

Set the following values for the timer constant K□.

Baton pass status (T0, T2)	More than (link scan time × 6) + (target station CPU sequence scan time × 2)
Cyclic transmission status (T1, T3)	More than (link scan time × 3)

Reason: This way the control is not stopped even if the network detects an instantaneous error due to a faulty cable condition and noise interference. Also, the multipliers of 6, 2 and 3 are used as examples.

REMARKS

For details of interlocks for special link instructions, refer to Section 7.4.5.

6.2 Cyclic Transmission

The link scan of MELSECNET/H and the sequence scan of the programmable controller operate asynchronously.

Thus, the link refresh executed per sequence scan is asynchronous with the link scan. Depending on the timing of the link refresh, link data with data types of more than 32 bits (two words), such as the ones below, may be broken up into new and old data, which may coexist in 16-bit (one word) units.

- Floating point data
- Current values of positioning module, command speed.

The MELSECNET/H provides the following functions for making handling of the link data easy. However, when the conditions (32-bit data assurance execution conditions) are not met, provide interlocks according to the example in Section 6.2.3.

- 32-bit data assurance : Section 6.2.1
- Station-based block data assurance for cyclic data : Section 6.2.2

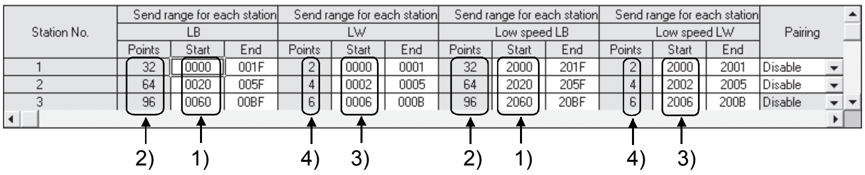
6.2.1 32-bit data assurance

32-bit data precision is assured automatically by setting parameters so that the following conditions 1) to 4) are satisfied.

If conditions 1) to 4) are not satisfied, a warning for 32-bit data separation is displayed during setting with GX Developer.

1) The start device number of LB is a multiple of 20_H.
2) The number of assigned LB points per station is a multiple of 20_H.
3) The start device number of LW is a multiple of 2.
4) The number of assigned LW points per station is a multiple of 2.

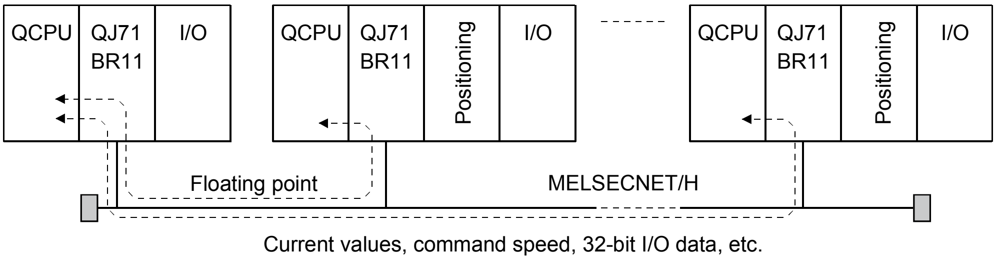
Parameter settings for network range assignments



Station No.	Send range for each station			Send range for each station			Send range for each station			Send range for each station			Pairing
	LB			LW			Low speed LB			Low speed LW			
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1	32	0000	001F	2	0000	0001	32	2000	201F	2	2000	2001	Disable
2	64	0020	005F	4	0002	0005	64	2020	205F	4	2002	2005	Disable
3	96	0060	00BF	6	0006	000B	96	2060	20BF	6	2006	200B	Disable

Refreshing link devices that satisfy the above conditions 1) to 4) ensures consistency of 32-bit data.

For the send data of less than 32 bits, an interlocked program is not required if the above conditions are satisfied.



POINT

(1) When handling data larger than 32 bits (two words), enable the station-based block data assurance described in Section 6.2.2, or apply interlocks in the programs by seeing the interlock program example in Section 6.2.3.

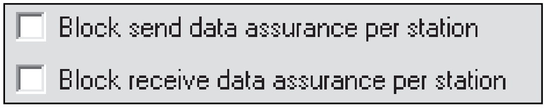
(2) When the network is set up in the MELSECNET/10 mode, 32-bit data assurance is valid only stations with QCPU. For those with ACPU/QnACPU, set interlock referring to interlock program example in Section 6.2.3.

6.2.2 Station-based block data assurance for cyclic data

Since handshakes are performed between a CPU module and a network module for link refresh, consistency of cyclic data is assured for each station (link data separation prevention per station ＊1).
As shown below, set the send and receive parameters as needed.
These settings can be made using the common parameters (supplementary settings) only for the control station.
The default varies depending on the network type.

Network type	Default
MELSECNET/H mode	"No" for both send and receive
MELSECNET/10 mode	
MELSECNET/H Extended mode	"Yes" for both send and receive

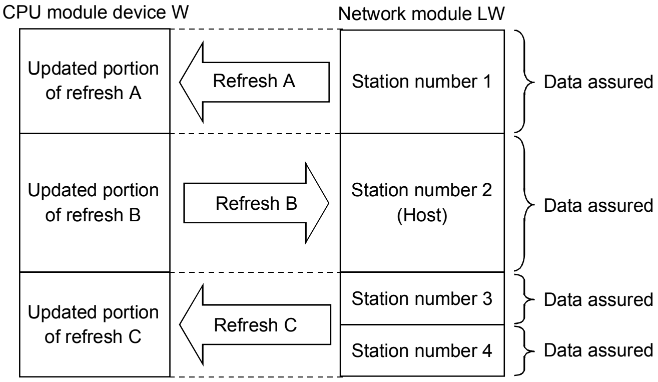
Network range assignments Supplementary settings



☐ Block send data assurance per station

☐ Block receive data assurance per station

By selecting both [Block send data assurance per station] and [Block receive data assurance per station], an interlock for the link data between the stations to be set becomes unnecessary.



<Precautions>

(1) In order to enable the station-based block data assurance, refresh parameters must be set. (Refer to Section 5.7.)

(2) Station-based block data assurance for cyclic data is not required for normal stations.

POINT

(1) The station-based block data assurance applies only to the refresh processing. To use the direct access (J□\□ designation) of the link devices, provide interlocks in the programs.

(2) For the transmission delay time calculation for the case where the Block send/receive data assurance per station is enabled, refer to Section 3.3.2 (1) (a) POINT.

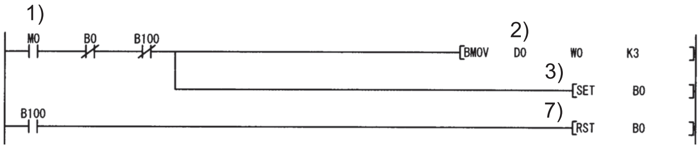
(3) When the network is set up in the MELSECNET/10 mode, station-based block data assurance is valid only for stations with QCPU. For those with ACPU/QnACPU, provide interlocks in the program referring to the program example in Section 6.2.3.

＊1: The separation prevention refers to a prevention of link data with double word precision (32 bits), such as the current value of the positioning module, from being separated into new data and old data in one word (16 bits) units due to the cyclic transmission timing.

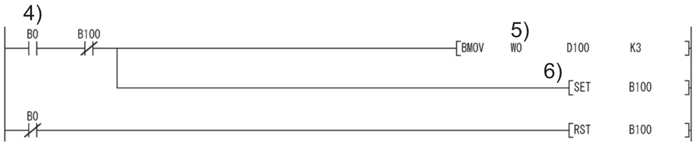
6.2.3 Interlock program example

When data larger than two words (32 bits) are transferred at one time with the 32-bit data assurance function or the station-based block data assurance function disabled, old and new data may be mixed in units of one word (16 bits).
As in the example below, provide interlocks in a program using the oldest number of either the link relay (B).

Sending station



Receiving station



1) The send command turns on.
2) The contents of D0 to D2 are stored in W0 to W2.
3) Upon completion of storage in W0 to W2, B0 for handshaking turns on.
4) By cyclic transmission, the link relay (B) is sent after the link register (W), which turns on B0 of the receiving station.
5) The contents of W0 to W2 are stored in D100 to D102.
6) Upon completion of storage in D100 to D102, B100 for handshaking turns on.
7) When the data is transmitted to the receiving station, B0 turns off.

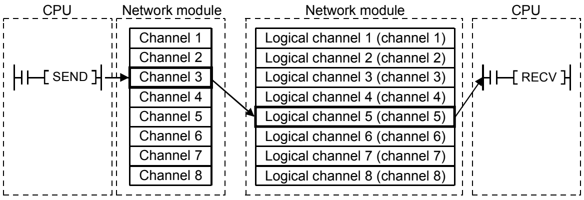
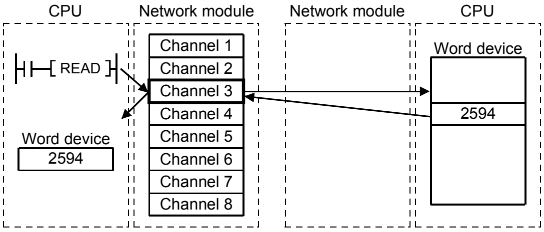
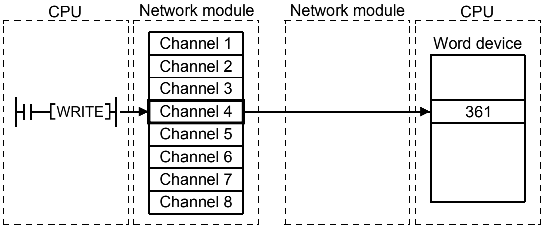
POINT

This interlock program example is not usable in the MELSECNET/H Extended mode. Use the station-based block data assurance.

6.3 Link Dedicated Instruction List

The following table outlines the instructions that can be used for the MELSECNET/H. For details of the format and program examples of each instruction, refer to the applicable section listed in the Reference section column.

Link dedicated instruction list

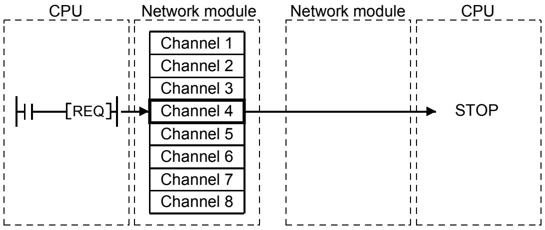
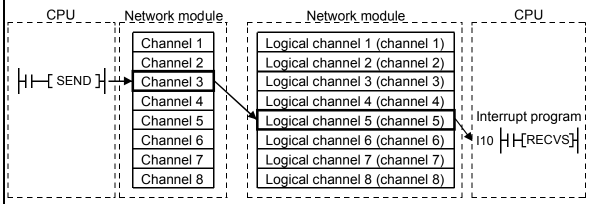
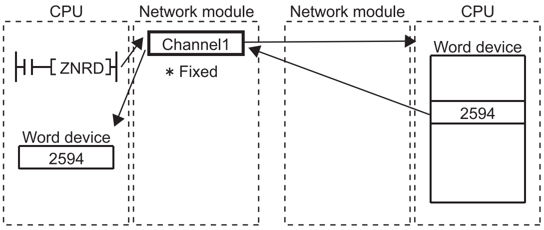
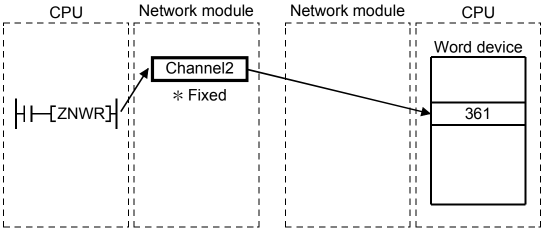
Instruction	Name	Description	Target station	Reference section
SEND	Send data	SEND : Writes data to the target station (network module) having the target network number. *1 RECV : Reads data sent with SEND to the CPU device. *1  	• QCPU • RCPU • LCPU • QnACPU • PC interface board *3	Section 7.4.5 (1)
RECV	Receive data		• QCPU • RCPU	
READ SREAD	Read word device from other station	Reads the CPU device data (16-bit units) from the target station having the target network number.  	• QCPU • RCPU • LCPU • QnACPU • Safety CPU	Section 7.4.5 (2)
WRITE SWRITE	Write word device to other station	Writes data (16-bit units) to the CPU device of the target station having the target network number. *2 (SWRITE can turn on the device of the target station.)  	• QCPU • RCPU • LCPU • QnACPU	Section 7.4.5 (2)

*1: Cannot be used if the executing station or target station is a safety CPU.

*2: Writing to a safety CPU is not allowed from other stations.

*3: Can access a PC interface board with the SEND/RECV functions.
- MELSECNET/H interface board
- MELSECNET/10 interface board
- CC-Link IE Controller Network interface board
- CC-Link IE Field Network interface board

Link dedicated instruction list

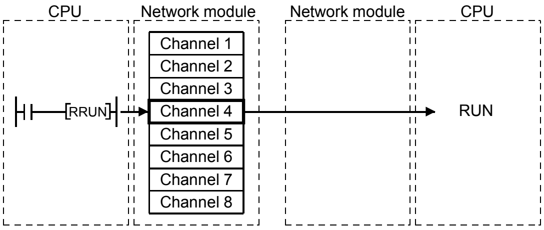
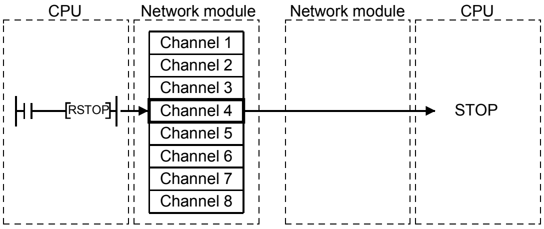
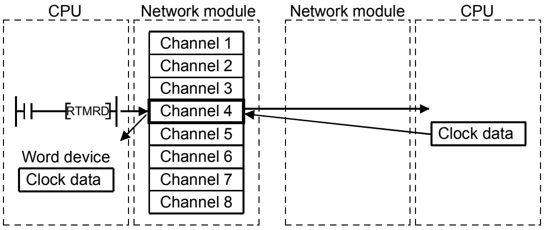
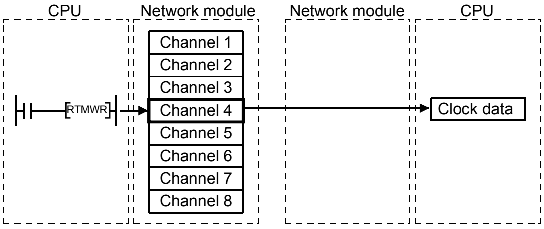
Instruction	Name	Description	Target station	Reference section
REQ	Transient request to other station	Issues "remote RUN/STOP" *1 and "clock data read/write" *2 requests to other stations.  	• QCPU • RCPU • LCPU • QnACPU • Safety CPU	Section 7.4.5 (3)
RECVS	Receive message (completed in 1 scan)	Receives the channel data sent with SEND by the interrupt program and immediately reads it to the CPU device. The processing is completed when the instruction is executed. *1  	• QCPU	Section 7.5.5
ZNRD	Read word device from other station	[A-compatible instruction] Reads the CPU device data from the target station having the target network number. *1  	• QCPU • RCPU • LCPU • QnACPU • AnUCPU *3 • AnACPU • AnNCPU	Section 7.4.5 (4)
ZNWR	Write word device to other station	[A-compatible instruction] Writes data to the CPU device of the target station having the target network number. *1  	• QCPU • RCPU • LCPU • QnACPU • AnUCPU *3 • AnACPU • AnNCPU	Section 7.4.5 (4)

*1: Cannot be used if the executing station or target station is a safety CPU.

*2: Writing to a safety CPU is not allowed from other stations.

*3: When the target station is an A2UCPU(S1), A3UCPU, A4UCPU, A2ASCPU(S1), or A2USCPU(S1), use the CPU module with the following version or later.
- A2UCPU(S1), A3UCPU, A4UCPU: Version AY (manufactured since July, 1995) or later
- A2ASCPU(S1), A2USCPU(S1): Version CP (manufactured since July, 1995) or later

Link dedicated instruction list

Instruction	Name	Description	Target station	Reference section
RRUN	Remote RUN	"Remote RUN" performed for other stations' CPU modules ＊1 	• QCPU • RCPU • LCPU	Section 7.4.5 (5)
RSTOP	Remote STOP	"Remote STOP" performed for other stations' CPU modules ＊1 	• QCPU • RCPU • LCPU	Section 7.4.5 (5)
RTMRD	Other station clock data read	"Read Clock Data" performed for other stations' CPU modules 	• QCPU • RCPU • LCPU	Section 7.4.5 (6)
RTMWR	Other station clock data written	"Write Clock Data" performed for other stations' CPU modules ＊2 	• QCPU • RCPU • LCPU	Section 7.4.5 (6)

＊1: Cannot be used if the executing station or target station is a safety CPU.

＊2: Writing to a safety CPU is not allowed from other stations.

POINT

(1) Link dedicated instructions must be executed in online mode.
Execution of the link dedicated instructions is not allowed in offline mode.

(2) Turn off the executing link instruction after the completion device turns on.

(3) When the link dedicated instruction is used to access the other station programmable controller during network diagnosis, the execution of the link dedicated instruction may be delayed.
After taking the following measures, perform network diagnosis processing and execute the link dedicated instruction.

- Execute the COM instruction.
- Secure the communication processing security time for 2 to 3ms.
  For the Basic model QCPU, High Performance model QCPU, Process CPU, and Redundant CPU, set it by the special register SD315.
  For the Universal model QCPU, set it by the service processing setting of the PLC parameter (PLC system) of GX Developer.

(4) Do not execute any instruction that cannot be executed to AnUCPU stations.
If executed, the AnUCPU may detect "MAIN CPU DOWN" or "WDT ERROR" and stop its operation.

(5) To execute such an instruction to all of the network which contains an AnUCPU station, use group specification to exclude the AnUCPU station.

6.4 Using the Link Special Relays (SB)/Link Special Registers (SW)

The data linking information is stored in the link special relays (SB)/link special registers (SW).
They can be used by the sequence programs, or used for investigating faulty areas and the causes of errors by monitoring them.
For details, refer to Appendixes 3 and 4.

(1) Cyclic transmission stop/restart

Cyclic transmission stop/restart is executed through the GX Developer network tests, but it also can be executed with link special relay (SB) and link special register (SW). Refer to Section 7.8)

(a) Cyclic transmission stop/restart

(Cyclic transmission stop)

1) In the following link special register (SW), specify a station for stopping cyclic transmission.
    - Specification of target station
      Link stop/startup direction content (SW0000)
    - Specification of station No.
      Link stop/startup direction content (SW0001 to SW0004)
2) Turn System link stop (SB0003) ON.
3) When the network module accepts a request, Cyclic transmission stop acknowledgment status (system) (SB0052) is turned ON.
4) When the cyclic transmission stop is completed, Cyclic transmission stop completion status (system) (SB0053) is turned ON.
5) The station No. of the station that performed the cyclic transmission stop request is stored in Data linking stop request station (SW004A). (Saved in the station which received the stop request.)
6) If the cyclic transmission stop is completed abnormally, an error code will be stored in Data linking stop status (entire system) (SW0053).
7) Turn System link stop (SB0003) OFF.

(Cyclic transmission restart)

8) In the following link special register (SW), specify a station for restarting cyclic transmission.

- Specification of target station
  Link stop/startup direction content (SW0000)
- Specification of station No.
  Link stop/startup direction content (SW0001 to SW0004)

9) Turn System link startup (SB0002) ON.

10) When the network module accepts a request, Cyclic transmission start acknowledgment status (system) (SB0050) is turned ON.

11) When the cyclic transmission restart is completed, Cyclic transmission start completion status (system) (SB0051) is turned ON.

12) If the cyclic transmission restart is completed abnormally, an error code will be stored in Data linking start status (entire system) (SW0051).

13) Turn System link startup (SB0002) OFF.

No.	Description	No.	Description
SB0002	System link startup	SW0000	Link stop/startup direction content
SB0003	System link stop	SW0001 to SW0004	
—		SW004A	Data linking stop request station
SB0050	Cyclic transmission start acknowledgment status (system)	—	
SB0051	Cyclic transmission start completion status (system)	SW0051	Data linking start status (entire system)
SB0052	Cyclic transmission stop acknowledgment status (system)	—	
SB0053	Cyclic transmission stop completion status (system)	SW0053	Data linking stop status (entire system)

(b) Cyclic transmission stop/restart of the host

(Cyclic transmission stop)

1) Turn Link stop (host) (SB0001) ON.
2) When the network module accepts a request, Cyclic transmission stop acknowledgment status (host) (SB004E) is turned ON.
3) When the cyclic transmission stop is completed, Cyclic transmission stop completion status (host) (SB004F) is turned ON.
4) If the cyclic transmission stop is completed abnormally, an error code will be stored in Data linking stop status (host) (SW004F).
5) Turn Link stop (host) (SB0001) OFF.

(Cyclic transmission restart)

6) Turn Link startup (host) (SB0000) ON.
7) When the network module accepts the request, Cyclic transmission start acknowledgment status (host) (SB004C) is turned ON.
8) When the cyclic transmission restart is completed, Cyclic transmission start completion status (host) (SB004D) is turned ON.
9) If the cyclic transmission restart is completed abnormally, an error code will be stored in Data linking start status (host) (SW004D).
10) Turn Link startup (host) (SB0000) OFF.

No.	Description	No.	Description
SB0000	Link startup (host)	—	
SB0001	Link stop (host)		
SB004C	Cyclic transmission start acknowledgment status (host)		
SB004D	Cyclic transmission start completion status (host)	SW004D	Data linking start status (host)
SB004E	Cyclic transmission stop acknowledgment status (host)	—	
SB004F	Cyclic transmission stop completion status (host)	SW004F	Data linking stop status (host)

(2) Checking data link

The data link status is checked through the GX Developer network diagnostics, but it also can be checked with link special relay (SB) and link special register (SW). (Refer to Sections 8.1.1 and 8.1.2.)

(a) Check the data link status of other stations

1) Link scan time etc., can be checked in SW005A to SW005B and SW006B to SW006D.
2) If an error occurs to data link, either of the following link special relays (SB) will be turned ON.
   - Baton pass status of each station (SB0070)
   - Cyclic transmission status of each station (SB0074)
3) When Baton pass status of each station (SB0070) is turned ON, the station No. of a station where an error has occurred is stored in Baton pass status of each station (SW0070 to SW0073).
   When Cyclic transmission status of each station (SB0074) is turned ON, the station No. of a station where an error has occurred is stored in Cyclic transmission status of each station (SW0074 to SW0077).
4) The details of the cause of an error can be checked with the link special relay (SB) and link special register (SW) of the station No. for a station where the error has occurred. (Refer to (2)(b) in this Section)

No.	Description	No.	Description
—		SW005A	Maximum baton pass station
		SW005B	Maximum cyclic transmission station
		SW006B	Maximum link scan time
		SW006C	Minimum link scan time
		SW006D	Current link scan time
SB0070	Baton pass status of each station	SW0070 to SW0073	Baton pass status of each station
SB0074	Cyclic transmission status of each station	SW0074 to SW0077	Cyclic transmission status of each station

(b) Checking data link status of the host

1) Link scan time etc., can be checked in SW005A to SW005B and SW006B to SW006D.
2) If an error occurs to data link, either of the following link special relays (SB) will be turned ON.
   - Baton pass status (host) (SB0047)
   - Host data link status (SB0049)
3) The cause of an error is stored in the following link special registers (SW).
   - Baton pass status (host) (SW0047)
   - Cause of baton pass interruption (SW0048)
   - Cause of data link stop (SW0049)

No.	Description	No.	Description
SB0047	Baton pass status (host)	SW0047	Baton pass status (host)
—		SW0048	Cause of baton pass interruption
SB0049	Host data link status	SW0049	Cause of data link top
—		SW005A	Maximum baton pass station
		SW005B	Maximum cyclic transmission station
		SW006B	Maximum link scan time
		SW006C	Minimum link scan time
		SW006D	Current link scan time

(3) Checking transient transmission errors

Transient transmission errors are checked through the GX Developer network diagnostics, but they also can be checked with link special relays (SB) and link special registers (SW). (Refer to Section 8.1.4)

1) When a transient transmission error occurs, Transient error (SB00EE) is turned ON.
2) An error code is stored in Transient transmission error history (SW00F0 to SW00FF).
3) The number of transient transmission errors is stored in Transient transmission error (SW00EE).
4) An exact error code storage area in Transient transmission error history (SW00F0 to SW00FF) is stored in Transient transmission error pointer (SW00EF).
5) If Transient transmission error area setting (SB000B) is turned ON, the error code stored in Transient transmission error history (SW00F0 to SW00FF) is retained. (Not overwritten even if another error occurs.)
6) Turning ON Clear transient transmission errors (SB000A) will clear the following areas:
    - Transient transmission error (SW00EE)
    - Transient transmission error pointer (SW00EF)

No.	Description	No.	Description
SB000A	Clear transient transmission errors	—	
SB000B	Transient transmission error area setting		
SB00EE	Transient error	SW00EE	Transient transmission error
—		SW00EF	Transient transmission error pointer
		SW00F0 to SW00FF	Transient transmission error history

(4) Checking the low-speed cyclic transmission status

The status of the low-speed cyclic transmission can be checked with link special relays (SB) and link special registers (SW).

1) When cyclic transmission settings are configured with common parameters, Low-speed cyclic designation (SB0059) turns ON.
2) If an error occurs at start of low-speed cyclic transmission, an error code is stored in Low-speed cyclic transmission start execution results (SW00EC).
3) An execution of low-speed cyclic transmission will turn ON Low-speed cyclic communication status (SB007A or SB007B).
4) The scan time of the low-speed cyclic transmission is stored in Low-speed cyclic scan time (SW006E).

No.	Description	No.	Description
SB0059	Low-speed cyclic designation	—	
—		SW006E	Low-speed cyclic scan time
SB007A to SB007B	Low-speed cyclic communication status	—	
—		SW00EC	Low-speed cyclic transmission start execution results

(5) Checking cables for faults

The cable condition can be checked not only in the network diagnostics of GX Developer but also with link special relays (SB) and link special registers (SW). (Refer to Section 8.1.4.)

1) When a communication error occurs due to a cable fault, the error count is stored in any of the link special registers (SW) in the table below.

2) Turning ON Clear retry count (SB0005) will clear Number of retries (SW00C8 and SW00C9).
Turning ON Clear communication error count (SB0006) will clear Communication errors (SW00B8 to SW00C7).
Turning ON Clear forward loop transmission errors (SB0007) will clear Line error on the forward loop side (SW00CC).
Turning ON Clear reverse loop transmission errors (SB0008) will clear Line error on the reverse loop side ON (SW00CD).

No.	Description	No.	Description
SB0005	Clear retry count	—	
SB0006	Clear communication error count		
SB0007	Clear forward loop transmission errors		
SB0008	Clear reverse loop transmission errors		
—		SW00B8	UNDER on the forward loop side
		SW00B9	CRC on the forward loop side
		SW00BA	OVER on the forward loop side
		SW00BB	Short frame on the forward loop side
		SW00BC	Abort on the forward loop side (AB, IF)
		SW00BD	Timeout on the forward loop side (TIME)
		SW00BE	Receiving 2k bytes or more on forward loop side (DATA)
		SW00BF	DPLL error on the forward loop side
		SW00C0	UNDER on the reverse loop side
		SW00C1	CRC on the reverse loop side
		SW00C2	OVER on the reverse loop side
		SW00C3	Short frame on the reverse loop side
		SW00C4	Abort on the reverse loop side (AB, IF)
		SW00C5	Timeout on the reverse loop side (TIME)
		SW00C6	Receiving 2k bytes or more on reverse loop side (DATA)
		SW00C7	DPLL error on reverse loop side
		SW00C8	Number of retries on the forward loop side
		SW00C9	Number of retries on the reverse loop side
		SW00CC	Line error on the forward loop side
		SW00CD	Line error on the reverse loop side

(6) Checking the forward/reverse loop in the optical loop system

The forward/reverse loop in the optical loop system can be checked not only in the network diagnostics of GX Developer but also with link special relays (SB) and link special registers (SW). (Refer to Sections 8.1.1 and 8.1.2.)

(a) Checking the forward/reverse loop of another station

1) When an error occurs on the forward or reverse loop, the following link special relay (SB) is turned ON.
   - Forward loop status (SB0091)
   - Reverse loop status (SB0095)
2) The station where an error occurred can be identified with the following link special registers (SW).
   - Forward loop status of each station (SW0091 to SW0094)
   - Reverse loop status of each station (SW0095 to SW0098)
3) If loop switching occurs, the cause of the loop switching is stored in Loop switch data (SW00D0 to SW00DF).
   The position of the loop switch data storage can be checked with Loop switch data pointer (SW00CF).
4) Cable disconnection or station failure causes loopback.
   When loopback occurs, any of the following link special relays (SB) is turned ON.
   - Forward loop loopback (SB0099)
   - Reverse loop loopback (SB009A)
5) The station where loopback occurred can be identified with the following link special registers (SW).
   - Loopback station (forward loop side) (SW0099)
   - Loopback station (reverse loop side) (SW009A)
6) An optical fiber cable reverse insertion (IN-IN, OUT-OUT) can be checked with Loop usage status of each station (SW009C to SW009F).
7) The count of loop switching can be checked with Number of loop switches (SW00CE).
8) Turning ON Clear loop switch count (SB0009) can clear SW00CE to SW00DF.

No.	Description	No.	Description
SB0009	Clear loop switch count	—	
SB0091	Forward loop status	SW0091 to SW0094	Forward loop status of each station
SB0095	Reverse loop status	SW0095 to SW0098	Reverse loop status of each station
SB0099	Forward loop loopback	SW0099	Loopback station (forward loop side)
SB009A	Reverse loop loopback	SW009A	Loopback station (reverse loop side)
—		SW009C to SW009F	Loop usage status of each station
		SW00CE	Number of loop switches
		SW00CF	Loop switch data pointer
		SW00D0 to SW00DF	Loop switch data

(b) Checking the forward/reverse loop of the host

1) When an error occurs on the forward or reverse loop, Host loop status (SB0090) turns ON.
2) If loopback occurs, the cause of the loopback is stored in Loop switch data (SW00D0 to SW00DF).
   The position of the loop switch data storage can be checked with Loop switch data pointer (SW00CF).
3) The loop status of the host can be checked with Loopback information (SW0090).
4) The count of loop switching can be checked with Number of loop switches (SW00CE).
5) Turning ON Clear loop switch count (SB0009) can clear SW00CE to SW00DF.

No.	Description	No.	Description
SB0009	Clear loop switch count	—	
SB0090	Host loop status	SW0090	Loopback information
—		SW00CE	Number of loop switches
		SW00CF	Loop switch data pointer
		SW00D0 to SW00DF	Loop switch data

(7) Checking the offline test status

The test status is checked through the LEDs on the network module, but it also can be checked with link special relays (SB) and link special registers (SW). (Refer to Sections 4.5 and 4.7.)

(a) Requesting side

1) When the offline test is instructed, Offline test instruction (SB00AC) is turned ON.
   An offline test item and a faulty station number are stored in Offline test execution item/faulty station (requesting side) (SW00AC).
2) Upon completion of the offline test, Offline test completion (SB00AD) is turned ON.
   The offline test result is stored in Offline test result (requesting side) (SW00AD).

No.	Description	No.	Description
SB00AC	Offline test instruction	SW00AC	Offline test execution item/faulty station (requesting side)
SB00AD	Offline test completion	SW00AD	Offline test result (requesting side)

(b) Responding side (the forward/reverse loop test only)

1) When a response is made to an offline test request from the requesting side, Offline test response (SB00AE) is turned ON.
   An offline test item is stored in Offline test execution item (responding side) (SW00AE).
2) Upon completion of the offline test, Offline test response completion (SB00AF) is turned ON.
   The offline test result is stored in Offline test result (responding side) (SW00AF).

No.	Description	No.	Description
SB00AE	Offline test response	SW00AE	Offline test execution item (responding side)
SB00AF	Offline test response completion	SW00AF	Offline test result (responding side)

(8) Checking the online test status

The test status is checked through LED of the network module main frame, but it also can be checked with link special relay (SB) and link special register (SW). (Refer to Section 4.8.)

(a) Requesting side

1) When the online test is instructed, Online test instruction (SB00A8) is turned ON.
   An online test item and a faulty station number are stored in Online test execution item/faulty station (requesting side) (SW00A8).
2) Upon completion of the online test, Online test completion (SB00A9) is turned ON.
   The online test result is stored in Online test result (requesting side) (SW00A9).

No.	Description	No.	Description
SB00A8	Online test instruction	SW00A8	Online test execution item/faulty station (requesting side)
SB00A9	Online test completion	SW00A9	Online test result (requesting side)

(b) Responding side

1) When a response is made to an online test request from the requesting side, Online test response (SB00AA) is turned ON.
   An online test item is stored in Online test execution item (responding side) (SW00AA).
2) Upon completion of the online test, Online test response completion (SB00AB) is turned ON.
   The online test result is stored in Online test result (responding side) (SW00AB).

No.	Description	No.	Description
SB00AA	Online test response	SW00AA	Online test execution item (responding side)
SB00AB	Online test response completion	SW00AB	Online test result (responding side)

(9) Checking parameter status

The reflection status and setting contents of parameters can be checked with link special relay (SB) and link special register (SW).

(a) Checking parameter status of other stations

1) Check the following link special relay (SB) and link special register (SW) with the master station.
   - When receiving parameters is completed, Parameter communication status of each station (SB0078) is turned OFF.
   - Stations that are still communicating parameters can be checked with Parameter communication status of each station (SW0078 to SW007B).
2) Check the following link special relay (SB) and link special register (SW) with the master station.
   - When parameters have an error, Parameter status of each station (SB007C) is turned ON.
   - The station No. of the faulty station is stored in Parameter error status of each station (SW007C to SW007F).
3) When the network type of the control station is different from that of a normal station, Network type consistency check (SB01E0) is turned ON.
   The station number of different network type is stored in Network type consistency check (SW01E0 to SW01E3).
4) Details of the parameters for each station can be checked with the link special relay (SB) and link special register (SW) of each station.
   (Refer to (9)(b) in this Section)

No.	Description	No.	Description
SB0078	Parameter communication status of each station	SW0078 to SW007B	Parameter communication status of each station
SB007C	Parameter status of each station	SW007C to SW007F	Parameter error status of each station
SB01E0	Network type consistency check	SW01E0 to SW01E3	Network type consistency check

(b) Checking the parameter status of the host (including the switch setting on the network module)

1) Upon completion of receiving parameters, Parameter receive status (SB0054) is turned OFF.
2) If any error is found in the parameters, the following link special relays (SB) are turned ON.
   - Setting information (host) (SB0045)
   - Received parameter error (SB0055)
3) An error code is stored in Parameter setting status (SW0055).
4) The presence or absence of parameters can be checked with Parameter information (SW0054).

No.	Description	No.	Description
SB0045	Setting information (host)	—	
SB0054	Parameter receive status	SW0054	Parameter information
SB0055	Received parameter error	SW0055	Parameter setting status

5) When the parameters are reflected in the network module, contents of parameters are stored in the following link special relay (SB) and link special register (SW).

No.	Description	No.	Description
SB0040	Network type (host)	SW0040	Network No.
—		SW0041	Group No.
		SW0042	Station No.
SB0043	Online switch (host)	SW0043	Mode status
SB0044	Station setting (host)	SW0044	Station setting
SB0046	Data link operation designation result (host)	SW0046	Module type
SB0048	Control station status (host)	—	
SB0056	Communication status	SW0056	Current control station
SB0057	Parameter type	SW0057	Designated control station
SB0058	Operation designation at fault of control station	—	
SB0059	Low-speed cyclic designation	SW0059	Total number of link stations
SB005A	Parameter type 2	—	
SB005C	I/O master station (Block 1)	SW005C	I/O master station (block 1)
SB005D	I/O master station (Block 2)	SW005D	I/O master station (block 2)
SB0064	Reserved station designation	SW0064 to SW0067	Reserved station designation
SB0068	Communication mode	SW0068	Communication mode
SB0069	Multiplex transmission designation	SW0069	Communication speed setting value

(10) Checking CPU module status

The CPU module status is checked through the GX Developer network diagnostics, but it also can be checked with link special relay (SB) and link special register (SW). (Refer to Sections 8.1.2 and 8.1.3.)

(a) Checking the CPU module status of other stations

1) Whether the CPU module is in RUN status or STOP status can be checked with the following link special relay (SB) and link special register (SW).
   - CPU RUN status of each station (SB0084)
   - CPU RUN status of each station (SW0084 to SW0087)
2) When a continuation error occurs with the CPU module, CPU operation status of each station (2) (SB0088) is turned ON.
   The station No. of the station where a continuation error is occurring is stored in CPU operation status of each station (2) (SW0088 to SW008B).
3) When a stop error occurs with the CPU module, CPU operation status of each station (1) (SB0080) is turned ON.
   The station No. of the station where a stop error is occurring is stored in CPU operation status of each station (1) (SW0080 to SW0083).

No.	Description	No.	Description
SB0080	CPU operation status of each station (1)	SW0080 to SW0083	CPU operation status of each station (1)
SB0084	CPU RUN status of each station	SW0084 to SW0087	CPU RUN status of each station
SB0088	CPU operation status of each station (2)	SW0088 to SW008B	CPU operation status of each station (2)

(b) Checking the CPU module status of the host

1) When a continuation error occurs with the CPU module, Host CPU status (1) (SB004A) is turned ON.
   When a stop error occurs with the CPU module, Host CPU status (2) (SB004B) is turned ON.
2) The CPU module status can be checked with Host CPU status (SW004B).

No.	Description	No.	Description
SB004A	Host CPU status (1)	—	
SB004B	Host CPU status (2)	SW004B	Host CPU status

(11) Checking the multiplex transmission status

The multiplex transmission status is checked through the GX Developer network diagnostics, but it also can be checked with link special relay (SB) and link special register (SW). (Refer to Section 8.1.3.)

1) If the "With multiplex transmission" box is checked in the supplementary settings of common parameters, Multiplex transmission designation (SB0069) is turned ON.
2) An execution of the multiplex transmission function turns ON Multiplex transmission status (SB006A).
3) Data showing the forward and reverse loop states during multiplex transmission are stored in the following link special registers (SW).
   - Multiplex transmission status (1) (SW00B0 to SW00B3)
   - Multiplex transmission status (2) (SW00B4 to SW00B7)

No.	Description	No.	Description
SB0069	Multiplex transmission designation	—	
SB006A	Multiplex transmission status		
—		SW00B0 to SW00B3	Multiplex transmission status (1)
		SW00B4 to SW00B7	Multiplex transmission status (2)

(12) Checking the redundant system status

The redundant system status can be checked with link special relays (SB) and link special registers (SW).

(a) Checking the redundant system support and setting

1) When the network module supports the redundant system, Host station's redundant function support information (SB0041) is ON.
2) To set the time taken from detection of a data link stop until system switching is requested in the redundant system, set a time value in System switching monitoring time setting (SW0018).
3) If System switching monitoring time setting valid flag (SB0018) is turned ON, System switching monitoring time setting (SW0018) is enabled.

No.	Description	No.	Description
SB0018	System switching monitoring time setting valid flag	SW0018	System switching monitoring time setting
SB0041	Host station's redundant function support information	—	

(b) Checking the redundant system status

1) When a Redundant CPU in separate mode exists, Redundant system status (1) (SB01F4) is ON.
The operation mode of a redundant CPU can be checked in Redundant system status (1) (SW01F4 to SW01F7).

2) When any pairing setting exists, Redundant system status (2) (SB01F8) is ON.
Stations for which the pairing setting is done can be checked in Redundant system status (2) (SW01F8 to SW01FB).

3) When a station operating on the standby system exists, Redundant system status (3) (SB01FC) is ON.
The control or standby status of a Redundant CPU can be confirmed with Redundant system status (3) (SW01FC to SW01FF).

No.	Description	No.	Description
SB01F4	Redundant system status (1)	SW01F4 to SW01F7	Redundant system status (1)
SB01F8	Redundant system status (2)	SW01F8 to SW01FB	Redundant system status (2)
SB01FC	Redundant system status (3)	SW01FC to SW01FF	Redundant system status (3)

(13) Setting a link dedicated instruction and checking the processing result

With link special relays (SB) and link special registers (SW), link dedicated instructions can be set and the processing results can be checked.

1) Link dedicated instructions can be set with the following link special registers (SW).
    - Logical channel setting (SW0008 to SW000F)
    - Number of retries (SW001C)
    - Retry interval (SW001D)
    - Number of gates (SW001E)

2) When data are stored in the host's channel area, the corresponding RECV execution request flag (SB00A0 to SB00A7) turns ON.
   Upon completion of the RECV instruction, the RECV instruction execution request flag (SB00A0 to SB00A7) turns OFF.

3) Processing results of link dedicated instructions can be checked with Send/receive instruction processing results (SW0031 to SW003F).

No.	Description	No.	Description
—		SW0008	Logical channel setting (channel 1)
		SW0009	Logical channel setting (channel 2)
		SW000A	Logical channel setting (channel 3)
		SW000B	Logical channel setting (channel 4)
		SW000C	Logical channel setting (channel 5)
		SW000D	Logical channel setting (channel 6)
		SW000E	Logical channel setting (channel 7)
		SW000F	Logical channel setting (channel 8)
		SW001C	Number of retries
		SW001D	Retry interval
		SW001E	Number of gates
		SW0031	ZNRD instruction processing result Send/receive instruction (1) processing result
		SW0033	ZNWR instruction processing result Send/receive instruction (2) processing result
		SW0035	Send/receive instruction (3) processing result
		SW0037	Send/receive instruction (4) processing result
		SW0039	Send/receive instruction (5) processing result
		SW003B	Send/receive instruction (6) processing result
		SW003D	Send/receive instruction (7) processing result
		SW003F	Send/receive instruction (8) processing result
SB00A0	RECV instruction execution request flag (1)	—	
SB00A1	RECV instruction execution request flag (2)		
SB00A2	RECV instruction execution request flag (3)		
SB00A3	RECV instruction execution request flag (4)		
SB00A4	RECV instruction execution request flag (5)		
SB00A5	RECV instruction execution request flag (6)		
SB00A6	RECV instruction execution request flag (7)		
SB00A7	RECV instruction execution request flag (8)		

(14) Checking the communication status between the network module and CPU module

The communication status between the network module and CPU module can be checked by using the link special relay (SB) or link special register (SW).

(a) Checking the error details

1) When an error occurs during the communications between the network module and CPU module, Module status (SB0020) is turned ON.
2) An error code is stored in Module status (SW0020).

No.	Description	No.	Description
SB0020	Module status	SW0020	Module status

(b) Checking the module type

The module type data are stored in the following link special relays (SB) and link special registers (SW).

No.	Description	No.	Description
SB008D	Module type of each station	—	
—		SW00E8 to SW00EB	Module type of each station

(c) Checking the external power supply status

1) When external power is supplied, External power supply information (SB008C) is turned ON.
The status of the host can be also checked with Power supply status of host (SB0042).
2) Station numbers of the stations to which external power is supplied are stored in Power supply status of each station (SW008C to SW008F).

No.	Description	No.	Description
SB0042	Power supply status of host	—	
SB008C	External power supply information	SW008C to SW008F	Power supply status of each station

(d) Checking the current communication speed

When the twisted bus system is configured, current communication speed is stored in the following special register (SW).

No.	Description	No.	Description
—		SW006A	Current communication speed value

7 APPLICATION FUNCTIONS

When applying any of the program examples introduced in this chapter to the actual system, verify the applicability and confirm that no problems will occur in the system control.

Chapter 3

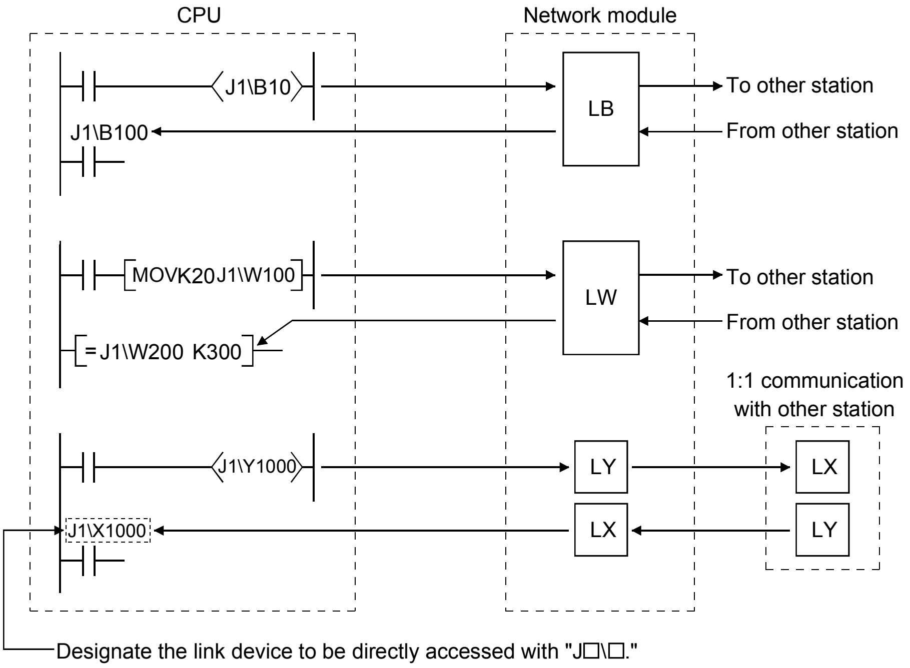
- Basic functions
  - Cyclic transmission function (Periodical communication)
    - Communication using LB/LW ---- Section 3.2.1 (1)
    - Communication using LX/LY ---- Section 3.2.1 (2)
  - RAS function
    - Automatic return function ---- Section 3.2.2 (1)
    - Control station switch function ---- Section 3.2.2 (2)
    - Control station return control function ---- Section 3.2.2 (3)
    - Loopback function (optical loop system) ---- Section 3.2.2 (4)
    - Prevention of station failure by using external power supply (Optical loop system) ---- Section 3.2.2 (5)
    - Station detach function (coaxial bus system, and twisted bus system) ---- Section 3.2.2 (6)
    - Transient transmission enabled even at CPU module error ---- Section 3.2.2 (7)
    - Checking transient transmission abnormal detection time ---- Section 3.2.2 (8)
    - Diagnostic function ---- Section 3.2.2 (9)

Chapter 7

- Application functions
  - Direct access to link devices ---- Section 7.1
  - Cyclic transmission function (Periodical communication)
    - Inter-link data transfer function ---- Section 7.2
    - Low-speed cyclic transmission ---- Section 7.3
  - Transient transmission function (Non-periodical communication)
    - Communication function ---- Section 7.4.1
    - Routing function ---- Section 7.4.2
    - Group function ---- Section 7.4.3
    - Message sending function using logical channel numbers ---- Section 7.4.4
    - Data sending/receiving (SEND/RECV) ---- Section 7.4.5 (1)
    - Other station word device read/write (READ/SREAD/WRITE/SWRITE) ---- Section 7.4.5 (2)
    - Other station transient request (REQ) ---- Section 7.4.5 (3)
    - Other station word device read/write (ZNRD/ZNWR) ---- Section 7.4.5 (4)
    - Remote RUN/Remote STOP (RRUN/RSTOP) ---- Section 7.4.5 (5)
    - Reading and writing other station CPU module's clock data (RTMRD/RTMWR) ---- Section 7.4.5 (6)
  - Clock setting to stations on a network using GX Developer ---- Section 7.4.6
  - Starting interrupt sequence program — Message receiving "1 scan completion" (RECVS) ---- Section 7.5
  - Multiplex transmission function (optical loop system) ---- Section 7.6
  - Simple dual-structured network ---- Section 7.7
  - Stopping/restarting of cyclic transmission and stopping link refresh (network test) ---- Section 7.8
  - Increasing number of send points by installing multiple modules with the same network number ---- Section 7.9
  - Redundant system function
    - Pairing setting ---- Section 7.10.3
    - Redundant settings ---- Section 7.10.4
    - System switching request function ---- Section 7.10.5
  - Network diagnostic (network monitor) ---- Section 8.1

7.1 Direct Access to the Link Devices

The link devices (LB, LW, LX, LY, SB, SW) of the network module can be directly read or written by sequence programs regardless of the link refresh of the CPU module. With direct access, link devices that are not set within the range of the link refresh with the refresh parameters can also be read or written.



POINT

(1) The direct access of the link devices LX/LY is limited to the communication with the block I/O master station set with the communication parameters. By limiting the communication, data cannot be shared among multiple stations, such as LB/LW, but 1:1 communication between predefined stations is allowed.

(2) Remove any infrequently used link devices from the link refresh range, and directly read or write them using link direct devices.
This reduces the points of the link refresh to the CPU module, resulting in a shorter link refresh time.

(3) Since the link direct device reads or writes data directly to the link devices of the network module at the time of the instruction execution, the transmission delay time can be reduced.

(1) How to specify J□\□

Specify the network number and link device to be read or written.

J□\□

Link relay	B0 to 3FFF
Link register	W0 to 3FFF
Link input	X0 to 1FFF
Link output	Y0 to 1FFF
Link special relay	SB0 to 1FF
Link special register	SW0 to 1FF
Network No.	1 to 239

POINT

When specifying the link direct device by a network No., a module that is mounted on the slot with the smallest number in the base unit is targeted.

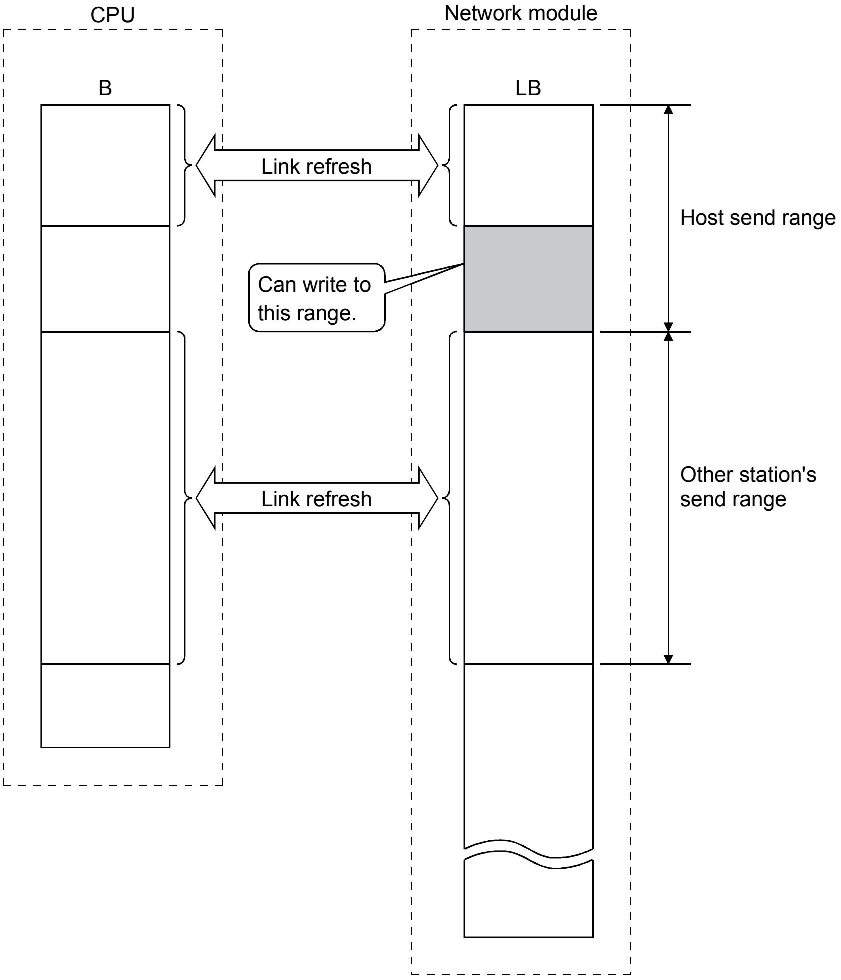
(2) Address specification range of the link devices

(a) When reading

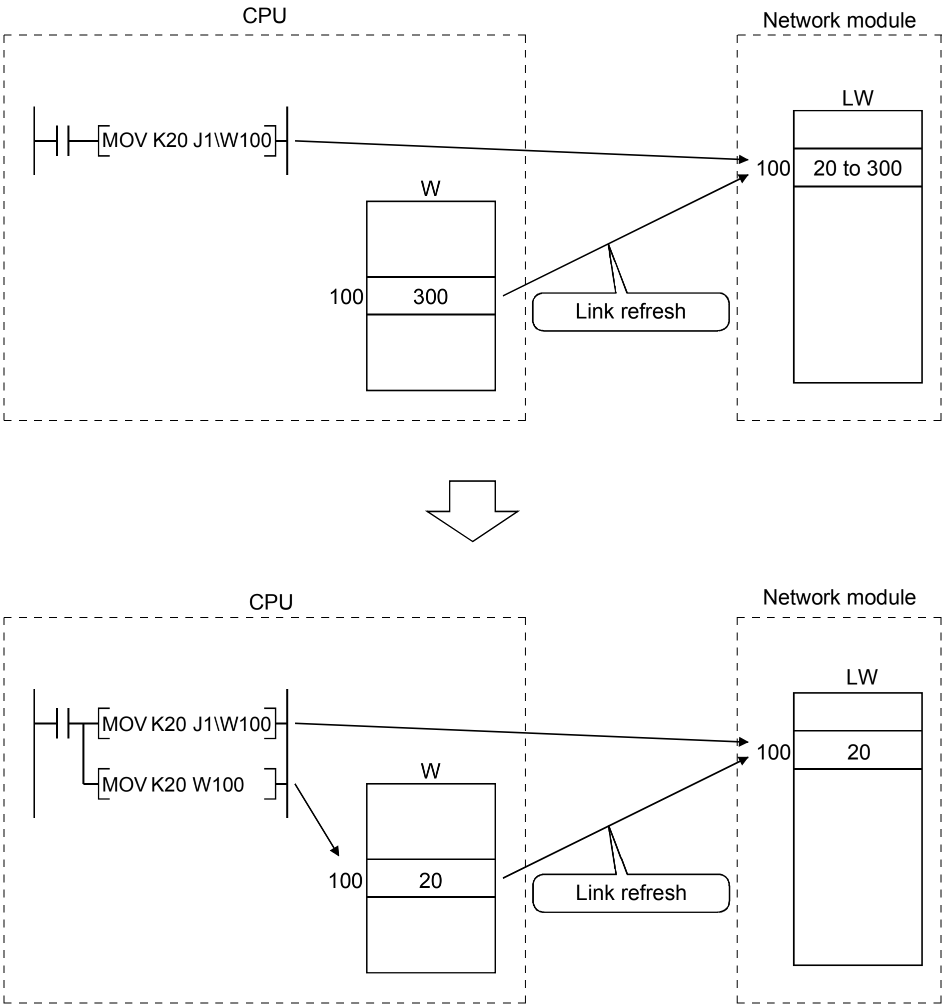
Read the entire range of link device addresses of the network module.

(b) When writing

1) Make sure to write into a range of link device addresses within the host's send range that has not been set as a link refresh range.



2) If an address in the link refresh range is specified, data is written to that address when the instruction is executed, but the link device of the network module is overwritten by the link device data of the CPU module by the link refresh.
Make sure to write the same data to the link device of the CPU module as well when writing by direct access (same for B, Y, SB and SW).



(3) Differences from the link refresh

The following table shows how the direct access to link devices is different from the link refresh.
For details, refer to the User's Manual (Function Explanation, Program Fundamentals) of the CPU module used.

Access method Item	Link refresh	Direct access
Number of steps	1 step	2 steps
Processing speed (LD BO – | | –) ＊1	High speed (0.034 μs)	Low-speed (several 10 μs)
Data reliability	Per station ＊2	2-word units (32 bits) ＊3

＊1: For Q02HCPU
＊2: When the parameter of the station-based block data assurance is enabled.
＊3: When the 32-bit data assurance conditions are satisfied.

7.2 Inter-Link Data Transfer Function (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU)

This function transfers link data to different networks in a batch mode using parameters when multiple networks are connected to one programmable controller.
Interlink transfer is executable between CC-Link IE Controller Network, CC-Link IE Field Network and MELSECNET/H.

POINT

Only one network module can be accepted on the Basic model QCPU, Q00UJCPU, Q00UCPU, Q01UCPU, and safety CPU.
Hence, the inter-link data transfer function cannot be used.

(1) Inter-link data transfer function

(a) By using this function, it becomes unnecessary to transfer data between networks with the sequence programs using the MOV instruction, etc.

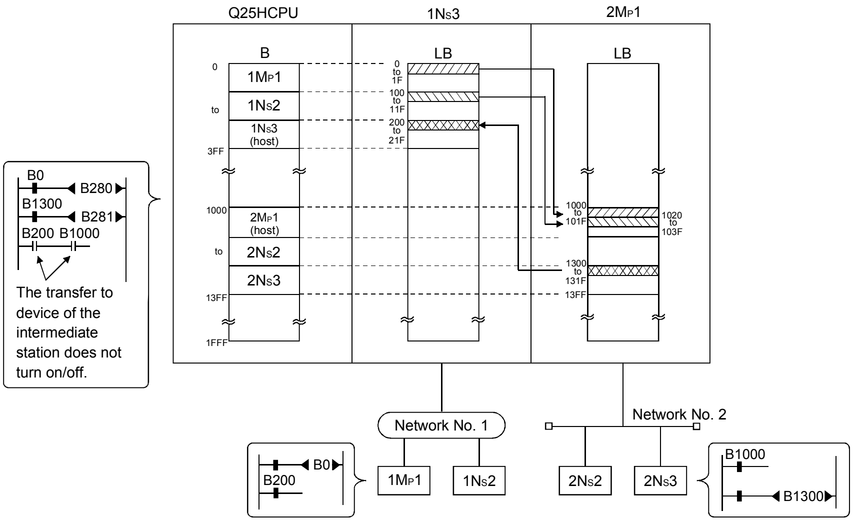
(b) It is necessary to set the "Interlink transmission parameters" in order to execute the inter-link data transfer function.

(c) The devices whose data can be transferred by the inter-link data transfer are the link relay (LB) and link register (LW) of each network module (data link module). The data of the link input (LX) and link output (LY) devices cannot be transferred between data links.

(d) When sending data, set the device range within the host's send range of the transfer from network module.

(e) When sending one batch of data to multiple networks, the same numbers can be set for the device range of the transfer source. For example, when transferring the data received from network number 1 (module 1) to both network number 2 (module 2) and number 3 (module 3), the same transfer from device range can be set for the interlink transmission parameters, "Module 1 → 2" and "Module 1 → 3."

The figure below shows an example of transfer between network number 1 and network number 2.
Set the "Interlink transmission parameters" for the programmable controller that serves as the relay station.
In this example, the data of B0, which was turned on by station's 1MP1 of network number 1, is received by relay station 1NS3 of network number 1. Then, the data is transferred to the range (LB1000) assigned for relay station 2MP1 of network number 2.
Stations 2NS2 and 2NS3 of network number 2 can thus check the on/off status of B0 of station 1MP1 of network number 1 through the data of B1000.



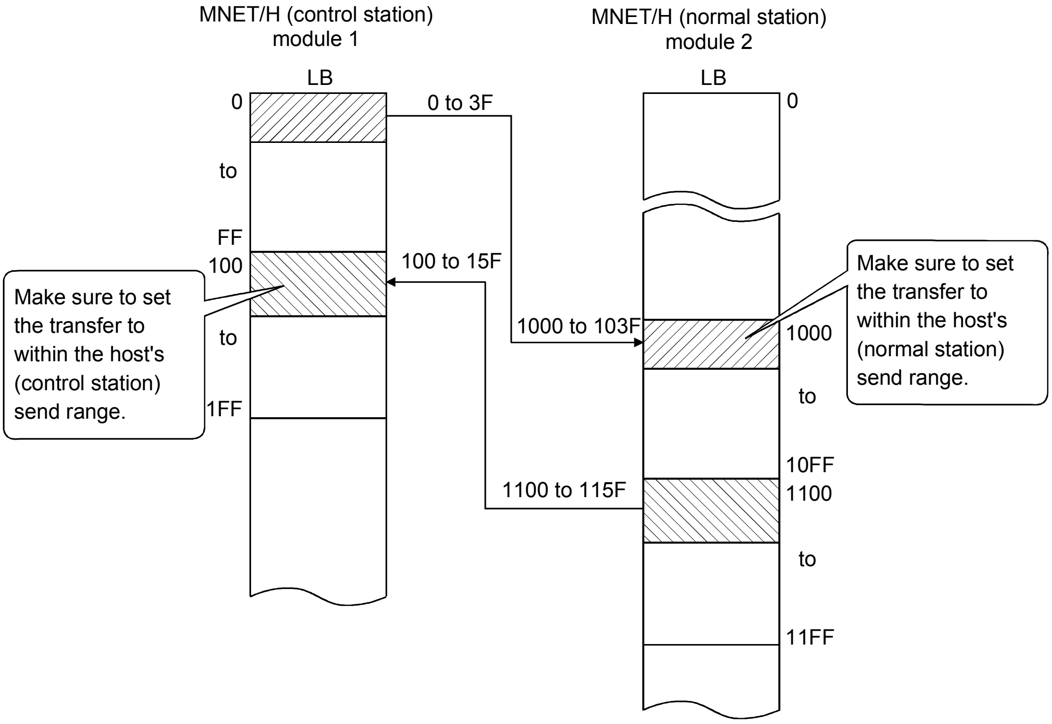
(2) Interlink transmission parameters

When transferring data to other network, up to 64 transfer ranges can be set between the network modules. Note that, when data from a given device range is transferred to multiple network numbers, as many setting ranges must be set as the number of transfer to networks.

[Setting example]

Module 1 (0_H to $3F_H$) → Module 2 (1000_H to $103F_H$)

Module 2 (1100_H to $115F_H$) → Module 1 (100_H to $15F_H$)

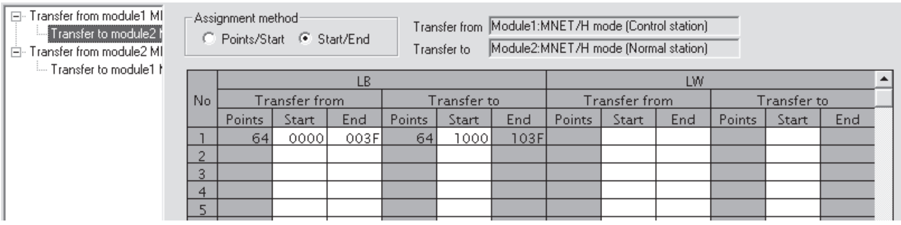


Click the Interlink transmission parameters button.

↓

Transfer from Module1: MNET/H mode (Control station)

➡ Transfer to Module2: MNET/H mode (Normal station)



○ Points/Start ● Start/End

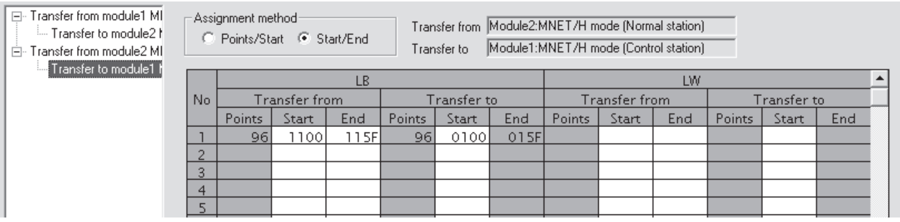
Transfer from: Module1:MNET/H mode (Control station)

Transfer to: Module2:MNET/H mode (Normal station)

No	LB						LW					
	Transfer from			Transfer to			Transfer from			Transfer to		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
1	64	0000	003F	64	1000	103F						
2												
3												
4												
5												

Transfer to Module1: MNET/H mode (Control station)

⬅ Transfer from Module2: MNET/H mode (Normal station)



○ Points/Start ● Start/End

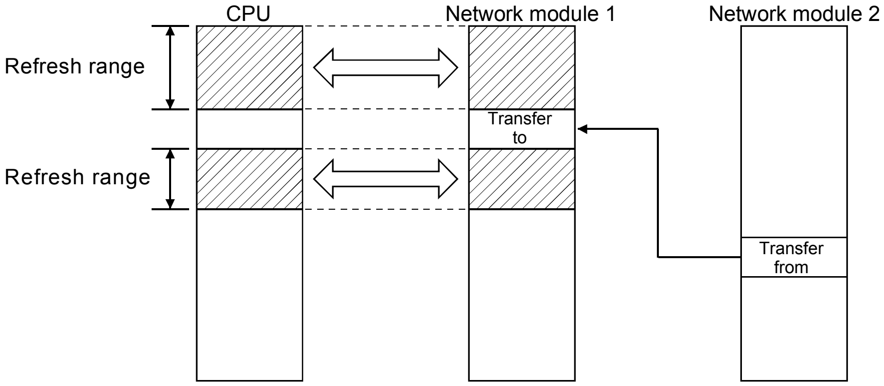
Transfer from: Module2:MNET/H mode (Normal station)

Transfer to: Module1:MNET/H mode (Control station)

No	LB						LW					
	Transfer from			Transfer to			Transfer from			Transfer to		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
1	96	1100	115F	96	0100	015F						
2												
3												
4												
5												

Precautions

1) Do not set the Transfer to device range of the network module within the refresh range of the network. Otherwise, the correct data cannot be sent to other stations.



2) The transfer data is sent to the transfer to network via the network module; it is not stored in the transfer to device range of the network module.
When using the transfer data in the relay station, the transfer to data must be transferred to the device on the CPU side by link refreshing.

POINT

When it is necessary to set 65 or more transfer ranges for the inter-link data transfer function, the data must be transferred from the transfer from to the destination in the sequence programs using the MOV instruction, etc.

(3) Available inter-link data transfer stations

As shown in the table below, the control stations and normal stations are available.

Transfer to / Transfer from		MELSECNET/H		
		Control station	Normal station	Standby station
MELSEC NET/H	Control station	○	○	×
	Normal station	○	○	×
	Standby station	×	×	×

○: Available ×: Not available

7.3 Low-Speed Cyclic Transmission Function (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU)

The low-speed cyclic transmission function is convenient when sending data that does not require high-speed transfer to other stations in a batch mode using the link devices (LB/LW).

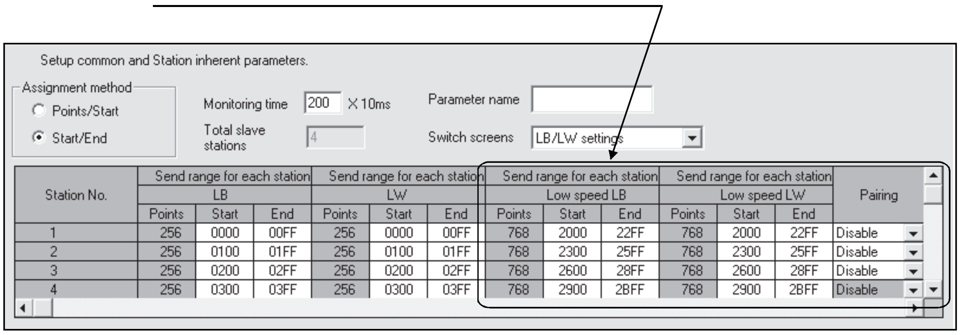
The performance of the low-speed cyclic transmission function is almost the same as that of the transient transmission function.

For details of the performance, refer to Section 7.4.

A station can transmit data only once in a single link scan. To send data from multiple stations concurrently, the link scan time must be longer than the total transmission time for all the sending stations.

In the low-speed cyclic transmission, send range for each station is set with the common parameters of the control station.

Low-speed cyclic send range for each station



Setup common and Station inherent parameters.

Assignment method: ○ Points/Start ● Start/End

Monitoring time 200 ×10ms

Total slave stations 4

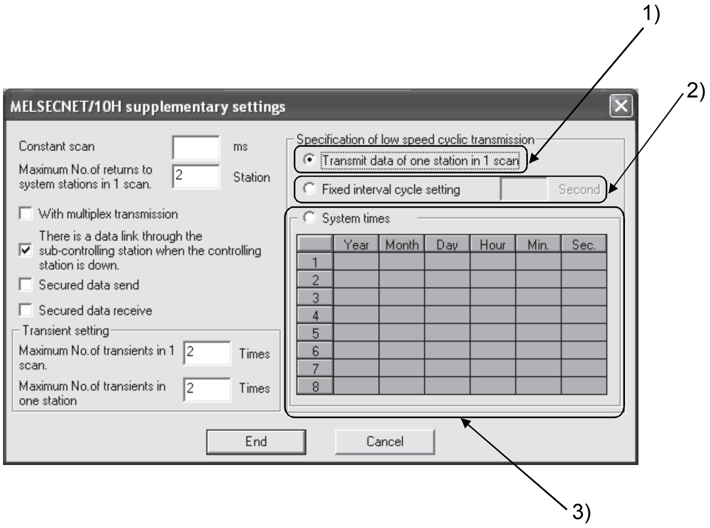
Parameter name

Switch screens LB/LW settings

Station No.	Send range for each station LB			Send range for each station LW			Send range for each station Low speed LB			Send range for each station Low speed LW			Pairing
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1	256	0000	00FF	256	0000	00FF	768	2000	22FF	768	2000	22FF	Disable
2	256	0100	01FF	256	0100	01FF	768	2300	25FF	768	2300	25FF	Disable
3	256	0200	02FF	256	0200	02FF	768	2600	28FF	768	2600	28FF	Disable
4	256	0300	03FF	256	0300	03FF	768	2900	2BFF	768	2900	2BFF	Disable

The sending to other stations can be activated by three methods: 1) Transmit data of one station in 1 scan (default), 2) Fixed term cycle interval setting, and 3) System times. These methods can be specified through by the supplementary settings, and only one of them can be selected.

The screen shown below is the supplemental screen where the activation method can be selected.



MELSECNET/10H supplementary settings

Constant scan ms

Maximum No.of returns to system stations in 1 scan. 2 Station

☐ With multiplex transmission

☑ There is a data link through the sub-controlling station when the controlling station is down.

☐ Secured data send

☐ Secured data receive

Transient setting

Maximum No.of transients in 1 scan. 2 Times

Maximum No.of transients in one station 2 Times

Specification of low speed cyclic transmission

● Transmit data of one station in 1 scan

○ Fixed interval cycle setting Second

○ System times

	Year	Month	Day	Hour	Min.	Sec.
1						
2						
3						
4						
5						
6						
7						
8						

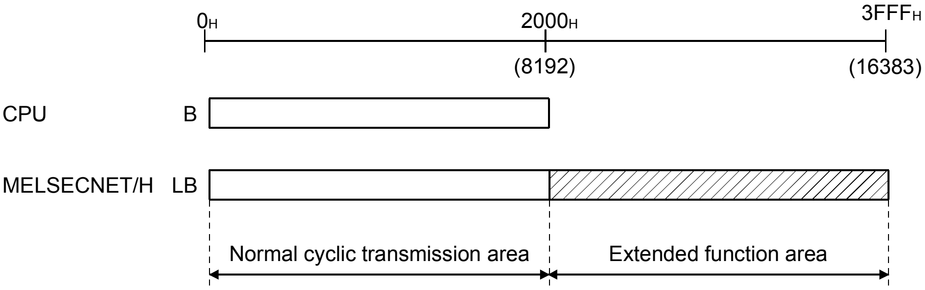
POINT

The Basic model QCPU, Q00UJCPU, Q00UCPU, Q01UCPU, and safety CPU does not support the low-speed cyclic transmission function.

7.3.1 Send range settings

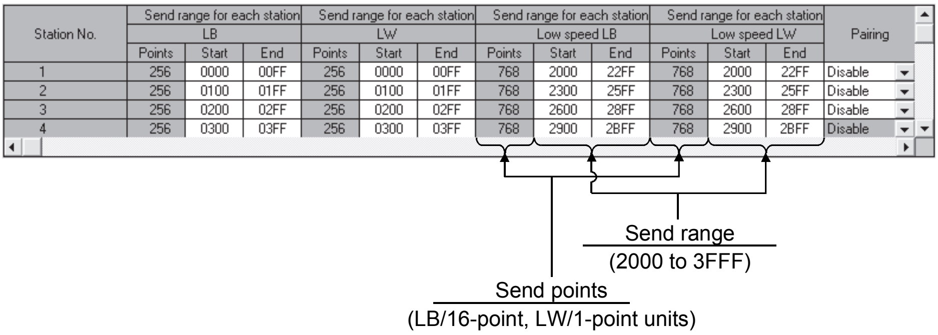
Each station's send range of link devices (low-speed LB, low-speed LW) is assigned to the extended area (2000 to 3FFF) in 16-point units for LB (start : ☐ ☐ ☐ 0 to end ☐ ☐ ☐ F) and in one-point units for LW.
Each station's send range can also be assigned using a random station number assignment sequence.
The B/W device numbers on the CPU side that correspond to the extended area are not assigned.

(1) Device range



(2) Screen settings

On the following screen that is displayed by clicking the Network range assignment button, 768 points are assigned to the send range for each station (low-speed LB, low-speed LW).



Station No.	Send range for each station			Send range for each station			Send range for each station			Send range for each station			Pairing
	LB			LW			Low speed LB			Low speed LW			
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1	256	0000	00FF	256	0000	00FF	768	2000	22FF	768	2000	22FF	Disable
2	256	0100	01FF	256	0100	01FF	768	2300	25FF	768	2300	25FF	Disable
3	256	0200	02FF	256	0200	02FF	768	2600	28FF	768	2600	28FF	Disable
4	256	0300	03FF	256	0300	03FF	768	2900	2BFF	768	2900	2BFF	Disable

POINT

(1) To use 2-word (32-bit) data, set appropriate send points and send range that satisfy the conditions for the 32-bit data assurance.
For details, refer to Section 6.2.1.

(2) The device points (B, W) of the CPU module can be increased by changing the PLC parameters (8 k to 16 k). However, there are restrictions for the device points, such as that the total must be less than 28.8 k words.

(3) Link devices in the Extended function area (2000_H to $3FFF_H$) can be also used for normal cyclic transmission (when link devices of 8193 points or more are used for normal cyclic transmission).
For low-speed transmission, use link devices in the Extended function area, which are not used for normal cyclic transmission.

(4) The total of the send ranges per station must not exceed 2000 bytes in the low-speed cyclic transmission. (The send range for the normal cyclic transmission is not included.)

(5) LX and LY cannot be set as link devices for low-speed cyclic transmissions.

7.3.2 Send timing

The low-speed cyclic transmission is executed separately from the normal cyclic transmission. This section describes the setting, processing interval and link cycle of the low-speed cyclic transmission.

(1) Transmission setting

The link cycle of the low-speed cyclic transmission varies depending on its transmission setting.

The setting can be made at "Specification of low speed cyclic transmission" on "Supplementary setting". (Refer to Section 7.3.3.)

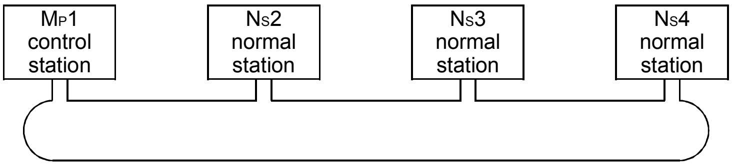
The following lists the setting options.

Setting item	Description
Transmit data of one station in 1 link scan	Low-speed cyclic data of max. one station are sent during one link scan of normal cyclic transmission.
Fixed term cycle interval setting	Low-speed cyclic data are sent at a specified time interval. ＊1
System times	Low-speed cyclic data are sent at a specified time. ＊1

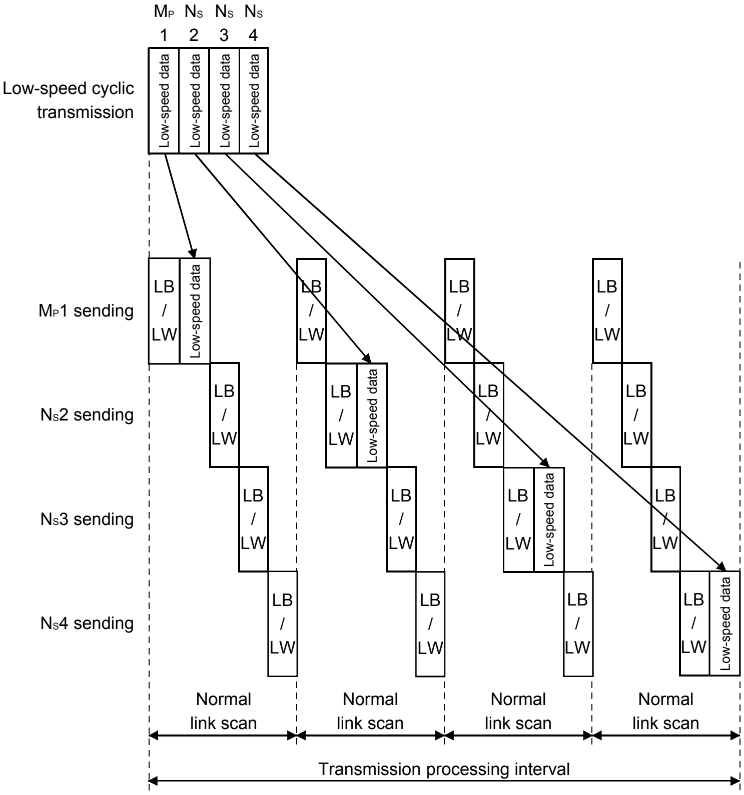
＊1: Maximum no. of stations capable of sending data during 1 link scan of normal cyclic transmission varies depending on the "Maximum no. of transients in 1 scan" setting.
Refer to Section 7.4.1 for the "Maximum no. of transients in 1 scan" setting.

(2) Transmission processing interval

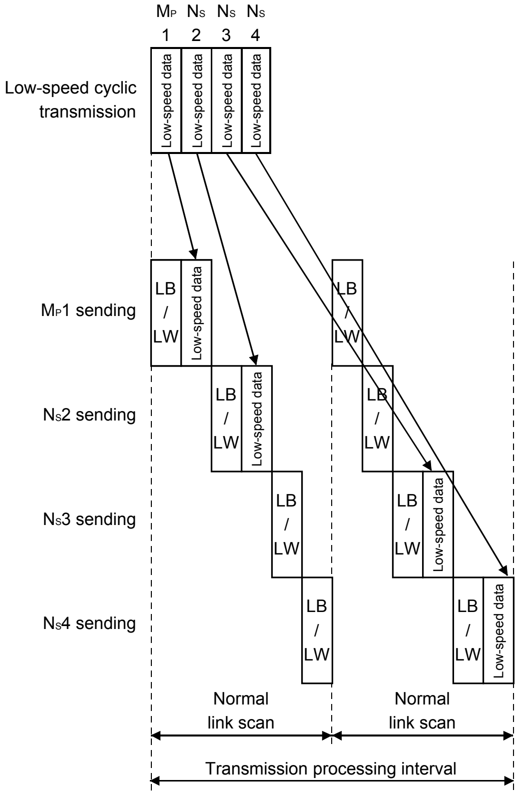
The following system configuration example is used for subsequent explanations.



(a) When "Transmit data of one station in 1 link scan", "Fixed term cycle interval setting (Maximum no. of transients: 1)" and "System times (Maximum no. of transients: 1)" are set



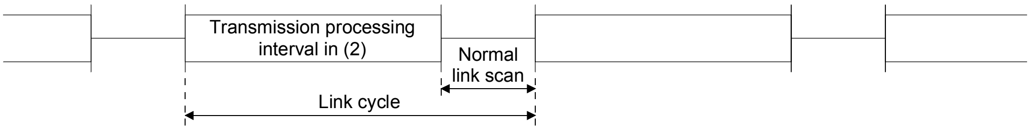
(b) When "Fixed term cycle interval (Maximum no. of transients: 2)" and "System times (Maximum no. of transients: 2)" are set



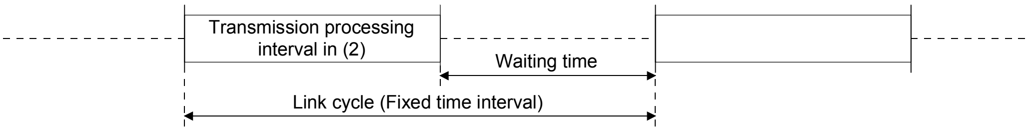
(3) Link cycle

Link cycle examples of the low-speed transmission are as shown below.

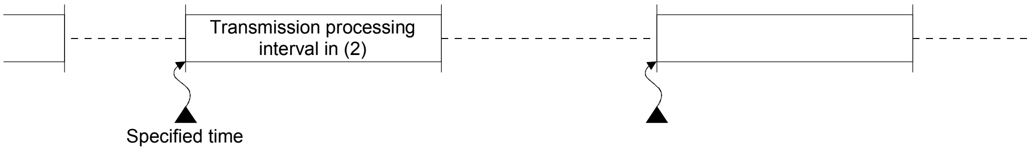
(a) When "Transmit data of one station in 1 link scan" is set



(b) When "Fixed term cycle interval setting" is set



(c) When "System times" is set



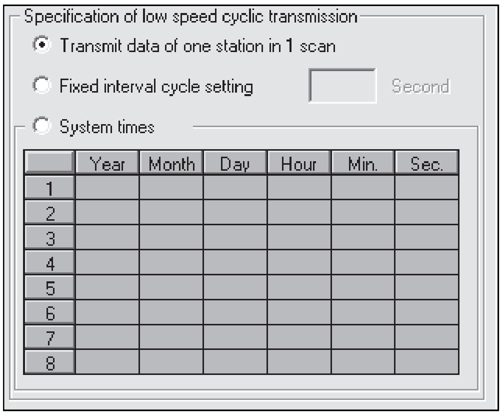
7.3.3 Startup

(1) Sending of data for one station per link scan (default)

The low-speed cyclic data for a maximum of one station is sent in one link scan of the normal cyclic transmission.

[Setting method]

1) Click (●) [Transmit data of one station in 1 scan] to select.



Specification of low speed cyclic transmission

● Transmit data of one station in 1 scan

○ Fixed interval cycle setting Second

○ System times

	Year	Month	Day	Hour	Min.	Sec.
1						
2						
3						
4						
5						
6						
7						
8						

POINT

The fastest link scan time in the low-speed cyclic transmission can be calculated by the following equation:

$$LS_L = LS \times \text{number of stations} + LS$$
$$= LS \times (\text{number of stations} + 1)$$

LS_L : The fastest link scan time in the low-speed cyclic transmission

LS : Normal link scan time

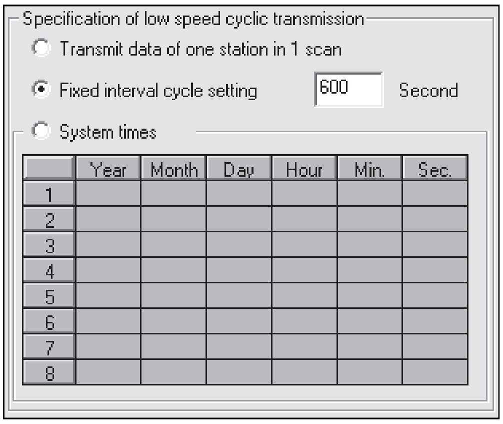
(2) Fixed term cycle interval setting

The low-speed cyclic data is sent in the link cycle of the specified time frequency.

Valid setting frequency: 1 to 65535 s (18 h, 12 min and 15 s)

[Setting method]

1) Click (●) [Fixed interval cycle setting] to select.
2) Set the time in seconds (the screen shows a value of 600).



Specification of low speed cyclic transmission

○ Transmit data of one station in 1 scan

● Fixed interval cycle setting 600 Second

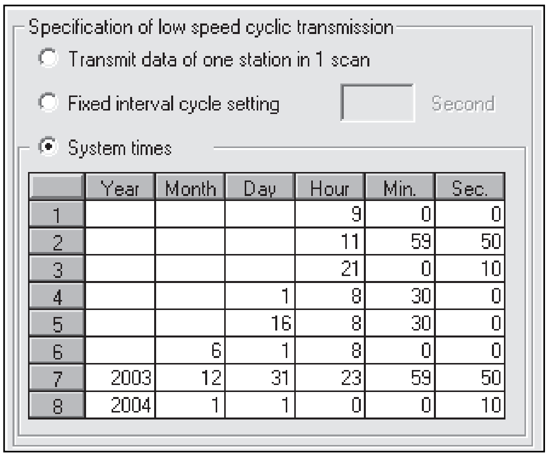
○ System times

	Year	Month	Day	Hour	Min.	Sec.
1						
2						
3						
4						
5						
6						
7						
8						

(3) System timer interval

The low-speed cyclic data is sent in the link cycle at the specified time.
By omitting year, month, and date, the low-speed cycle transmission can be activated yearly (or monthly, or daily). Hour, minute and second cannot be omitted.
Setting points: 1 to 8 points
[Setting method]

1) Click (●) [System times] to select.
2) Set year, month, date, hour, minute and second to the specified time.
   In the following screen example:
   Points 1 to 3 : By omitting year, month and date, data is sent every day at the specified time.
   Points 4 and 5 : By omitting year and month, data is sent at the specified time monthly.
   Point 6 : By omitting the year, data is sent at the specified time every year.
   Points 7 to 8 : Data is sent only once at the specified time.



Specification of low speed cyclic transmission
○ Transmit data of one station in 1 scan
○ Fixed interval cycle setting ☐ Second
● System times

	Year	Month	Day	Hour	Min.	Sec.
1				9	0	0
2				11	59	50
3				21	0	10
4			1	8	30	0
5			16	8	30	0
6		6	1	8	0	0
7	2003	12	31	23	59	50
8	2004	1	1	0	0	10

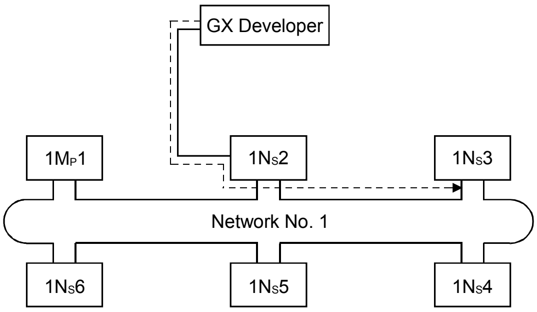
POINT

(1) The system timer operates based on the host's clock. If used without matching the clocks on the sending station and receiving station, there may be a time gap between the stations.
(2) When handling multiple data without the station-based block data assurance function, new and old data may coexist. Apply interlocks in the programs (refer to Section 6.2.3).

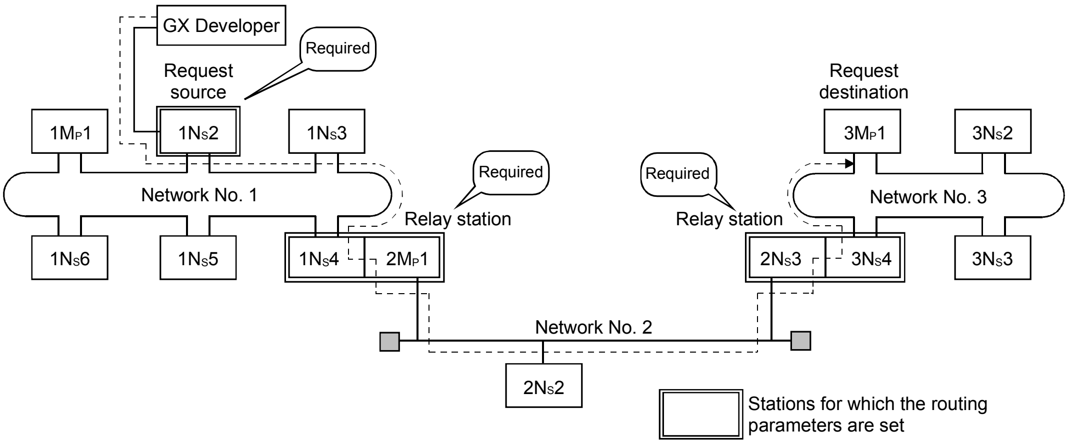
7.4 Transient Transmission Function (Non-Periodical Communication)

The transient transmission function performs data communication only when it is requested between stations.
The transient transmission function can be requested with the dedicated link instructions (SEND, RECV, READ, SREAD, WRITE, SWRITE, REQ, ZNRD, ZNWR, RECVS, RRUN, RSTOP, RTMRD and RTMWR), GX Developer, the intelligent function module, etc.
In the MELSECNET/H, data communication can be performed with other stations having the same network number (the same network as where the host is connected), as well as with stations having other network numbers.

1) Transient transmission function to a station on the same network



2) Transient transmission to stations on other networks (routing function)
In this case, the routing parameters must be set for the request source and relay stations.



7.4.1 Communication function

(1) Parameter settings

Set the execution conditions for the transient transmission with the parameters listed below.
In the default settings, both the number of transients that one network can execute in one link scan ([Maximum no. of transients in 1 scan]) and the number of transients that one station can execute in one link scan ([Maximum no. of transients in one station]) are set to 2 times. Change the number of transients that can be executed in a link scan as necessary (refer to POINT on the bottom of this page).

Setting value Setting item	Valid setting times	Default setting
Maximum no. of transients in 1 scan	1 to 255 times	Twice
Maximum no. of transients in one station	1 to 10 times	Twice

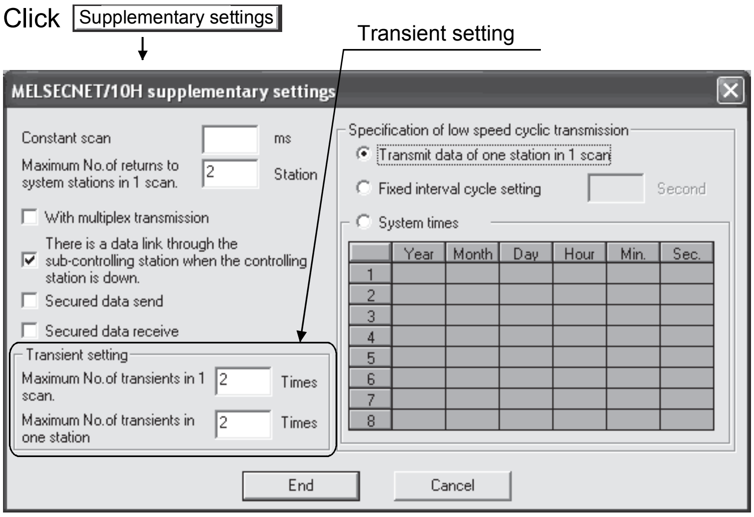
[Screen display]

Click Network range assignment

↓

Click Supplementary settings

↓



Transient setting

MELSECNET/10H supplementary settings

Constant scan [ ] ms

Maximum No.of returns to system stations in 1 scan. [2] Station

☐ With multiplex transmission

☑ There is a data link through the sub-controlling station when the controlling station is down.

☐ Secured data send

☐ Secured data receive

Transient setting

Maximum No.of transients in 1 scan. [2] Times

Maximum No.of transients in one station [2] Times

Specification of low speed cyclic transmission

● Transmit data of one station in 1 scan

○ Fixed interval cycle setting [ ] Second

○ System times

	Year	Month	Day	Hour	Min.	Sec.
1						
2						
3						
4						
5						
6						
7						
8						

POINT

(1) By increasing the number of transients, multiple transient instructions can be executed at the same time (in one link scan).

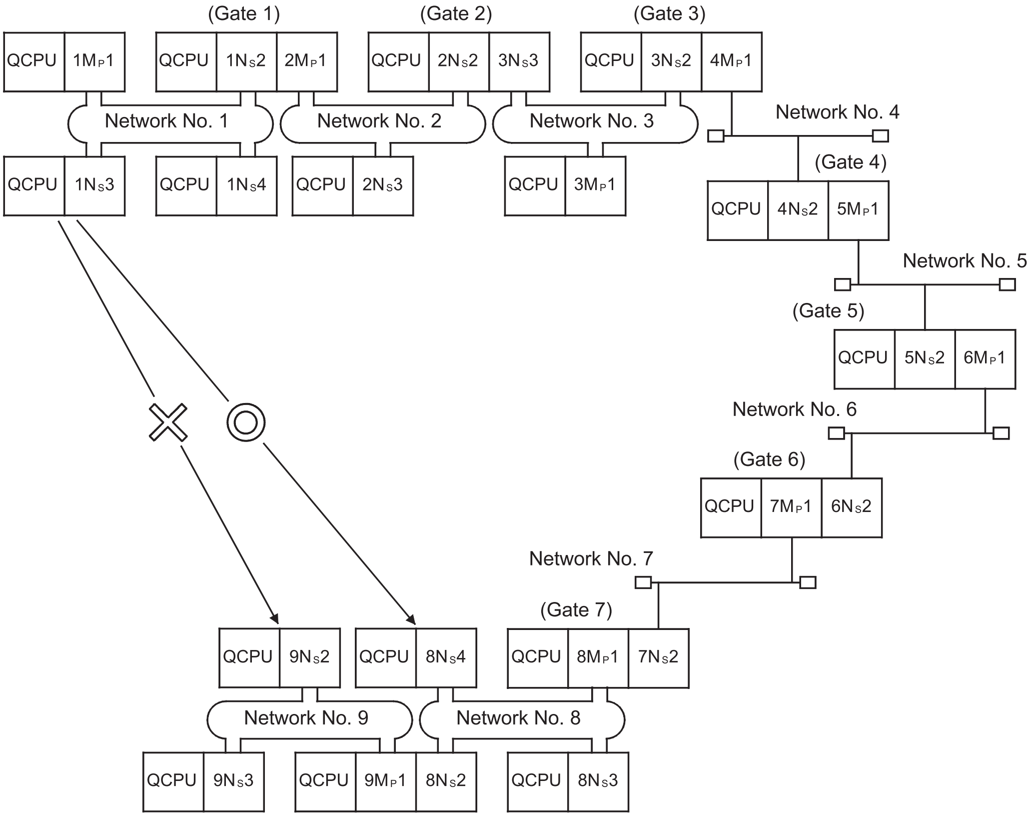
(2) If the number of transients is increased and the transient request was issued in each station at the same time, the link scan time becomes temporarily longer and the cyclic transmission is also affected. Do no set unnecessarily large values.

(3) When the transient transmission and the low-speed cyclic transmission are used at the same time, these transient setting parameters limit the total number of transient and low-speed cyclic transmissions.

(2) Transient transmission range

In a multiple network system of the MELSECNET/H, communication can be performed with stations in a maximum of eight networks by setting the routing parameters described in Section 7.4.2.

The following figure illustrates the transient transmission range using an example where the destinations are limited to eight networks.

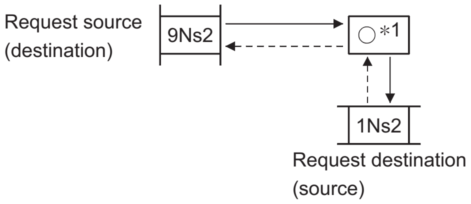


POINT

(1) Since only one network module can be installed with the Basic model QCPU, Q00UJCPU, Q00UCPU, Q01UCPU, and safety CPU, it cannot be used as a relay station.

(2) For access via a redundant system, the routing parameters of the request source or relay station(s) must be changed with the RTWRITE instruction if system switching occurs in the redundant system.
For details, refer to Section 7.10.8.

[Transient transmission valid range]
The following table shows the valid ranges of send/receive by transient transmission using the network configuration on the previous page.
In the table below, ◎, ○, and × indicate whether or not the transient transmission between the request source (destination) listed in the column at the left and the request destination (source) listed in the row at the bottom is possible.
For example, the valid range between 9NS2 of network number 9 and 1NS2 of network number 1 is indicated by ○ ∗1 (communication is possible by specifying a network module that is close to the request source of the same programmable controller).



◎: Possible
○: Possible by setting the routing parameter
×: Not possible
∗1: Communication is possible by specifying a network module that is close to the request source of the same programmable controller

Network No. 1	1MP1	Host																	
	1NS2	◎	Host																
	1NS3	◎	◎	Host															
	1NS4	◎	◎	◎	Host														
Network No. 2	2MP1	◎	Host	◎	◎	Host													
	2NS2	○	◎∗1	○	○	◎	Host												
	2NS3	○	◎∗1	○	○	◎	◎	Host											
Network No. 3	3MP1	○	○	○	○	○	◎∗1	○	Host										
	3NS2	○	○	○	○	○	◎∗1	○	◎	Host									
	3NS3	○	○	○	○	◎	Host	◎	◎	◎	Host								
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮								
Network No. 8	8MP1	○	○	○	○	○	○	○	○	○	○	•••••	Host						
	8NS2	○	○	○	○	○	○	○	○	○	○	•••••	◎	Host					
	8NS3	○	○	○	○	○	○	○	○	○	○	•••••	◎	◎	Host				
	8NS4	○	○	○	○	○	○	○	○	○	○	•••••	◎	◎	◎	Host			
Network No. 9	9MP1	○	○	○	○	○	○	○	○	○	○	•••••	◎	Host	◎	◎	Host		
	9NS2	×	○∗1	×	×	○	○	○	○	○	○	•••••	○	◎∗1	○	○	◎	Host	
	9NS3	×	○∗1	×	×	○	○	○	○	○	○	•••••	○	◎∗1	○	○	◎	◎	Host
Request source (destination) / Request destination (source)		1MP1	1NS2	1NS3	1NS4	2MP1	2NS2	2NS3	3MP1	3NS2	3NS3	•••••	8MP1	8NS2	8NS3	8NS4	9MP1	9NS2	9NS3
		Network No. 1				Network No. 2			Network No. 3			•••••	Network No. 8				Network No. 9		

7.4.2 Routing function

The routing function is used to execute transient transmissions to stations having other network numbers in a multiple network system.
In order to execute the routing function, it is necessary to set the "routing parameters" to associate the network numbers of the request source and the station that will function as a bridge between the networks. ∗1

(1) Stations that require routing parameter setting

(a) The setting is required for both the transient transmission request source and relay stations.

(b) For the relay stations, two routing settings are required: one from the request source to the request destination, and the other from the request destination back to the request source.

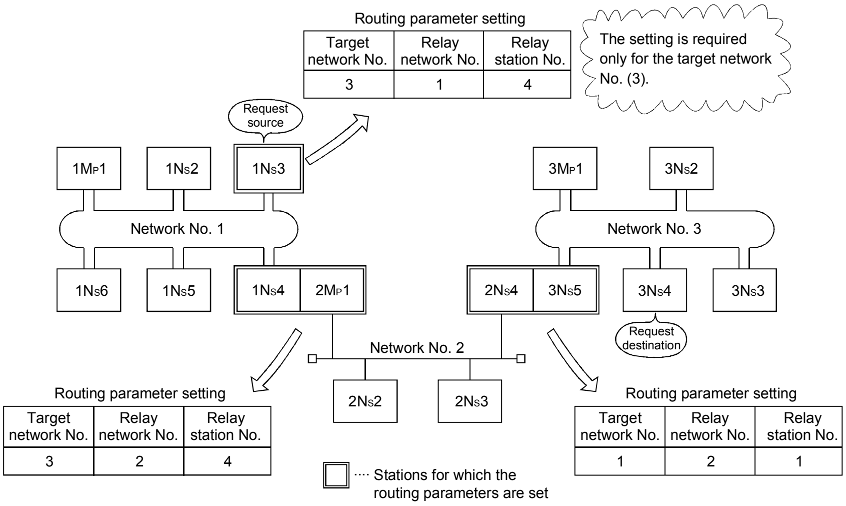
(c) The setting is not required for the request destination.

In the example shown in the figure below where the transient transmission is executed from 1NS3 to 3NS4, the setting is required for the following three stations:

1) Setting for 1NS3 that requests the transient transmission
Target network No. (3) of the Transfer to, the relay station (1NS4), and the relay network No. (1) to the relay station.

2) Setting for 1NS4 that functions as a bridge
Target network No. (3) of the Transfer to, the relay station (2NS4), and the relay network No. (2) to the relay station. It is not necessary to set the return route because it is specified in the setting for 2NS4.

3) Setting for 2NS4 that function as a bridge
It is not necessary to set the routing to the Transfer to because the host is on the same network as the destination transfer (3). However, it is necessary to set the Transfer from network No. (1) as the Target network No. and to specify the relay station (2MP1) and the relay network No. (2) to the relay station in order to trace a route back to the request source.



∗1: The bridge function refers to sending data via an adjacent network.

(2) Routing parameter settings

(a) Setting screen

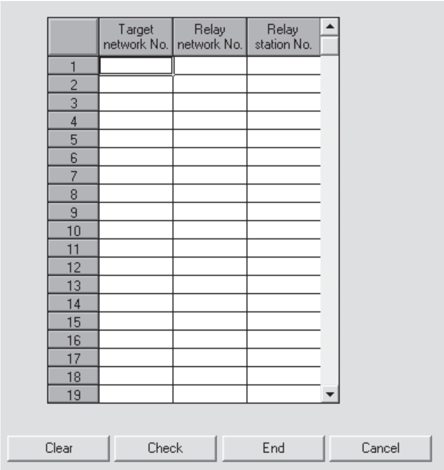
On the following screen, up to 64 "Target network No." can be set for the High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU, or up to eight for the Basic model QCPU and safety CPU.

Note that the same target network No. cannot be specified more than once. Therefore, the host can become the request source or can be relayed through when accessing other stations on up to 64 or 8 networks with different "Target network No."

Setting item	Valid setting range
Transfer network No.	1 to 239
Relay network No. (Relay destination network No.)	1 to 239
Relay station No. (Relay destination station No.)	1 to 64

[Screen display]

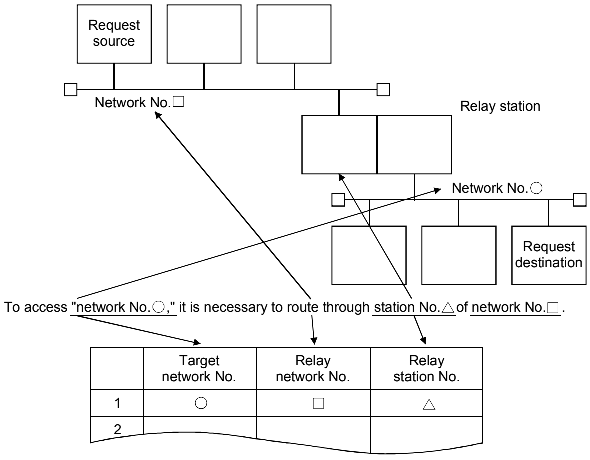
Click Routing parameters



	Target network No.	Relay network No.	Relay station No.
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			

(b) Setting method

Set the routing parameters according to the procedure described below.



To access "network No.○," it is necessary to route through station No.△ of network No.□.

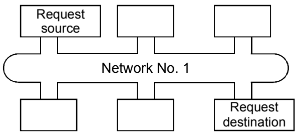
	Target network No.	Relay network No.	Relay station No.
1	○	□	△
2			

(3) Settings for different network system configurations and setting contents

The stations to set for the transient transmission and the contents of the routing parameters vary depending on the system configuration.

(a) Single network system

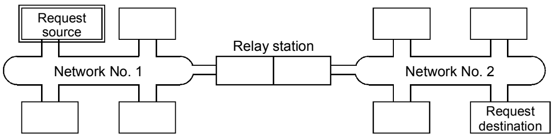
It is not necessary to set the routing parameters for the transient transmission to the same network.



(b) Multiple network system: two networks

Set the routing parameters only for the request source station.

The route for reaching the request destination (network number 2) must be set for the request source station.



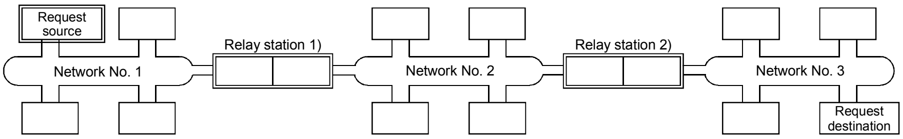
(c) Multiple network system: three networks

Set the routing parameters for the request source and the relay stations.

The route for reaching the request destination (network number 3) must be set for the request source.

The route for reaching the request destination (network number 3) must be set for relay station 1).

The route for reaching the request source (network number 1) must be set for relay station 2).



(d) Multiple network system: four networks

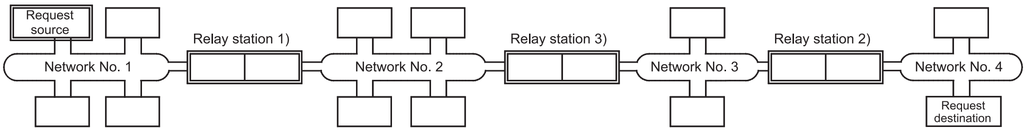
Set the routing parameters for the request source station and the relay stations.

The route for reaching the request destination (network number 4) must be set for the request source station.

The route for reaching the request destination (network number 4) must be set for relay station 1) (the relay station that is closest to the request source).

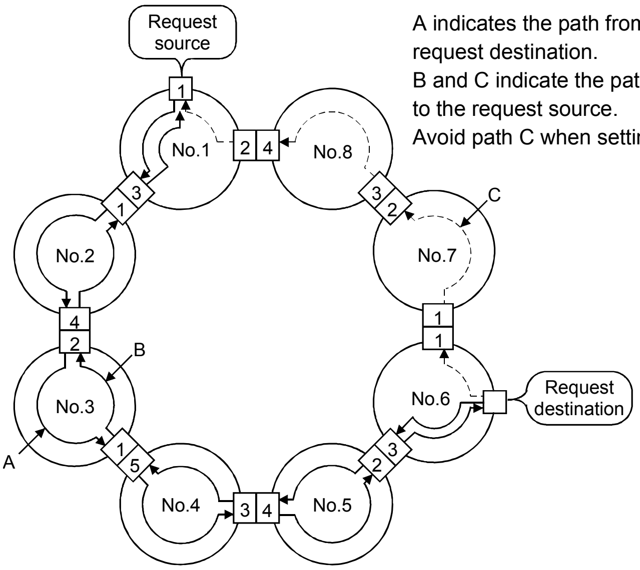
The route for reaching the request source (network number 1) must be set for relay station 2) (the relay station that is closest to the request destination).

The routes for reaching the request destination (network 4) and the request source (network number 1) must be set for relay station 3) (relay station other than 1) and 2)).



POINT

(1) When a network is connected in a loop as shown in the figure below, make sure to set the routing parameters so that the same relay station is routed for both the "route from request source to request designation" and the "route back from request destination to request source."
Do not set the destination and returning paths to circle the entire loop. The first relay station in the return path from the request destination is determined by the relay station in the forward path; thus, data cannot be transferred to a station beyond that relay station and an error occurs.



A indicates the path from the request source to the request destination.
B and C indicate the path from the request destination to the request source.
Avoid path C when setting the return path.

(2) When data is sent to a remote network by transient transmission using the routing parameters, data is transferred through many networks; thus, the amount of transmission data and the number of transmissions may affect the entire system.
For example, in network number 2 to 5 in the figure above, the link scan time may become temporarily longer and there may be delays in the transient transmission of the local station because of the transient transmissions from other networks.
When using the routing parameters, design the transient transmission by considering the entire system.

(3) When multiple network systems are connected with the routing function, the request source can send requests to destinations in up to eight network systems (the maximum number of relay stations is seven stations).

(4) Calculation of transmission delay time

The processing time of the transient transmission instruction to access a station on other network in a multiple network system can be obtained by adding the following transmission delay factors.

(Routing transmission delay time) = (processing time from request source to relay station)

+ (processing time from relay station to request destination)

(a) Processing time from request source to relay station

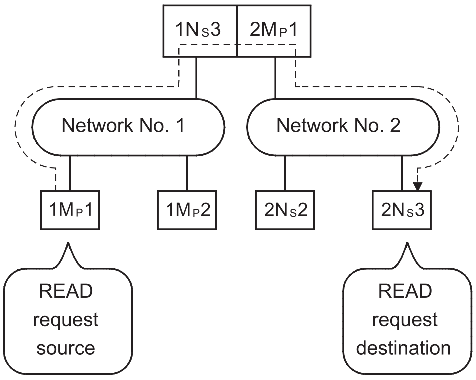
This is the transmission delay time from the request source (the station that executed the instruction) to the relay station that performs the routing. In the following example, it is the time required for the data to be transmitted from station 1M$_P$1 to station 1N$_S$3.

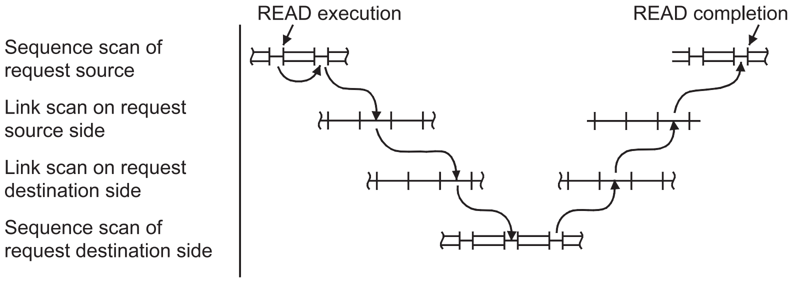
Use the equation for the transmission delay time described in Section 3.3.2 to calculate the delay time.

(b) Processing time from relay station to request destination

This is the transmission delay time from the relay station to the request destination (the station accessed with the instruction). In the following example, it is the time required for the data to be transmitted from station 2M$_P$1 to station 2N$_S$3.

Use the equation for the transmission delay time described in Section 3.3.2 to calculate the delay time.



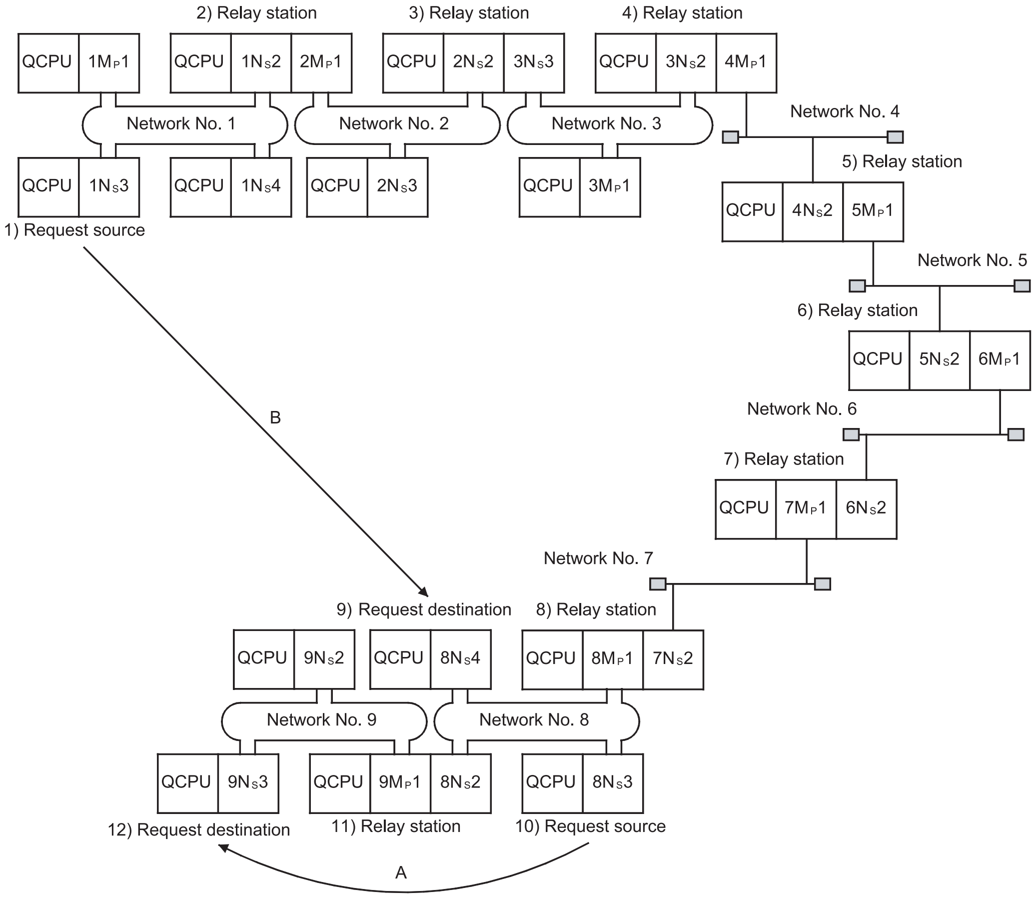


REMARKS

When three or more networks are relayed through by means of routing, add the processing time from one relay station to the other relay station to the routing transmission delay time.

(5) Setting example

The routing parameter setting examples (A, B) are explained using the following system configuration.



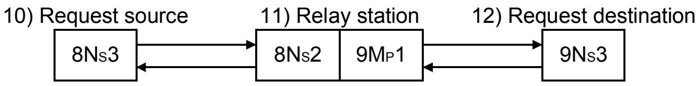
POINT

(1) Since only one network module can be installed with the Basic model QCPU, Q00UJCPU, Q00UCPU, Q01UCPU and safety CPU, it cannot be used as a relay station.

(2) For access via a redundant system, the routing parameters of the request source or relay station(s) must be changed with the RTWRITE instruction if system switching occurs in the redundant system.
For details, refer to Section 7.10.8.

(a) Setting example A

The routing parameter must be set for request source 10).



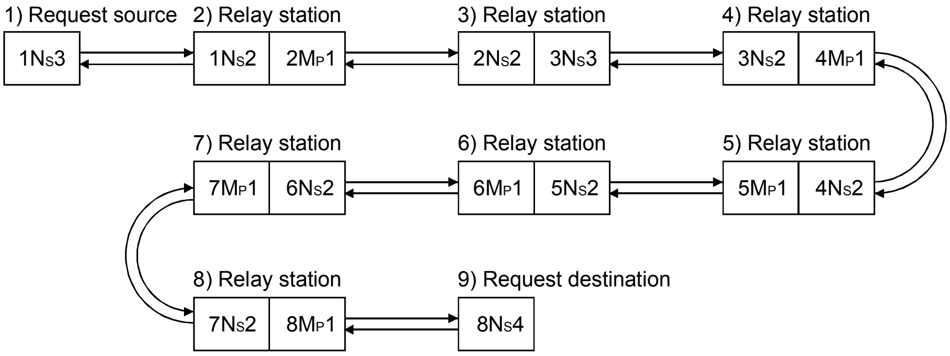
	No.	Target network No.	Relay network No.	Relay station No.
10) Request source	1	[9]	[8]	[2]

(b) Setting example B

The routing parameters must be set for the request source 1), relay station 2), relay station 3), relay station 4), relay station 5), relay station 6), relay station 7), and relay station 8).

In addition, there are two types of routing parameter settings; one is used when sending data from the request source to the request destination (when sending a request), and the other is used when returning from the request destination to the request source (when sending a response).

Either one of them or both must be set for each station.



	No.	Target network No.	Relay network No.	Relay station No.	
1) Request source	1	[8]	[1]	[2]	Used when sending a request
2) Relay station	1	[8]	[2]	[2]	Used when sending a request
3) Relay station	1	[8]	[3]	[2]	Used when sending a request
	2	[1]	[2]	[1]	Used when sending a response
4) Relay station	1	[8]	[4]	[2]	Used when sending a request
	2	[1]	[3]	[3]	Used when sending a response
5) Relay station	1	[8]	[5]	[2]	Used when sending a request
	2	[1]	[4]	[1]	Used when sending a response
6) Relay station	1	[8]	[6]	[2]	Used when sending a request
	2	[1]	[5]	[1]	Used when sending a response
7) Relay station	1	[8]	[7]	[2]	Used when sending a request
	2	[1]	[6]	[1]	Used when sending a response
8) Relay station	1	[1]	[7]	[1]	Used when sending a response

POINT

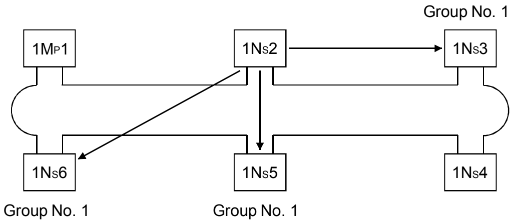
If a transient transmission (SEND, READ, SREAD, WRITE, SWRITE or REQ) was terminated abnormally, the "Time" when an error was detected, "Abnormal detection network number," and "Abnormal detection station number" can be checked from the control data of the instruction used.
For detail on these instructions, refer to Section 7.4.5.

7.4.3 Group function

The group function is used to group the target stations of a transient transmission and send data to all of the stations in a group with a single instruction. One network may have a maximum of 32 groups.
By setting a group specification to the target station number in the control data of a dedicated link instruction, stations with the matching group number retrieve the transient data.
However, whether or not the transient transmission is normally completed cannot be verified because the data is transmitted to multiple stations.

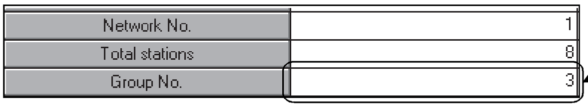
(1) Visual representation of the function

The following figure shows an example of grouping. When a transient transmission is executed by specifying group number 1, all of the three stations, 1Ns3, 1Ns5 and 1Ns6, retrieve the transient data.



(2) Setting method

Set the group number of the target network module using the following network parameters from GX Developer.


Network No. 1
Total stations 8
Group No. 3

Set the desired group number.

Setting Item	Valid setting range	Default
Parameter screen Group No.	1 to 32	0 (no group specification)
Control data target station No.	81_H(1) to $A0_H$ (32)	—

(3) Transient transmission instructions that allows group specification

No.	Instruction	Description	Reference
1	SEND	Data sending	Section 7.4.5 (1)
2	(S)WRITE	Writes to word device of other station	Section 7.4.5 (2)
3	REQ	Requests transient transmission to other station	Section 7.4.5 (3)
4	ZNWR	Writes to word device of other station	Section 7.4.5 (4)
5	RRUN	Remote RUN	Section 7.4.5 (5)
6	RSTOP	Remote STOP	Section 7.4.5 (5)
7	RTMWR	Writes other station clock data	Section 7.4.5 (6)
8	Clock setting	GX Developer	Section 7.4.7
9	Remote RUN/STOP	GX Developer	GX Developer Operating Manual

POINT

The execution of the transient transmission using the group function cannot be verified.
When this mode of transient transmission is executed successively, a "No free area in the receive buffer" (error code: F222) may occur. Design the system thoroughly to allow for a sufficient interval between executions, and make sure to test (debug) to confirm that successive executions can be performed without generating any error.

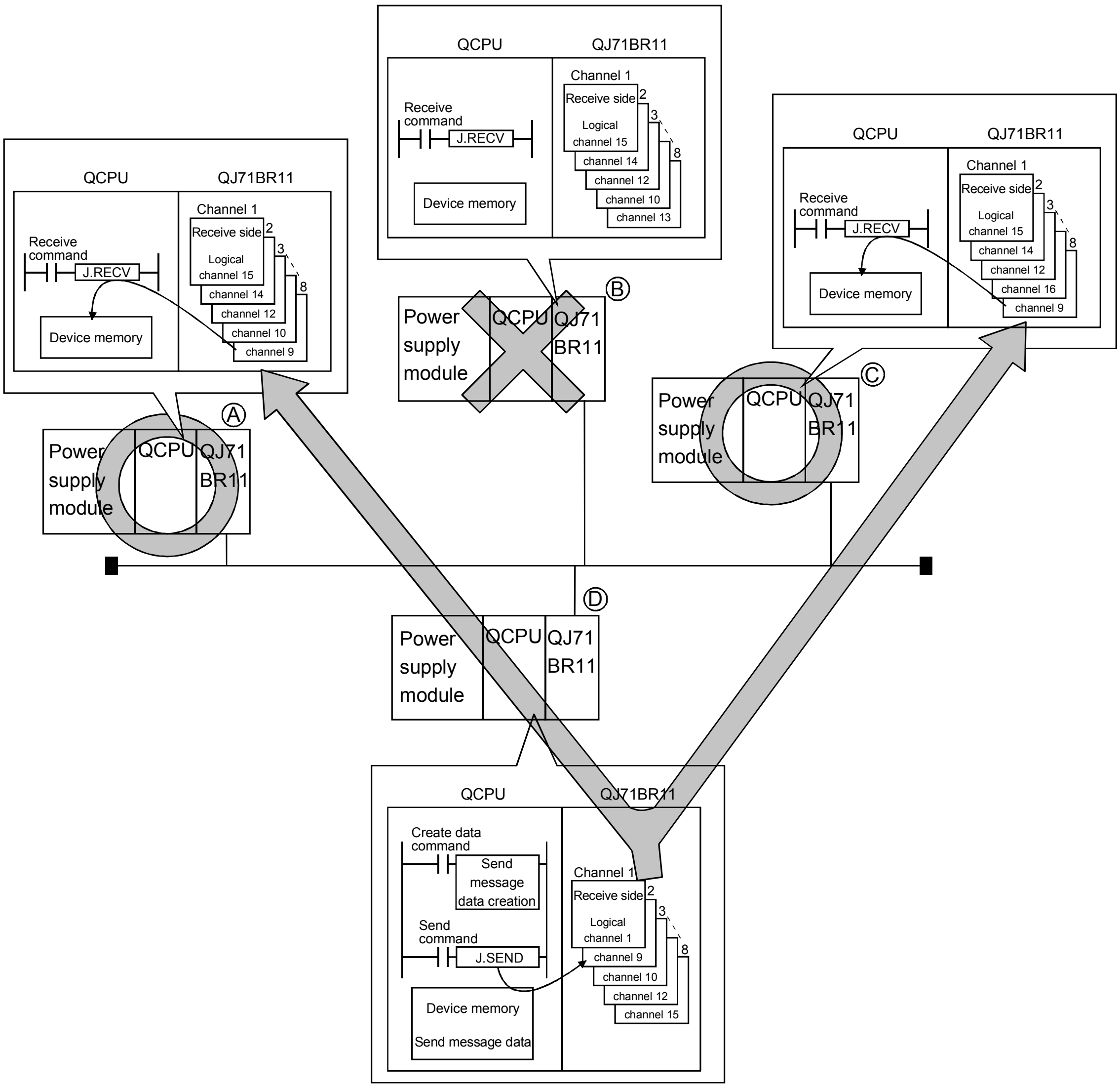
7.4.4 Message sending function using the logical channel numbers

The message sending function using the logical channel numbers ＊1 is useful when there are many kinds of information and the receiving station side needs to selectively receive only some of the send messages.
The sending station side is equivalent to a broadcast station that delivers messages to logical channels, and the receiving station side is equivalent to a television receiver in an ordinary household that can switch between logical channels.
The sending station side executes the transient transmission by attaching an address for a logical channel without specifying a specific station number (although specification of station numbers is also possible). All the other stations on a single network receive the send data, and then the receiving stations delete the messages except for the messages whose logical channel number matches with the one set by the receiving stations.

＊1: The logical channel refers to an input channel that can be changed by the sequence program. There are eight physical input channels, but up to 64 channel numbers can be set by modifying the link special register value.

(1) Visual representation of the function

When the message is sent from the network module Ⓓ to logical channel 9, only the network modules Ⓐ, Ⓒ where logical channel 9 has been set can receive it. The network module Ⓑ does not receive it since logical channel 9 has not been set there.



POINT

Whether or not channel No.-specified transient transmission has been executed cannot be verified.
If it is executed consecutively, the no free area in the receive buffer error (error code: F222) may occur. Properly design the system to leave execution intervals and perform a test (debugging) so that transmission can be executed consecutively.

(2) Setting method

Set the logical channel numbers in the link special registers (SW0008 to SW000F) with the sequence program.

SW No.	Name	Valid setting range	Default
SW0008	Logical channel setting (channel 1)	1 to 64	0: (Logical channel 1) ＊1
SW0009	Logical channel setting (channel 2)	1 to 64	0: (Logical channel 2) ＊1
SW000A	Logical channel setting (channel 3)	1 to 64	0: (Logical channel 3) ＊1
SW000B	Logical channel setting (channel 4)	1 to 64	0: (Logical channel 4) ＊1
SW000C	Logical channel setting (channel 5)	1 to 64	0: (Logical channel 5) ＊1
SW000D	Logical channel setting (channel 6)	1 to 64	0: (Logical channel 6) ＊1
SW000E	Logical channel setting (channel 7)	1 to 64	0: (Logical channel 7) ＊1
SW000F	Logical channel setting (channel 8)	1 to 64	0: (Logical channel 8) ＊1

＊1: The logical channel number is processed as the actual channel number when "0" is set.

(3) Transient transmission instruction that allows logical channel specification

No.	Instruction	Description	Reference
1	SEND	Sends data	Section 7.4.5 (1) (d)

7.4.5 Programming

This section describes the formats of dedicated instructions available for network modules and program examples.

POINT

The descriptions in this section are based on the MELSECNET/H specifications. For access to CC-Link IE Controller Network or CC-Link IE Field Network, refer to the manual for the network module used.

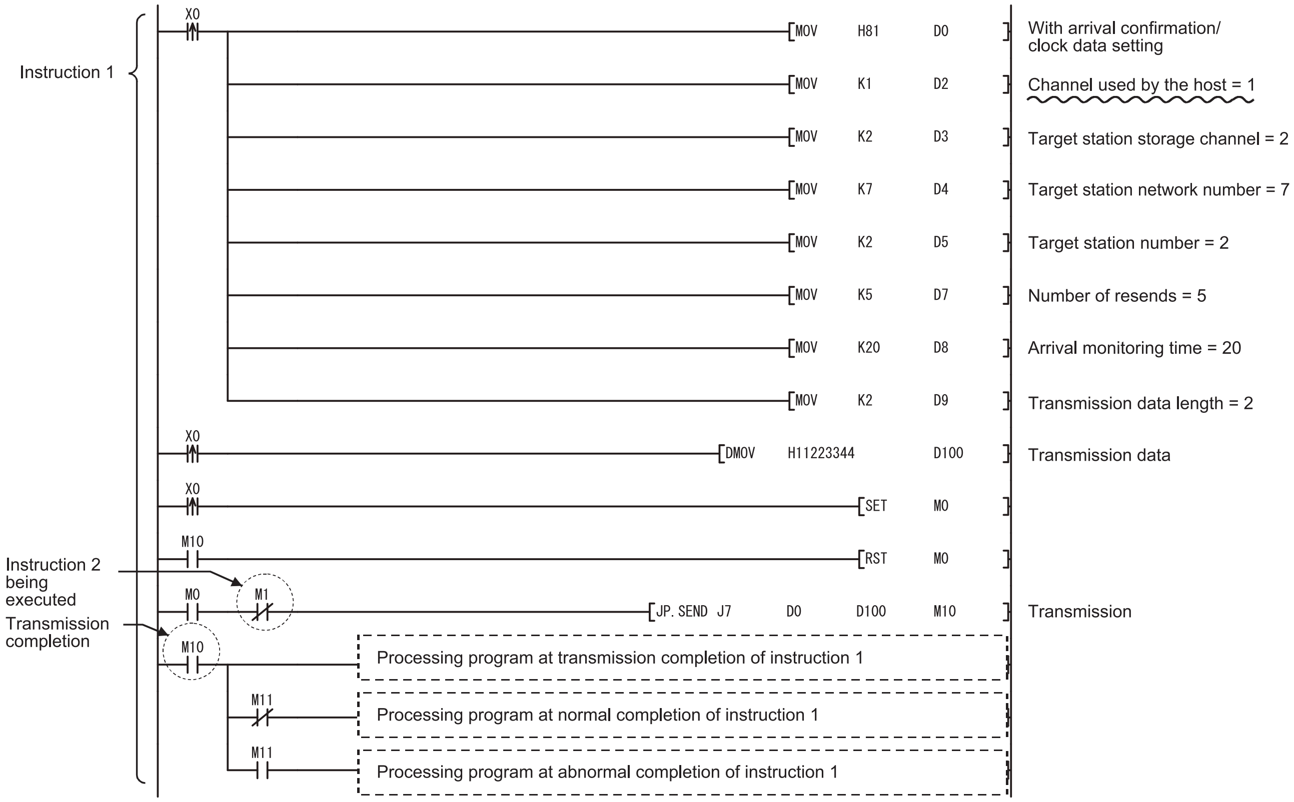
1) Instruction execution in transient transmission

To perform the following processing in transient transmission, provide interlocks:

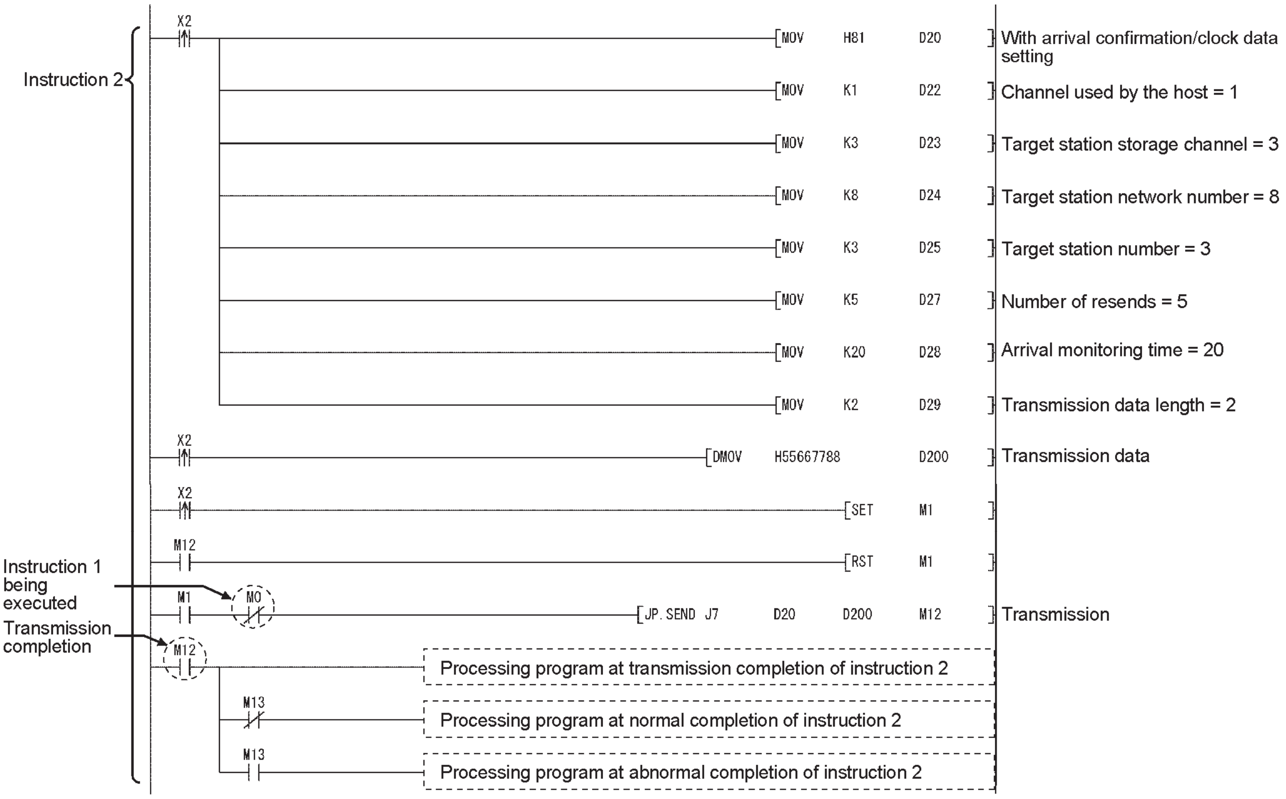
- Using the same channel with multiple instructions
  (Refer to Example 1.)
- Executing instructions from a redundant system
  (Refer to Example 2.)

(Example 1) When using the same channel with multiple instructions

One network module has 8 channels for executing instructions. Although these channels can be used at the same time, the same channel cannot be concurrently used for multiple instructions. If execution of multiple instructions are attempted at the same time on the same channel, those to be executed later have to wait. For this reason, create a program as shown below so that flags turn on until the previous instruction is completed.

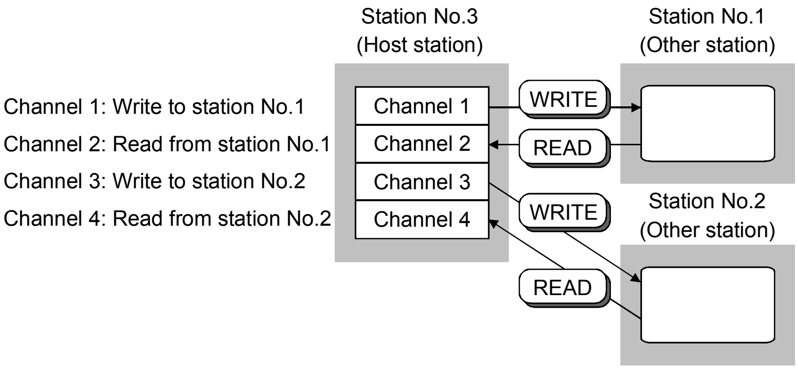


(To next page)


Instruction 2
X2
MOV H81 D20
With arrival confirmation/clock data setting
MOV K1 D22
Channel used by the host = 1
MOV K3 D23
Target station storage channel = 3
MOV K8 D24
Target station network number = 8
MOV K3 D25
Target station number = 3
MOV K5 D27
Number of resends = 5
MOV K20 D28
Arrival monitoring time = 20
MOV K2 D29
Transmission data length = 2
X2
DMOV H55667788 D200
Transmission data
X2
SET M1
M12
RST M1
Instruction 1 being executed
M1
M0
JP.SEND J7 D20 D200 M12
Transmission
Transmission completion
M12
Processing program at transmission completion of instruction 2
M13
Processing program at normal completion of instruction 2
M13
Processing program at abnormal completion of instruction 2

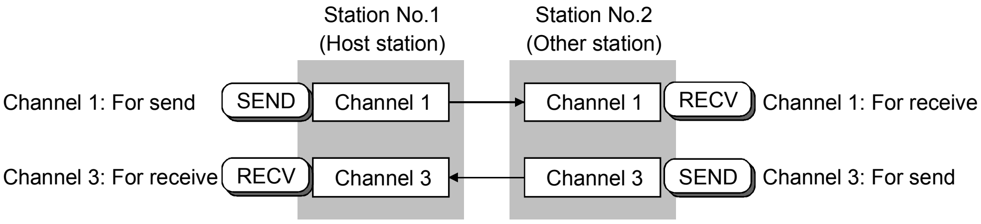
POINT

(1) When simultaneously accessing multiple other stations from the host station, change the channel setting of the host station for each request target.



(2) When accessing other stations with the same channel No. specified, make the next other station access after completion of the preceding access.
The completion status can be confirmed with the completion device of the link dedicated instruction.
When the next access is attempted before completion of the preceding access to another station, the link dedicated instruction issued later is not executed.

(3) When making access mutually between the host station and another station, change the channel of the host station for each link dedicated instruction.



(4) Up to eight instructions are executable at the same time if no duplication is found in the channel Nos. (1 to 8) specified in the control data of the instructions.

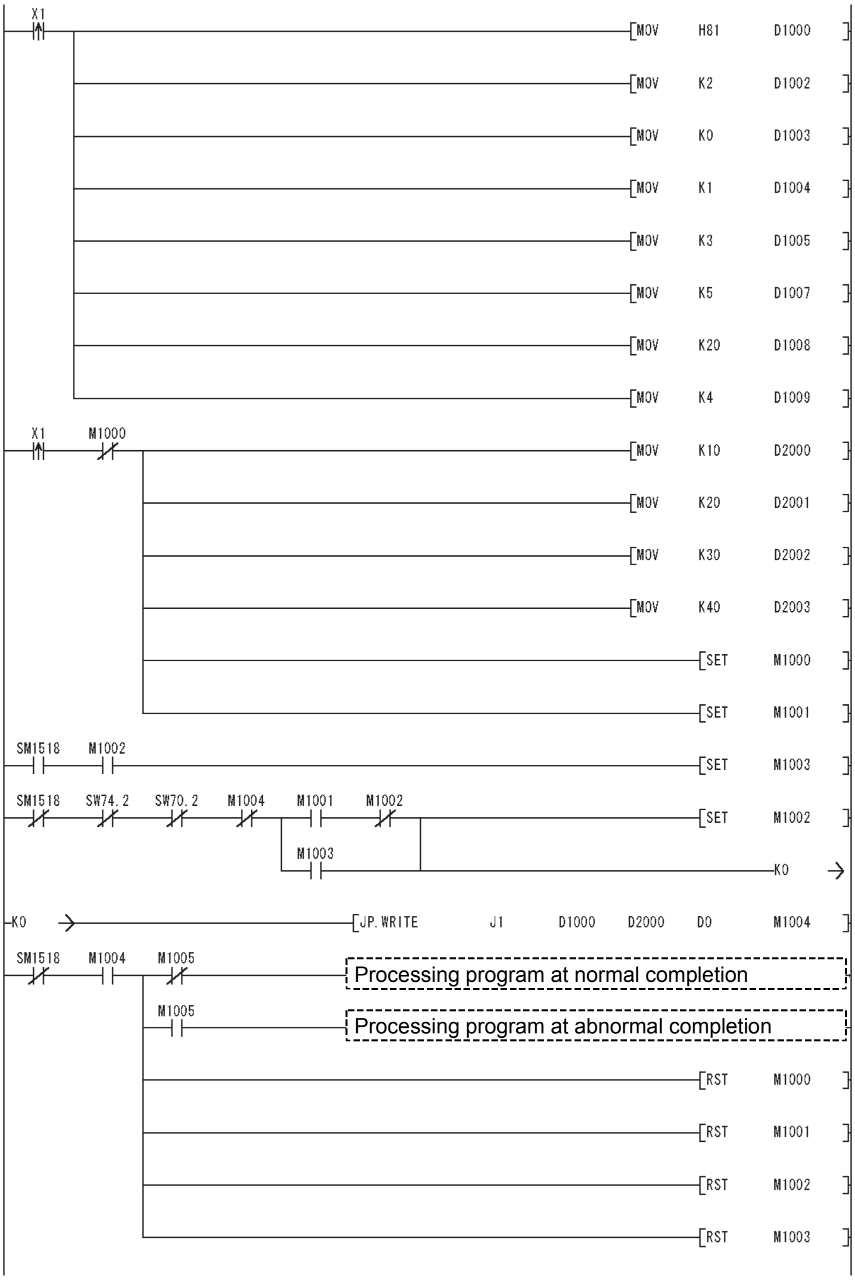
REMARKS

Do not use the same channel for link dedicated instructions of both the scan execution program and the interrupt program.
If a channel is being used for a link dedicated instruction of the scan execution program, the channel is not available for another link dedicated instruction of the interrupt program.
The instruction of the interrupt program is put in the wait status at this time, and will be executed at the next scan timing in this case.
If the link dedicated instruction of the interrupt program precedes that of the scan execution program, however, the latter cannot be executed because the next scan timing does not exist in the interrupt program.

(Example 2) When executing instructions from a redundant system

If system is switched in a redundant system during execution of an instruction, the instruction will be discontinued in the redundant CPU of the new control system and will not be completed.

Using the SM1518 (one scan ON after system switching) and the complete signal, create a program that any instruction being executed will be continued by the new control system even when the system is switched in the redundant system.



Arrival confirmed/clock data setting

Channel used by host station

Target station CPU type

Target station network number

Target station number

Number of resend times

Arrival monitoring time

Written data length

Written data

Processing program at normal completion

Processing program at abnormal completion

2) Available devices
The following devices are available for the dedicated instructions:

Internal devices		File register	Constant ＊2
Bit ＊1	Word		
X, Y, M, L, F, V, B	T, ST, C, D, W	R, ZR	K, H, $

＊1: Word device bit specification is available for bit data.
A bit of a word device is specified with Word device and Bit No..
(Bit No. must be specified in hexadecimal.)
For example, bit 10 of D0 is specified as D0.A.
Note that bit specification is not allowed for timers (T), retentive timers (ST), and counters (C).

＊2: Available devices are given in each of the Constant column.

3) When specifying the target of dedicated instructions by network No.
If multiple network modules with the same network number are mounted, execution target will be as follows.

CPU type	Description
Host station is the Universal model QCPU	A network module mounted on the slot with the smallest number in a base unit is targeted.
Host station is not the Universal model QCPU	A network module to which the smallest start I/O number has been assigned in the I/O assignment tab of the PLC parameter dialog box.

7.4.5 (1) Data sending/receiving (JP/GP.SEND, JP/GP.RECV)

Target station
Refer to Section 6.3.

(a) Instruction format

1) JP/GP.SEND

This instruction sends data to a network module in other station.

Applicable device

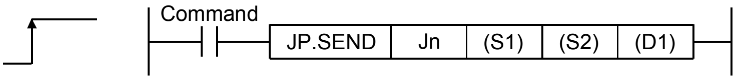
Setting data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(S2)	—	○		—					
(D1)	○			—					

Instruction format

[Network No. specification]

[Instruction symbol] [Execution condition]

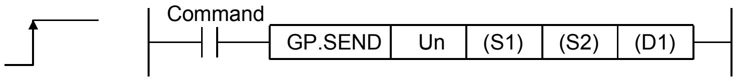
JP.SEND



[Network module start I/O No. specification]

[Instruction symbol] [Execution condition]

GP.SEND



Setting data

Setting data ＊1	Description	Setting side ＊2	Data type
Jn	Network No. of the host station (1 to 239, 254) 254: The network specified in Valid module during other station access	User	Binary 16 bits
Un	Start I/O number of the host station's network module (00 to FE$_H$: The higher two digits of the 3-digit I/O number)		Character string
(S1)	Start device of the host station that stores control data	User, system	Device name
(S2)	Start device of the host station that stores send data	User	
(D1)	The host station's device that is turned on for one scan upon completion of the instruction (D1)+1 also turns on if the instruction execution has failed.	System	Bit

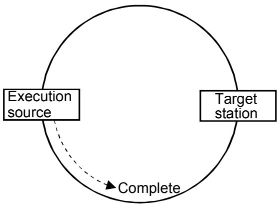
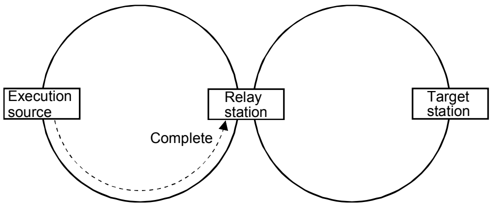
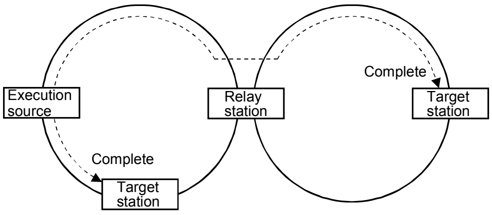
＊1: Local devices and file registers for each program cannot be used as devices in setting data.

＊2: The setting side is as shown below.

User : It is data the user sets in the sequence program before execution of a link dedicated instruction.

System: The programmable controller CPU stores the execution result of the link dedicated instruction.

Control data

Device	Item	Setting data	Setting range	Setting side ＊2
(S1)+ 0	Execution/Error completion type	b15 to b7 to b0 0 2) 0 1) 1) Execution type (bit 0) 0: No arrival confirmation • When the target station is on the same network Completed when data are sent from the host station.  • When the target station is on another network Completed when data reach a relay station on the same network.  1: With arrival confirmation Completed when data are stored in the specified channel area of the target station.  When "0: No arrival confirmation" is specified, even if transmission to the target station is terminated abnormally in the following cases, it is normal completion on the host station. • Communication itself was completed normally, although the data sent were erroneous. • Data could not be stored in the target station because instructions from multiple stations were sent to the same station. (An error code ($F222_H$) is detected on the target station.) 2) Error completion type (bit 7) Specify the clock data setup status for error completion. 0: Clock data at the time of error completion is not set in the area starting from (S1)+11. 1: Clock data at the time of error completion is set in the area starting from (S1)+11.	0000_H 0001_H 0080_H 0081_H	User
(S1)+1	Completion status	The instruction completion status is stored. 0 : Normal Other than 0 : Error (Refer to Section 8.3 for error codes)	—	System
(S1)+2	Channel used by host station	Specify the channel used by the host station. 1 to 8: Channel	1 to 8	User
(S1)+3	Target station storage channel (Logical channel No.)	Specifies the target station's channel to store the data. 1 to 64: Logical channel	1 to 64	User
(S1)+4	Target station network No.	Specify the network No. of the target station. 1 to 239 : Network No. 254 : Specify this when 254 has been set in Jn.	1 to 239 254	User

(Continued to the next page)

＊2: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

Device	Item	Setting data	Setting range	Setting side ＊2
(S1)+ 5	Target station No.	Specify the station No. of the target station. 1) Station No. specification 1 to 64 : Station No. (To increase the reliability of data, it is recommended to execute the instruction with the execution type in (S1)+0 set to "1: With arrival confirmation".) 2) Group specification 81_H to $A0_H$: All stations in group No.1 to 32 (Setting is available when the execution type is set to "0: With arrival confirmation" in (S1)+0.) 3) All stations specification FF_H : All stations of the target network No. (Except the host station) (Setting is available when the execution type is set to "0: No arrival confirmation" in (S1)+0.) When a group is specified, set the group No. of the target station with the network parameters from GX Developer.	1 to 64 81_H to $A0_H$ FF_H	User
(S1)+ 6	(Use prohibited)	—	—	—
(S1)+7	Number of resends	1) For instruction execution Specify the number of times the instruction is to be resent when it is not completed within the monitoring time specified in (S1)+8. (Setting is valid when the execution type is set to "1: With arrival confirmation" in (S1)+0.)	0 to 15	User
		2) At instruction completion The number of resends executed (result) is stored. (Setting is valid when the execution type is set to "1: With arrival confirmation" in (S1)+0.)	—	System
(S1)+8	Arrival monitoring time	Specify the monitoring time required for instruction completion. (Setting is available when the execution type is set to "1: With arrival confirmation" in (S1)+0.) If an instruction is not completed within this time, it will be resent the number of times specified in (S1)+7. 0 : 10 seconds 1 to 32767 : 1 to 32767 seconds	0 to 32767	User
(S1)+9	Send data length	Specify the send data size of (S2) to (S2)+n. (Refer to Section 2.2.1.) 1 to 960: Number of send data (words)	1 to 960	User
(S1)+10	(Use prohibited)	—	—	—
(S1)+11	Clock set flag	The valid or invalid status of the data in the area starting from (S1)+12 is stored. (Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0). Note that the stored value will not be cleared even after the dedicated instruction is completed. 0: Invalid 1: Valid	—	System

(Continued to the next page)

＊2: The setting side is as shown below.
Use : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

<table>
<tr><th>Device</th><th>Item</th><th>Setting data</th><th>Setting range</th><th>Setting side ＊2</th></tr>
<tr><td>(S1)+12
to
(S1)+15</td><td>Clock data on error completion</td><td>Clock data on error completion are stored in BCD format.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
<table>
<tr><th></th><th>b15 to b8</th><th>b7 to b0</th></tr>
<tr><td>(S1)＋12</td><td>Month (01_H to 12_H)</td><td>Year (00_H to 99_H), Last 2 digits</td></tr>
<tr><td>(S1)＋13</td><td>Hour (00_H to 23_H)</td><td>Date (01_H to 31_H)</td></tr>
<tr><td>(S1)＋14</td><td>Second (00_H to 59_H)</td><td>Minute (00_H to 59_H)</td></tr>
<tr><td>(S1)＋15</td><td>Year (00_H to 99_H), First 2 digits</td><td>Day of the week (00_H to 06_H)
00_H (Sun.) to 06_H (Sat.)</td></tr>
</table>
When the target station is QnACPU, "00_H" is stored in the Year field (first two digits of the year).
(For the ACPU, clock data will not be stored when completed in error.)</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+16</td><td>Error-detected network No. ＊3</td><td>Network No. of the station, where an error was detected, is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
1 to 239: Network No.</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+17</td><td>Error-detected station No. ＊3</td><td>Station No. of the station, where an error was detected, is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
1 to 64: Station No.</td><td>—</td><td>System</td></tr>
</table>

＊2: The setting side is as shown below.

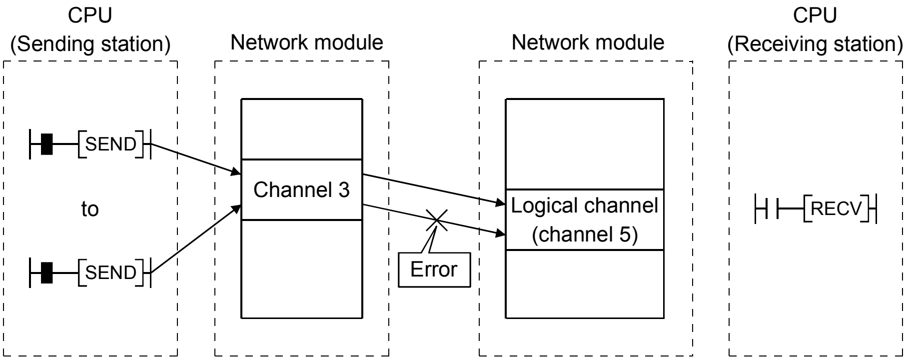
Use : It is data the user sets in the sequence program before execution of a link dedicated instruction.

System: The programmable controller CPU stores the execution result of the link dedicated instruction.

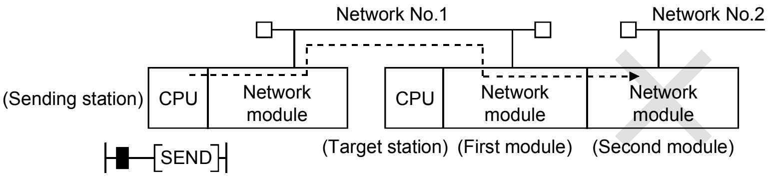
＊3: Data is not stored when Completion status (S1) + 1 is "Host station channel in use ($F7C1_H$)".

POINT

(1) When sending data to the same channel of the receiving station, execute the sending after the receiving station reads data using the RECV instruction.
If the sending station sends data to the same channel of the receiving station before the receiving station reads data using the RECV instruction, an error will occur.



(2) As the target station of data sending, specify the network number and station number of the network module or Ethernet module that will receive a request from the sending station.
＊: In the following figure, specify the network number and station number of the first network module.
You cannot execute the SEND instruction after specifying any module other than the network module or Ethernet module that will receive a request from the sending station.
＊: In the following figure, you cannot execute the SEND instruction after specifying the network number and station number of the second network module.



(3) Number of resends ((S1)+7) requires to be set every time an instruction is executed.

2) JP/GP.RECV
This instruction is used when sending data from the network module in another station.

Applicable device

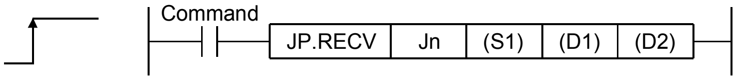
Setting data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(D1)	—	○		—					
(D2)	○			—					

Instruction format

[Network No. specification]

[Instruction symbol] [Execution condition]

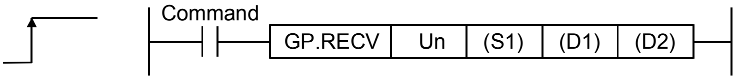
JP.RECV



[Network module start I/O No. specification]

[Instruction symbol] [Execution condition]

GP.RECV



Setting data

Setting data ＊1	Description	Setting side ＊2	Data type
Jn	Network No. of the host station (1 to 239, 254) 254: The network specified in Valid module during other station access	User	Binary 16 bits
Un	Start I/O number of the host station's network module (00 to FE$_H$: The higher two digits of the 3-digit I/O number)		character string
(S1)	Start device of the host station that stores control data	User, system	Device name
(D1)	Start device of the host station that stores receive data (A contiguous area for the receive data length is required.)	System	
(D2)	The host station's device that is turned on for one scan upon completion of the instruction (D2)+1 also turns on if the instruction execution has failed.		Bit

＊1: Local devices and file registers for each program cannot be used as devices in setting data.

＊2: The setting side is as shown below.

User : It is data the user sets in the sequence program before execution of a link dedicated instruction.

System: The programmable controller CPU stores the execution result of the link dedicated instruction.

Control data

Device	Item	Setting data	Setting range	Setting side ＊2
(S1)+0	Error completion type	b15 to b8 b7 b6 to b0 0 to 0 1) 0 to 0 1) Error completion type (bit 7) Specify the clock data setup status for error completion. 0: Clock data at the time of error completion is not set in the area starting from (S1)+11. 1: Clock data at the time of error completion is set in the area starting from (S1)+11.	0000_H 0080_H	User
(S1)+1	Completion status	The instruction completion status is stored. 0 : Normal Other than 0 : Error (Refer to Section 8.3 for error codes)	—	System
(S1)+2	Host station channel	Specify the channel of the host station, where receive data are stored. 1 to 8: Channel	1 to 8	User
(S1)+3	Channel used by sending station	Stores the channel used by the sending station. 1 to 8: Channel	—	System
(S1)+4	Network No. of sending station	Stores network No. of the sending station. 1 to 239: Network No.	—	System
(S1)+5	Sending station No.	Stores station No. of the sending station. 1 to 64: Station No.	—	System
(S1)+6	(Use prohibited)	—	—	—
(S1)+7	(Use prohibited)	—	—	—
(S1)+8	Arrival monitoring time	Specify the monitoring time required for instruction completion. If not completed within the time, the instruction is terminated with an error. 0 : 10 seconds 1 to 32767 : 1 to 32767 seconds	0 to 32767	User
(S1)+9	Receive data length	Stores the receive data size stored in (D1) to (D1)+ n. 1 to 960: Number of received data (words)	—	System
(S1)+10	(Use prohibited)	—	—	—
(S1)+11	Clock set flag	The valid or invalid status of the data in the area starting from (S1)+12 is stored. (Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0). Note that the stored value will not be cleared even after the dedicated instruction is completed. 0: Invalid 1: Valid	—	System
(S1)+12 to (S1)+15	Clock data on error completion	Clock data on error completion are stored in BCD format. (Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0). Note that the stored value will not be cleared even after the dedicated instruction is completed. b15 to b8 b7 to b0 (S1)＋12 Month (01_H to 12_H) Year (00_H to 99_H), Last 2 digits (S1)＋13 Hour (00_H to 23_H) Date (01_H to 31_H) (S1)＋14 Second (00_H to 59_H) Minute (00_H to 59_H) (S1)＋15 Year (00_H to 99_H), First 2 digits Day of the week (00_H to 06_H) 00_H (Sun.) to 06_H (Sat.)	—	System

(Continued to the next page)

＊2: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

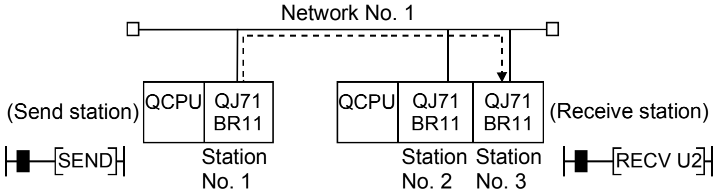
Device	Item	Setting data	Setting range	Setting side ✻ 2
(S1)+16	Error-detected network No. ✻ 3	Network No. of the station, where an error was detected, is stored. (Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0). Note that the stored value will not be cleared even after the dedicated instruction is completed. 1 to 239: Network No.	–	System
(S1)+17	Error-detected station No. ✻ 3	Station No. of the station, where an error was detected, is stored. (Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0). Note that the stored value will not be cleared even after the dedicated instruction is completed. 1 to 64: Station No.	–	System

✻ 2: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.
✻ 3: Data is not stored when Completion status (S1) + 1 is "Host station channel in use (F7C1$_H$)".

POINT

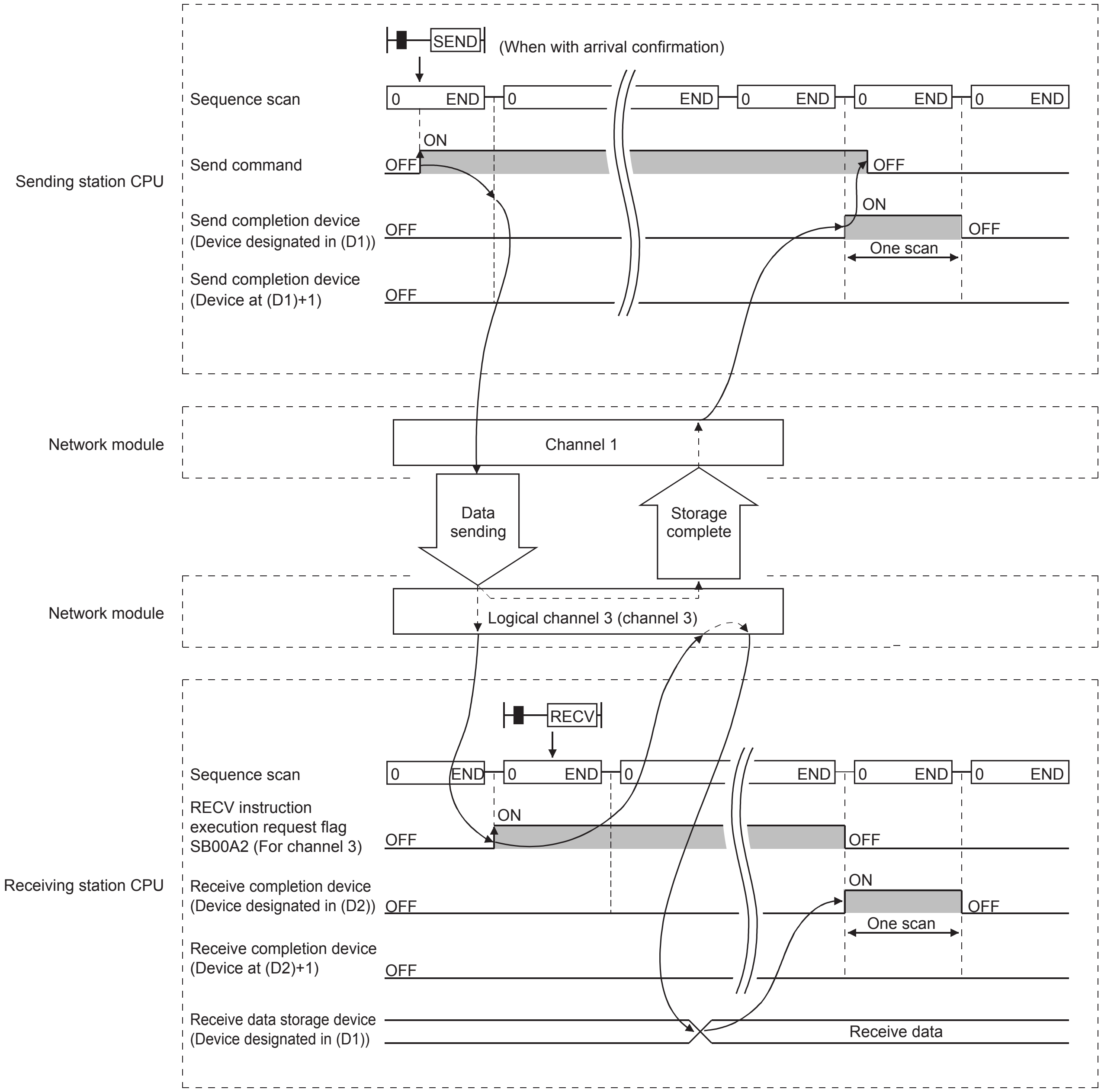
When the network modules on the same network are installed at the receive station, execute RECV instruction by specifying Un of the network module which stores the data sent by SEND instruction.
Specifying Jn does not execute RECV instruction.

(Example) Specify "U2" when executing the RECV instruction at station No. 3 in response to the SEND instruction from station No. 1.

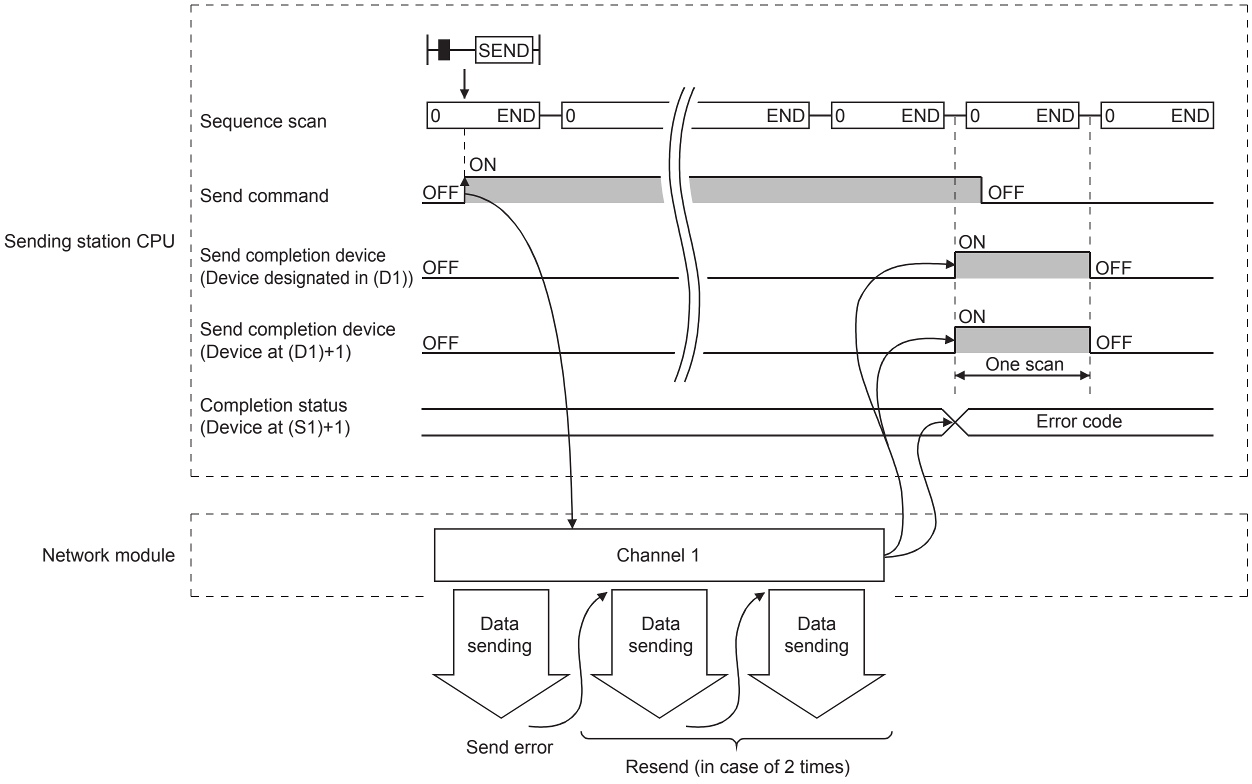


(b) Instruction execution timing

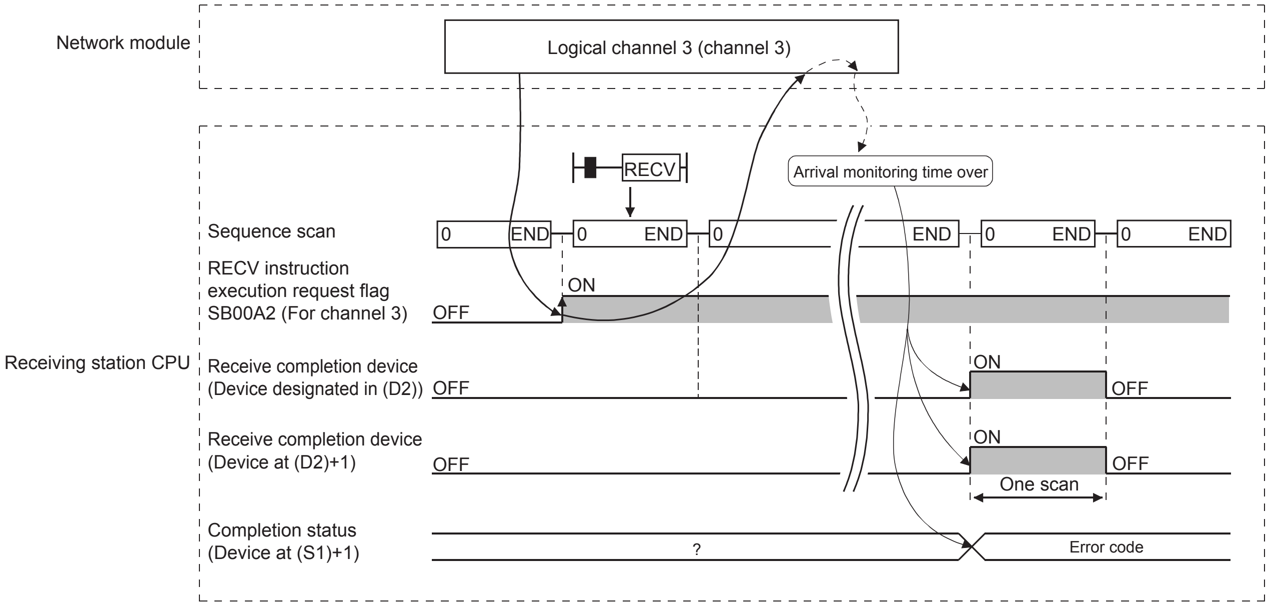
1) Normal completion



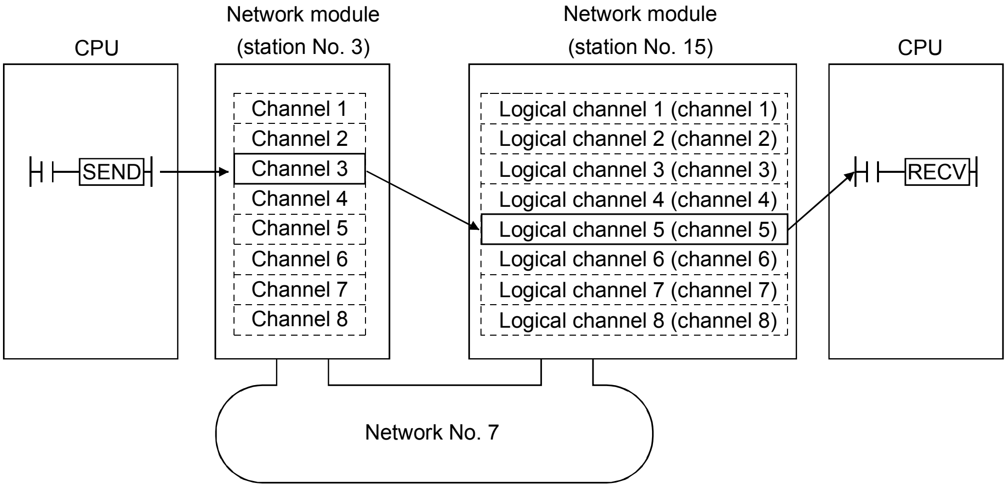
2) Abnormal completion
[In case of the SEND instruction]



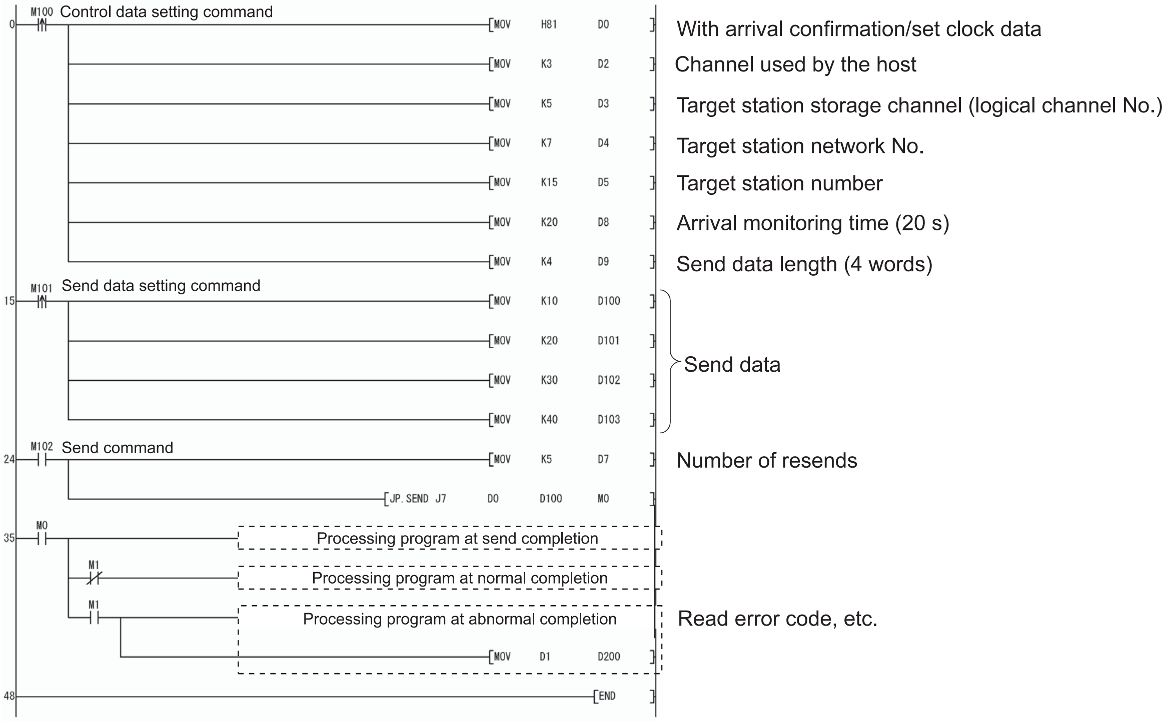
[In case of the RECV instruction]



(c) Program example 1 (target station is specified)
Station number 3 uses channel 3 and sends data to the target station of station number 15's storage channel 5 (logical channel 5) using the SEND instruction.
Upon receiving the data, station number 15 reads data from channel 5.

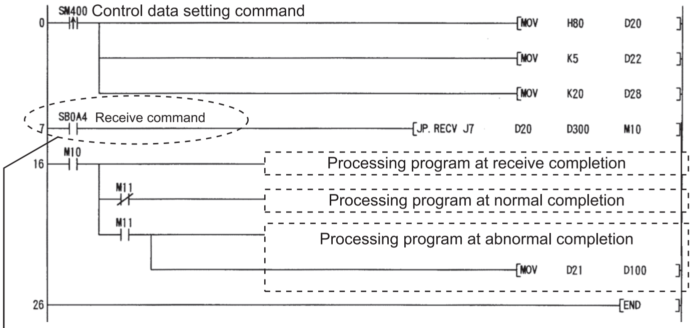


1) Program for station number 3 (SEND instruction)
When actually using the following program, interlock the program by referring to Section 6.1.



With arrival confirmation/set clock data
Channel used by the host
Target station storage channel (logical channel No.)
Target station network No.
Target station number
Arrival monitoring time (20 s)
Send data length (4 words)
Send data
Number of resends
Read error code, etc.

2) Program for station number 15 (RECV instruction)
When actually using the following program, provide interlocks in the program referring to Section 6.1.



Set the clock data

Host storage channel

Arrival monitoring time (20s)

SB0A4: RECV instruction execution request flag (for channel 5)

Read error code, etc.

When data is stored in the receiving station's channel, the link special relay (SB00A0 to 00A7) corresponding to each channel turns on.
By using this signal for the receive command, data can be read automatically.
The signal turns off when the RECV instruction completes.

Network module

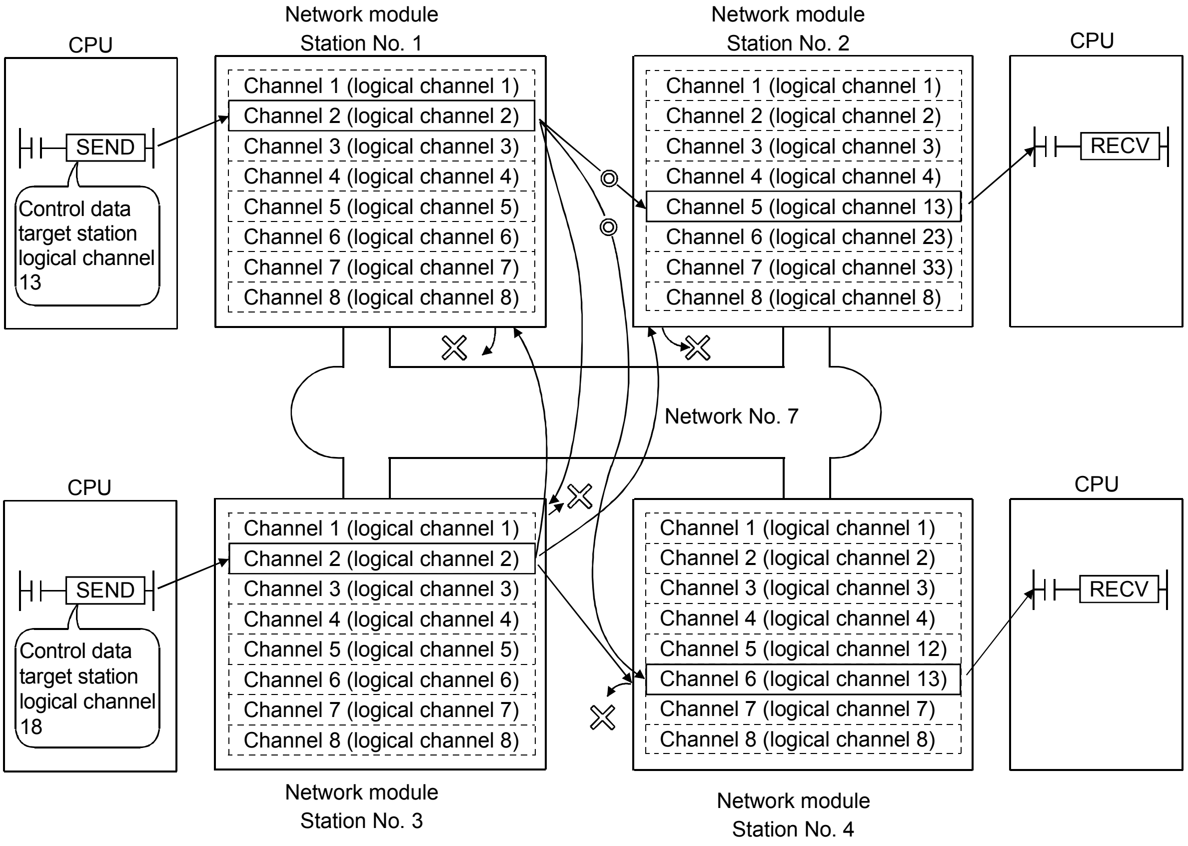
	RECV receive instruction flag	Logical channel setting register
Channel 1	SB00A0	SW0008
Channel 2	SB00A1	SW0009
Channel 3	SB00A2	SW000A
Channel 4	SB00A3	SW000B
Channel 5	SB00A4	SW000C
Channel 6	SB00A5	SW000D
Channel 7	SB00A6	SW000E
Channel 8	SB00A7	SW000F

(d) Program example 2 (logical channel numbers are used)

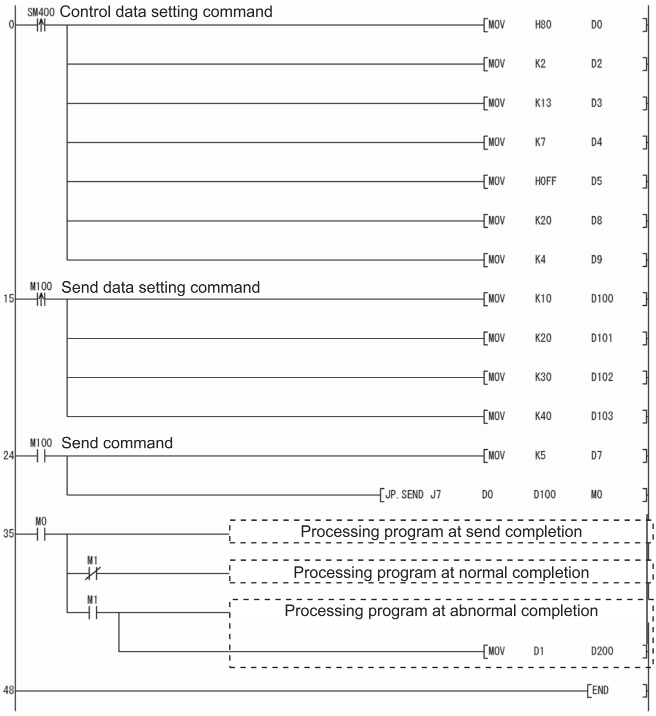
Station number 1 uses channel 2 and sends message data to the target station storage channel number 13 (logical channel 13) using the SEND instruction.

Station number 2 executes the RECV instruction and reads the received data from channel 5 (logical channel 13). At the same time, station number 4 executes the RECV instruction and reads the received data from channel 6 (logical channel 13).

Station number 3 uses channel 2 and sends the message data to the target station storage channel 18 (logical channel 18) using the SEND instruction, but it is not received because there is no matching logical channel number.



1) Program for station number 1 (SEND instruction)
When using the following program, provide interlocks in the program referring to Section 6.1.



No arrival confirmation/set clock data

Channel 2 used by the host

Target station storage channel (logical channel No. 13)

Target station network No. 7

All network station number 7

Arrival monitoring time (20s)

Send data length (4 words)

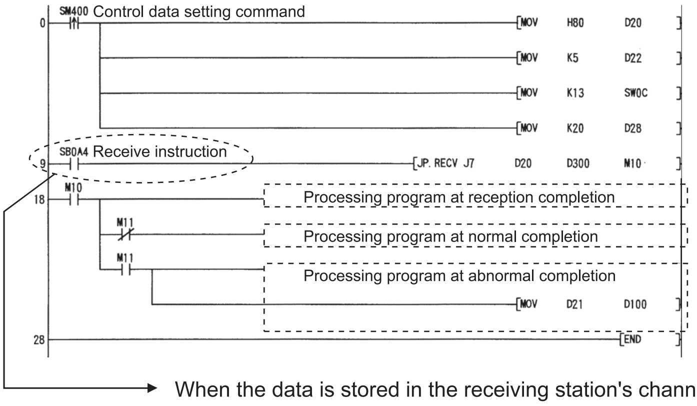
Send data

Number of resends (5 times)

Start sending

Read error code, etc.

2) Program for receiving station (station number 2) (RECV instruction)
When using the following program, provide interlocks in the program referring to Section 6.1.



Set clock data
Channel 5 used by the host
Set logical channel No. 13 for channel 5
Arrival monitoring time (20s)
SB00A4: RECV instruction execution request flag (for channel 5)
Read error code, etc.

When the data is stored in the receiving station's channel, the link special relay (SB00A0 to 00A7) corresponding to each channel turns on.
By using this signal for the receive command, data can be read automatically.
The signal turns off when the RECV instruction is completed.

Network module

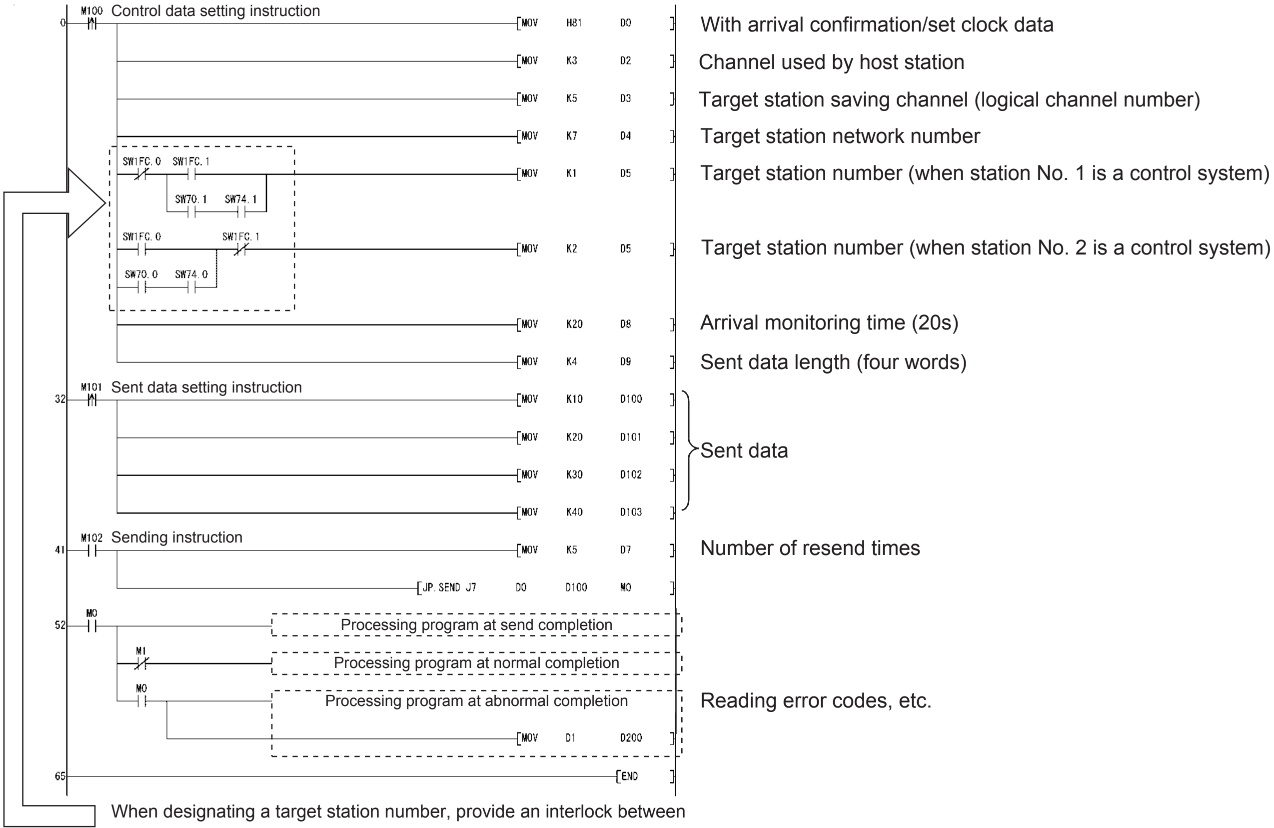
	RECV receive instruction flag	Logical channel setting register
Channel 1 →	SB00A0	SW0008
Channel 2 →	SB00A1	SW0009
Channel 3 →	SB00A2	SW000A
Channel 4 →	SB00A3	SW000B
Channel 5 →	SB00A4	SW000C
Channel 6 →	SB00A5	SW000D
Channel 7 →	SB00A6	SW000E
Channel 8 →	SB00A7	SW000F

(e) Program example 3 (when specifying a target station to execute an instruction to the redundant system)

When the target station is in a redundant system, the SEND instruction must be executed after judging whether it is a control system.

If the target station is on the standby system, the RECV instruction is not executed and the target station saving channel is not available.

The program example shown below is an interlock example for sending data from station number 3 of network number 7 to the control system of the redundant system made up of station numbers 1 and 2 of the same network.



When designating a target station number, provide an interlock between SW01FC to SW01FF (redundant system status) for judging whether the target station is a control system.

POINT

When the SEND instruction is executed to the redundant system, the processing of the RECV instruction and interrupt program (RECVS instruction) depends on the following conditions:

(1) When the SEND instruction is executed to the control system and the system is switched before execution of the RECV instruction and the interrupt program

If the control system is switched to the standby system before execution of the RECV instruction and the interrupt program, the control system retains the instruction execution request flags (SB00A0 to SB00A7) for the RECV instruction and the interrupt factor (interrupt pointer) of the interrupt program. If the standby system is returned to the control system due to system switching, the RECV instruction and the interrupt program will be executed according to the retained instruction execution request flags and interrupt factor.

(2) When the SEND instruction is executed to the standby system

When standby system receives data from the sending station, it retains the instruction execution request flags (SB00A0 to SB00A7) for the RECV instruction and the interrupt factor (interrupt pointer) of the interrupt program. If the standby system is switched to the control system, the RECV instruction and the interrupt program will be executed according to the retained instruction execution request flags and interrupt factor.

7.4.5 (2) Reading from/writing to word devices of other stations (JP/GP.READ, JP/GP.SREAD, JP/GP.WRITE, JP/GP.SWRITE)

Target station
Refer to Section 6.3.

(a) Instruction format

1) JP/GP.READ and JP/GP.SREAD
These instructions are used to read data from devices of a programmable controller on another station. (In units of words)
With the SREAD instruction, a device on another station turns on when data reading is completed. (The other station can recognize that data have been read out with the SREAD instruction.)

Applicable device

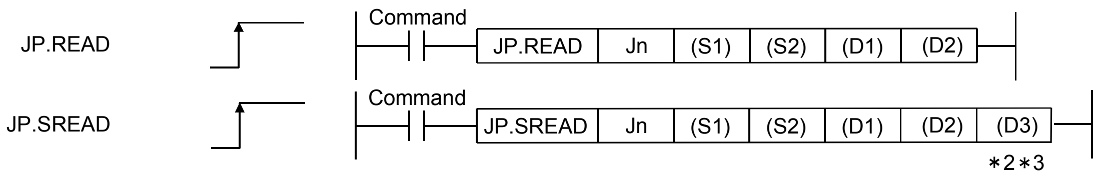
Setting data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(S2)	—	○*1		—					
(D1)	—	○		—					
(D2)	○			—					
(D3)	○			—					

*1: Any of T, C, D, W, ST, SD, and SW can be used.

Instruction format

[Network No. specification]

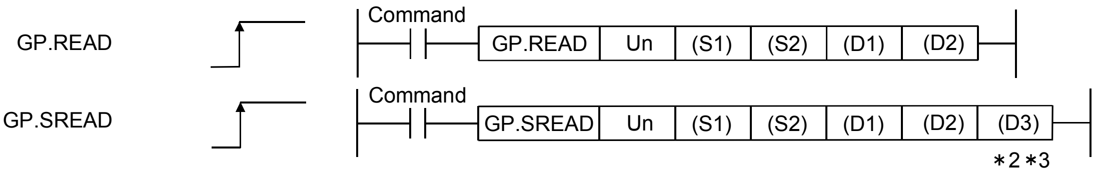
[Instruction symbol] [Execution condition]



JP.READ	JP.READ	Jn	(S1)	(S2)	(D1)	(D2)	
JP.SREAD	JP.SREAD	Jn	(S1)	(S2)	(D1)	(D2)	(D3)

[Network module start I/O No. specification]

[Instruction symbol] [Execution condition]

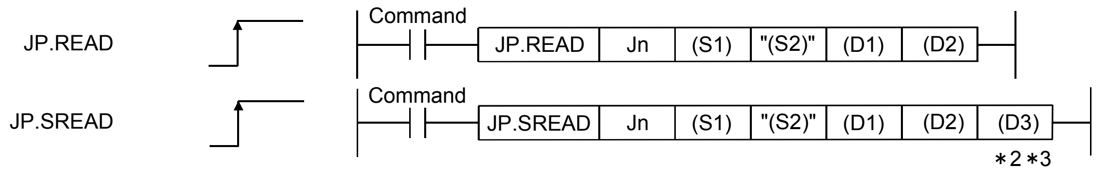


GP.READ	GP.READ	Un	(S1)	(S2)	(D1)	(D2)	
GP.SREAD	GP.SREAD	Un	(S1)	(S2)	(D1)	(D2)	(D3)

The following formats can be used only when the host is the Universal model QCPU

[Network No. specification]

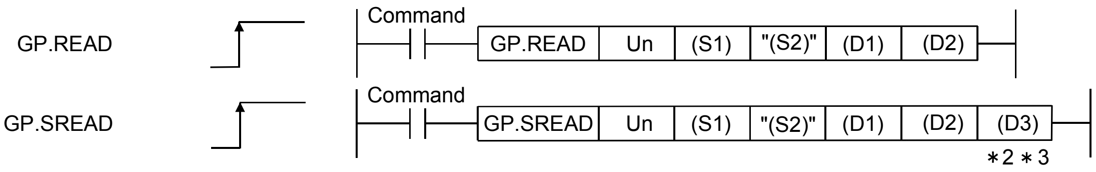
[Instruction symbol] [Execution condition]



JP.READ	JP.READ	Jn	(S1)	"(S2)"	(D1)	(D2)	
JP.SREAD	JP.SREAD	Jn	(S1)	"(S2)"	(D1)	(D2)	(D3)

[Network module start I/O No. specification]

[Instruction symbol] [Execution condition]



GP.READ	GP.READ	Un	(S1)	"(S2)"	(D1)	(D2)	
GP.SREAD	GP.SREAD	Un	(S1)	"(S2)"	(D1)	(D2)	(D3)

*2: The SREAD instruction can be programmed without argument (D3).
However, in such a case, the operation is identical to the READ instruction.
With the SREAD instruction, different operations are available depending on whether (D3) is omitted or not.

*3: When the target station is a Basic model QCPU or safety CPU, the read notification device set as argument (D3) for the target station is ignored. (Same operation as with the READ instruction)

Setting data

Setting data ＊4	Description	Setting side ＊5	Data type
Jn	Network No. of the host station (1 to 239, 254) 254: The network specified in Valid module during other station access	User	Binary 16 bits
Un	Start I/O number of the host station's network module (00 to FE$_H$: The higher two digits of the 3-digit I/O number)		
(S1)	Start device of the host station that stores control data	User, system	Device name
(S2)	Target station's start device where data to be read are stored	User	
(D1)	The host station's start device where readout data will be stored (A contiguous area for the read data length is required.)	System	
(D2)	The host station's device that is turned on for one scan upon completion of the instruction (D2)+1 also turns on if the instruction execution has failed.		Bit
(D3)	The target station's device that is turned on for one scan upon completion of the instruction. (The target station can recognize that data have been read out to the other station.)		

＊4: Local devices and file registers for each program cannot be used as devices in setting data.

＊5: The setting side is as shown below.

User : It is data the user sets in the sequence program before execution of a link dedicated instruction.

System: The programmable controller CPU stores the execution result of the link dedicated instruction.

Control data

<table>
<tr><th>Device</th><th>Item</th><th>Setting data</th><th>Setting range</th><th>Setting side ✻5</th></tr>
<tr><td>(S1)+0</td><td>Error completion type</td><td><table><tr><td>b15</td><td>to</td><td>b7</td><td>to</td><td>b0</td></tr><tr><td colspan="2">0</td><td>1)</td><td>0</td><td>1</td></tr></table>1) Error completion type (bit 7)
Specify the clock data setup status for error completion.
0: Clock data at the time of error completion is not set in the area starting from (S1)+11.
1: Clock data at the time of error completion is set in the area starting from (S1)+11.</td><td>0001_H
0081_H</td><td>User</td></tr>
<tr><td>(S1)+1</td><td>Completion status</td><td>The instruction completion status is stored.
0 : Normal
Other than 0 : Error (Refer to Section 8.3 for error codes)</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+2</td><td>Channel used by host station</td><td>Specify the channel used by the host station.
1 to 8: Channel</td><td>1 to 8</td><td>User</td></tr>
<tr><td>(S1)+3</td><td>Target station's CPU type</td><td>Specify the CPU module on the station to be accessed.<table><tr><th>Setting value</th><th>Description</th></tr><tr><td>0000_H</td><td>Target station CPU/control CPU/own system CPU
Control CPU (The access target is the same as when "$03FF_H$" is specified.)</td></tr><tr><td>$03D0_H$ ✻6</td><td>Control system CPU</td></tr><tr><td>$03D1_H$ ✻6</td><td>Standby system CPU</td></tr><tr><td>$03D2_H$ ✻6</td><td>System A CPU</td></tr><tr><td>$03D3_H$ ✻6</td><td>System B CPU</td></tr><tr><td>$03E0_H$ ✻7</td><td>• Control CPU (single CPU system)
• Multiple CPU system No.1</td></tr><tr><td>$03E1_H$ ✻7</td><td>Multiple CPU system No.2</td></tr><tr><td>$03E2_H$ ✻7</td><td>Multiple CPU system No.3</td></tr><tr><td>$03E3_H$ ✻7</td><td>Multiple CPU system No.4</td></tr><tr><td>$03FF_H$ ✻6</td><td>Control CPU</td></tr></table>When the instruction is executed with control system CPU ($03D0_H$) or standby system CPU ($03D1_H$) specified, if system switching occurs at the target station, the instruction execution may fail. (Error code: 4244_H, 4248_H)
If the instruction has failed with the above error, execute it again.</td><td>0000_H
$03D0_H$ to $03D3_H$
$03E0_H$ to $03E3_H$
$03FF_H$</td><td>User</td></tr>
<tr><td>(S1)+4</td><td>Target station network No.</td><td>Specify the network No. of the target station.
1 to 239 : Network No.
254 : Specify this when 254 has been set in Jn.</td><td>1 to 239
254</td><td>User</td></tr>
<tr><td>(S1)+5</td><td>Target station No.</td><td>Specify the station No. of the target station.
1 to 64: Station No.</td><td>1 to 64</td><td>User</td></tr>
<tr><td>(S1)+6</td><td>(Use prohibited)</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td rowspan="2">(S1)+7</td><td rowspan="2">Number of resends</td><td>1) For instruction execution
Specify the number of times the instruction is to be resent when it is not completed within the monitoring time specified in (S1)+8.</td><td>0 to 15</td><td>User</td></tr>
<tr><td>2) At instruction completion
The number of resends executed (result) is stored.</td><td>—</td><td>System</td></tr>
</table>

(Continued to the next page)

✻5: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

✻6: The CPU type can be specified when the host station is a network module of which function version is either D or later or the following.
- Network module: Serial number (first five digits) "10101" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

✻7: The CPU type can be specified when the QCPUs and network modules of the host station or target station are the following versions.
- Network module: Serial number (first five digits) "06092" or later
- QCPU: Serial number (first five digits) "06092" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

<table>
<tr><th>Device</th><th>Item</th><th>Setting data</th><th>Setting range</th><th>Setting side ＊5</th></tr>
<tr><td>(S1)+8</td><td>Arrival monitoring time</td><td>Specify the monitoring time required for instruction completion.
If an instruction is not completed within this time, it will be resent the number of times specified in (S1)+7.
0 : 10 seconds
1 to 32767 : 1 to 32767 seconds</td><td>0 to 32767</td><td>User</td></tr>
<tr><td>(S1)+9</td><td>Read data length</td><td>Specify the size of the read data. (Refer to Section 2.2.1)
1 to 960: Number of read data (words)</td><td>1 to 960</td><td>User</td></tr>
<tr><td>(S1)+10</td><td>(Use prohibited)</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td>(S1)+11</td><td>Clock set flag</td><td>The valid or invalid status of the data in the area starting from (S1)+12 is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
0: Invalid
1: Valid</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+12
to
(S1)+15</td><td>Clock data on error completion</td><td>Clock data on error completion are stored in BCD format.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
<table>
<tr><th></th><th>b15 to b8</th><th>b7 to b0</th></tr>
<tr><td>(S1)＋12</td><td>Month (01_H to 12_H)</td><td>Year (00_H to 99_H), Last 2 digits</td></tr>
<tr><td>(S1)＋13</td><td>Hour (00_H to 23_H)</td><td>Date (01_H to 31_H)</td></tr>
<tr><td>(S1)＋14</td><td>Second (00_H to 59_H)</td><td>Minute (00_H to 59_H)</td></tr>
<tr><td>(S1)＋15</td><td>Year (00_H to 99_H), First 2 digits</td><td>Day of the week (00_H to 06_H)</td></tr>
</table>
00_H (Sun.) to 06_H (Sat.)
When the target station is QnACPU, "00_H" is stored in the Year field (first two digits of the year).
(Clock data will not be stored when errors have been completed in the case of the ACPU.)</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+16</td><td>Error-detected network No. ＊8</td><td>Network No. of the station, where an error was detected, is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
1 to 239: Network No.</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+17</td><td>Error-detected station No. ＊8</td><td>Station No. of the station, where an error was detected, is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
1 to 64: Station No.</td><td>—</td><td>System</td></tr>
</table>

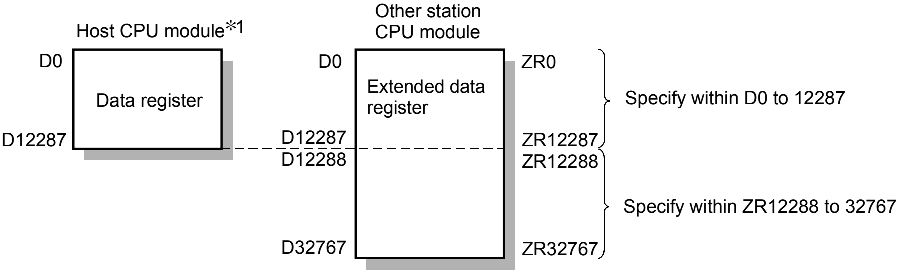
＊5: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

＊8: Data is not stored when Completion status (S1)+1 is "Host station channel in use ($F7C1_H$)".

POINT

(1) Specify the device of the other station CPU module to be read with the READ/SREAD instruction within the range available for the host CPU module.
(Head device No. (S2) of read target of other station CPU module) + (Number of read points - 1) ≤ (Last device No. of host CPU module ∗)
∗: Last device number at the host CPU module having the same device name as (S2)

(2) Use the file register (ZR) when specifying the extended data register (D) or the extended link register (W) that are out of area of the data register (D) or the link register (W) on the host CPU module respectively. (excluding the Universal model QCPU)
For calculating a area for the file register (ZR), refer to the user's manual (Function Explanation, Program Fundamentals) of the CPU module used.
(Example) When not assigning the data register (D) of the other station CPU module, or assigning all of the 32K points of the file register (ZR) to the extended data register (D).



∗1 File register with 32K points or more is required for the host CPU.

(3) Number of resends ((S1)+7) requires to be set every time an instruction is executed.

2) JP/GP.WRITE and JP/GP.SWRITE
These instructions are used to write data to devices of a programmable controller on another station. (In units of words)
With the SWRITE instruction, a device on another station turns on when data writing is completed. (The other station can recognize that data have been written with the SWRITE instruction.)

Applicable device

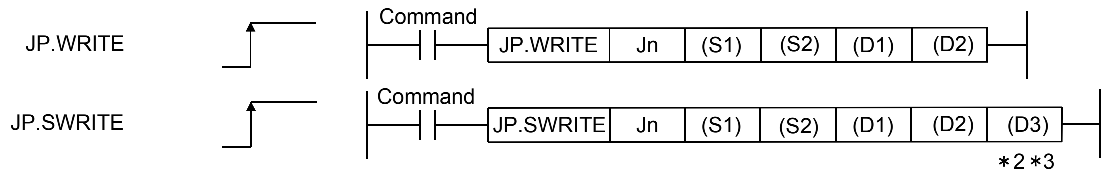
Setting data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(S2)	—	○		—					
(D1)	○*1			—					
(D2)	○			—					
(D3)	○			—					

*1: T, C, D, W, ST, SD, or SW can be used.
For SD/SW, data can be written within the setting range allowed for the user.
For details of SD/SW, refer to the manual for the programmable controller CPU or network module of the target station.

Instruction format

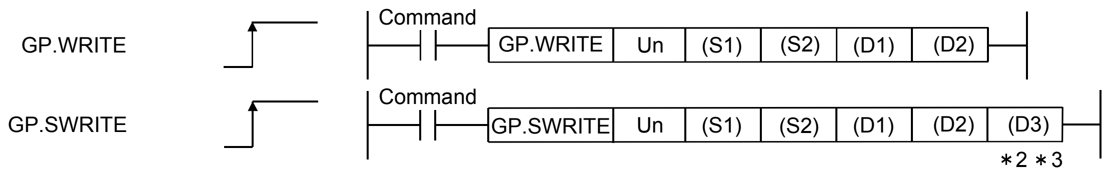
[Network No. specification]

[Instruction symbol] [Execution condition]



[Network module start I/O No. specification]

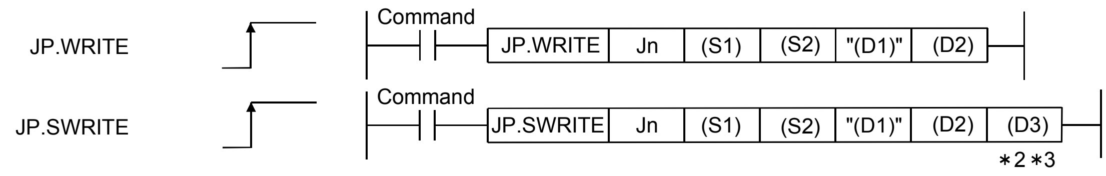
[Instruction symbol] [Execution condition]



The following formats can be used only when the host is the Universal model QCPU

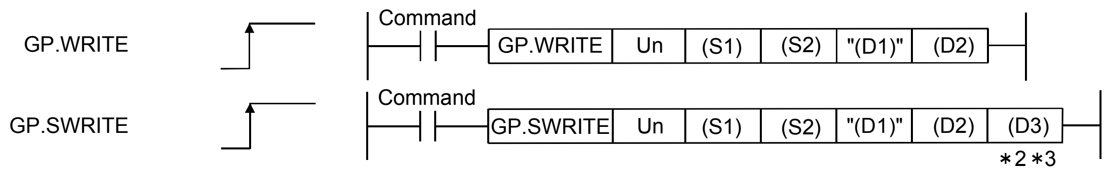
[Network No. specification]

[Instruction symbol] [Execution condition]



[Network module start I/O No. specification]

[Instruction symbol] [Execution condition]



*2: The SWRITE instruction can be programmed without argument (D3).
However, in such a case, the operation is identical to the WRITE instruction.
With the SWRITE instruction, different operations are available depending on whether (D3) is omitted or not.

*3: When the target station is a Basic model QCPU or safety CPU, the write notification device set as argument (D3) for the target station is ignored. (Same operation as with the WRITE instruction)

Setting data

Setting data ＊4	Description	Setting side ＊5	Data type
Jn	Network No. of the host station (1 to 239, 254) 254: The network specified in Valid module during other station access	User	Binary 16 bits
Un	Start I/O number of the host station's network module (00 to FE$_H$: The higher two digits of the 3-digit I/O number)		
(S1)	Start device of the host station that stores control data	User, system	Device name
(S2)	The host station's start device where write data are stored.	User	
(D1)	Target station's start device to which data are to be written. (A contiguous area for the write data length is required.)		
(D2)	The host station's device that is turned on for one scan upon completion of the instruction (D2)+1 also turns on if the instruction execution has failed.	System	Bit
(D3)	The target station's device that is turned on for one scan upon completion of the instruction (The target station can recognize that data have been written from the other station.)		

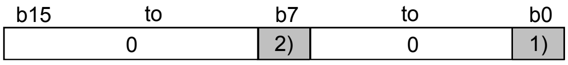
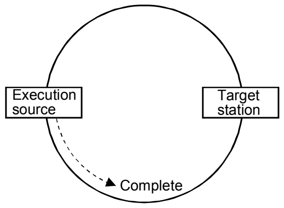
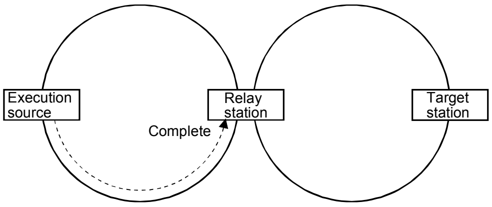
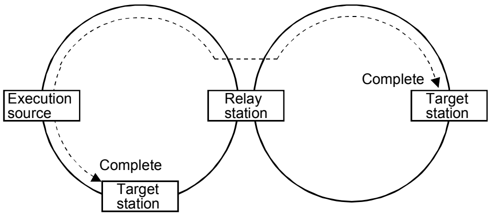
＊4: Local devices and file registers for each program cannot be used as devices in setting data.

＊5: The setting side is as shown below.

User : It is data the user sets in the sequence program before execution of a link dedicated instruction.

System: The programmable controller CPU stores the execution result of the link dedicated instruction.

Control data

Device	Item	Setting data	Setting range	Setting side ＊5
(S1)+0	Execution/Error completion type	 1) Execution type (bit 0) 0: No arrival confirmation • When the target station is on the same network Completed when data are sent from the host station.  • When the target station is on another network Completed when data reach a relay station on the same network.  1: With arrival confirmation Completed when data are written to the target station.  When "0: No arrival confirmation" is specified, even if writing to the target station is terminated abnormally in the following cases, it is normal completion on the host station. • Communication itself was completed normally, although the data sent were erroneous. • Data could not be written to the target station because instructions from multiple stations were sent to the same station. (An error code ($F222_H$) is detected on the target station.) 2) Error completion type (bit 7) Specify the clock data setup status at abnormal completion. 0: Clock data at the time of error completion is not set in the area starting from (S1)+11. 1: Clock data at the time of error completion is set in the area starting from (S1)+11.	0000_H 0001_H 0080_H 0081_H	User
(S1)+1	Completion status	The instruction completion status is stored. 0 : Normal Other than 0 : Error (Refer to Section 8.3 for error codes)	—	System
(S1)+2	Channel used by host station	Specify the channel used by the host station. 1 to 8: Channel	1 to 8	User

(Continued to the next page)

＊5: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

<table>
<tr><th>Device</th><th>Item</th><th>Setting data</th><th>Setting range</th><th>Setting side *5</th></tr>
<tr><td>(S1)+3</td><td>Target station's CPU type</td><td>Specify the CPU module on the station to be accessed.
<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>0000_H</td><td>Control CPU (The access target is the same as when "$03FF_H$" is specified.)</td></tr>
<tr><td>$03D0_H$ *6</td><td>Control system CPU</td></tr>
<tr><td>$03D1_H$ *6</td><td>Standby system CPU</td></tr>
<tr><td>$03D2_H$ *6</td><td>System A CPU</td></tr>
<tr><td>$03D3_H$ *6</td><td>System B CPU</td></tr>
<tr><td>$03E0_H$ *7</td><td>• Control CPU (single CPU system)
• Multiple CPU system No.1</td></tr>
<tr><td>$03E1_H$ *7</td><td>Multiple CPU system No.2</td></tr>
<tr><td>$03E2_H$ *7</td><td>Multiple CPU system No.3</td></tr>
<tr><td>$03E3_H$ *7</td><td>Multiple CPU system No.4</td></tr>
<tr><td>$03FF_H$ *6</td><td>Control CPU</td></tr>
</table>
When the instruction is executed with control system CPU ($03D0_H$) or standby system CPU ($03D1_H$) specified, if system switching occurs at the target station, the instruction execution may fail. (Error code: 4244_H, 4248_H)
If the instruction has failed with the above error, execute it again.</td><td>0000_H
$03D0_H$ to $03D3_H$
$03E0_H$ to $03E3_H$
$03FF_H$</td><td>User</td></tr>
<tr><td>(S1)+4</td><td>Target station network No.</td><td>Specify the network No. of the target station.
1 to 239 : Network No.
254 : Specify this when 254 has been set in Jn.</td><td>1 to 239
254</td><td>User</td></tr>
<tr><td>(S1)+5</td><td>Target station No. *8</td><td>Specify the station No. of the target station.
1) Station No. specification
1 to 64 : Station No.
(To increase the reliability of data, it is recommended to execute the instruction with the execution type in (S1)+0 set to "1: With arrival confirmation".)
2) Group specification
81_H to $A0_H$: All stations in group No.1 to 32
(Setting is available when the execution type is set to "0: No arrival confirmation" in (S1)+0.)
3) All stations specification
FF_H : All stations of the target network No. (Except the host station)
(Setting is available when the execution type is set to "0: With arrival confirmation" in (S1)+0.)
When a group is specified, set the group No. of the target station with the network parameters from GX Developer.</td><td>1 to 64
81_H to $A0_H$
FF_H</td><td>User</td></tr>
</table>

(Continued to the next page)

*5: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

*6: The CPU type can be specified when the host station is a network module of which function version is either D or later or the following.
- Network module: Serial number (first five digits) "10101" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

*7: The CPU type can be specified when the QCPUs and network modules of the host station or target station are the following versions.
- Network module: Serial number (first five digits) "06092" or later
- QCPU: Serial number (first five digits) "06092" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

*8: When a CPU in a multiple CPU system is specified for the target station CPU type ((S1)+3) and group specification (81_H to $A0_H$) or all stations (FF_H) is specified for the target station number ((S1)+5), the instruction is executed for only the system where the CPU in the multiple CPU system specified for the target station CPU type is the control CPU of the target station.
Refer to Section 2.2.2 (5) for details.

<table>
<tr><th>Device</th><th>Item</th><th>Setting data</th><th>Setting range</th><th>Setting side ＊5</th></tr>
<tr><td>(S1)+6</td><td>(Use prohibited)</td><td>–</td><td>–</td><td>–</td></tr>
<tr><td rowspan="2">(S1)+7</td><td rowspan="2">Number of resends</td><td>1) For instruction execution
Specify the number of times the instruction is to be resent when it is not completed within the monitoring time specified in (S1)+8.
(Setting is available when the execution type is set to "1: With arrival confirmation" in (S1)+0.)</td><td>0 to 15</td><td>User</td></tr>
<tr><td>2) At instruction completion
The number of resends executed (result) is stored.
(Setting is valid when the execution type is set to "1: With arrival confirmation" in (S1)+0.)</td><td>–</td><td>System</td></tr>
<tr><td>(S1)+8</td><td>Arrival monitoring time</td><td>Specify the monitoring time required for instruction completion.
(Setting is available when the execution type is set to "1: With arrival confirmation" in (S1)+0.)
If an instruction is not completed within this time, it will be resent the number of times specified in (S1)+7.
0 : 10 seconds
1 to 32767 : 1 to 32767 seconds</td><td>0 to 32767</td><td>User</td></tr>
<tr><td>(S1)+9</td><td>Write data length</td><td>Specify the write data size of (S2) to (S2)+n. (Refer to Section 2.2.1)
1 to 960: Number of write data (words)</td><td>1 to 960</td><td>User</td></tr>
<tr><td>(S1)+10</td><td>(Use prohibited)</td><td>–</td><td>–</td><td>–</td></tr>
<tr><td>(S1)+11</td><td>Clock set flag</td><td>Whether data stored in (S1) + 12 or later is enabled is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
0: Invalid
1: Valid</td><td>–</td><td>System</td></tr>
<tr><td>(S1)+12
to
(S1)+15</td><td>Clock data on error completion</td><td>Clock data on error completion are stored in BCD format.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
<table>
<tr><th></th><th>b15 to b8</th><th>b7 to b0</th></tr>
<tr><td>(S1)＋12</td><td>Month (01_H to 12_H)</td><td>Year (00_H to 99_H), Last 2 digits</td></tr>
<tr><td>(S1)＋13</td><td>Hour (00_H to 23_H)</td><td>Date (01_H to 31_H)</td></tr>
<tr><td>(S1)＋14</td><td>Second (00_H to 59_H)</td><td>Minute (00_H to 59_H)</td></tr>
<tr><td>(S1)＋15</td><td>Year (00_H to 99_H), First 2 digits</td><td>Day of the week (00_H to 06_H)</td></tr>
</table>
00_H (Sun.) to 06_H (Sat.)
When the target station is QnACPU, "00_H" is stored in the Year field (first two digits of the year).
(Clock data will not be stored when errors have been completed in the case of the ACPU.)</td><td>–</td><td>System</td></tr>
<tr><td>(S1)+16</td><td>Error-detection network No. ＊9</td><td>The network number of the station where an error has been detected is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
1 to 239: Network No.</td><td>–</td><td>System</td></tr>
<tr><td>(S1)+17</td><td>Error-detection station No. ＊9</td><td>The station number of the station where an error has been detected is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
1 to 64: Station No.</td><td>–</td><td>System</td></tr>
</table>

＊5: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

＊9: Data is not stored when Completion status (S1) + 1 is "Host station channel in use ($F7C1_H$)".

POINT

(1) Specify the device of the other station CPU module to be written with the WRITE/SWRITE instruction within the range available for the host CPU module.

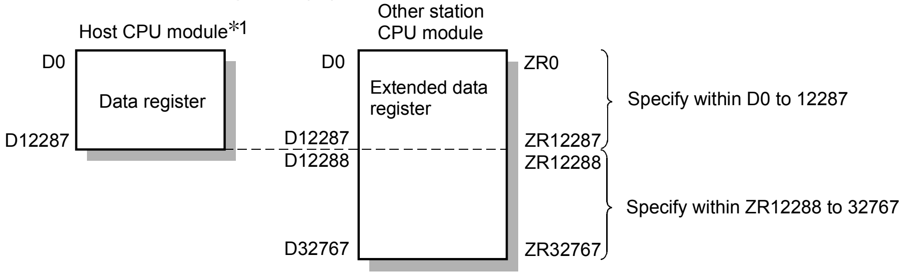
(Head device No. (D1) of write target of other station CPU module) + (Number of write points - 1) ≤ (Last device No. of host CPU module ＊)

＊: Last device number at the host CPU module having the same device name as (D1)

(2) Use the file register (ZR) when specifying the extended data register (D) or the extended link register (W) that are out of area of the data register (D) or the link register (W) on the host CPU module respectively. (excluding the Universal model QCPU)

For calculating a area for the file register (ZR), refer to the user's manual (Function Explanation, Program Fundamentals) of the CPU module used.

(Example) When not assigning the data register (D) of the other station CPU module, or assigning all of the 32K points of the file register (ZR) to the extended data register (D).

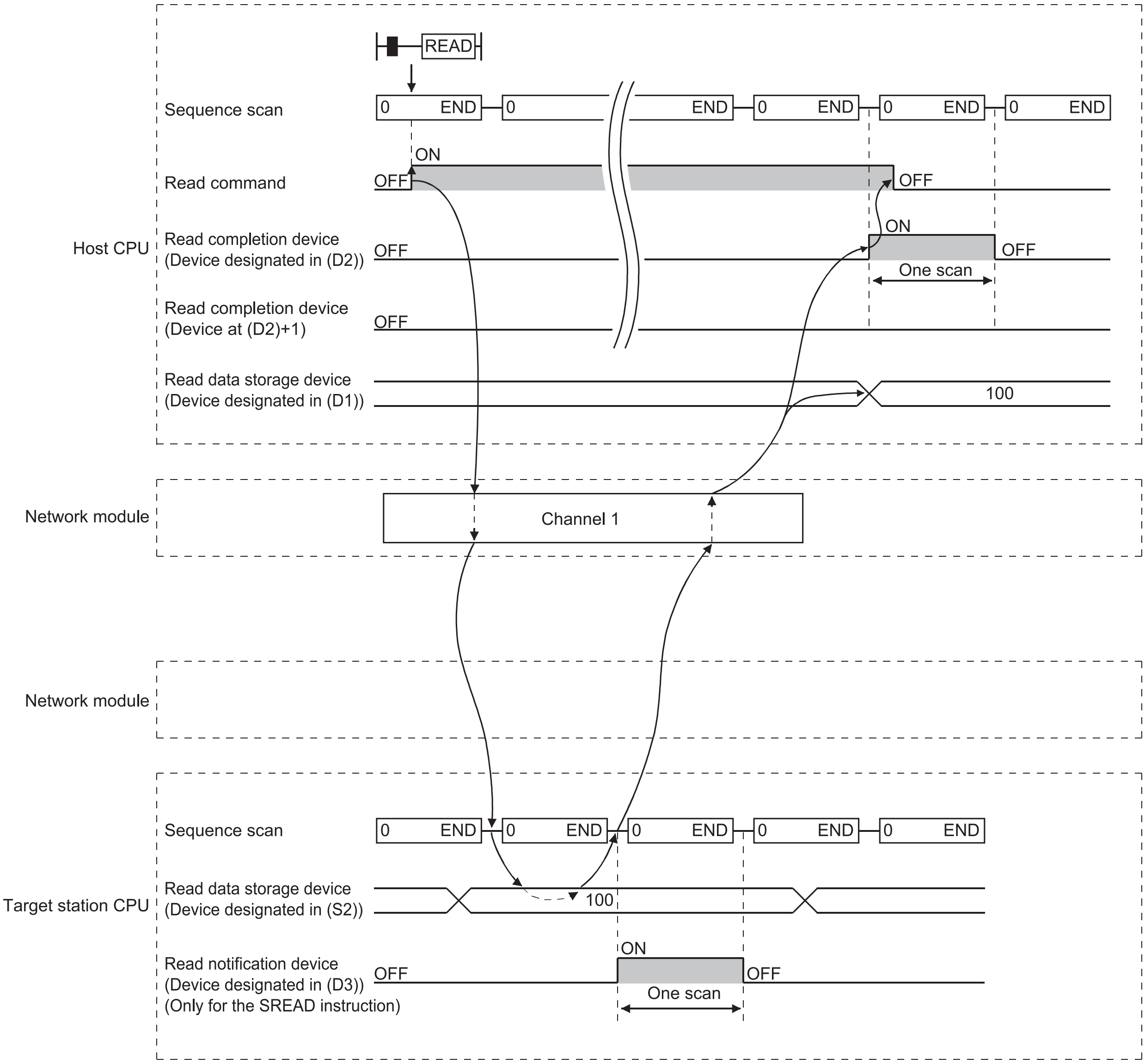


＊1 File register with 32K points or more is required for the host CPU.

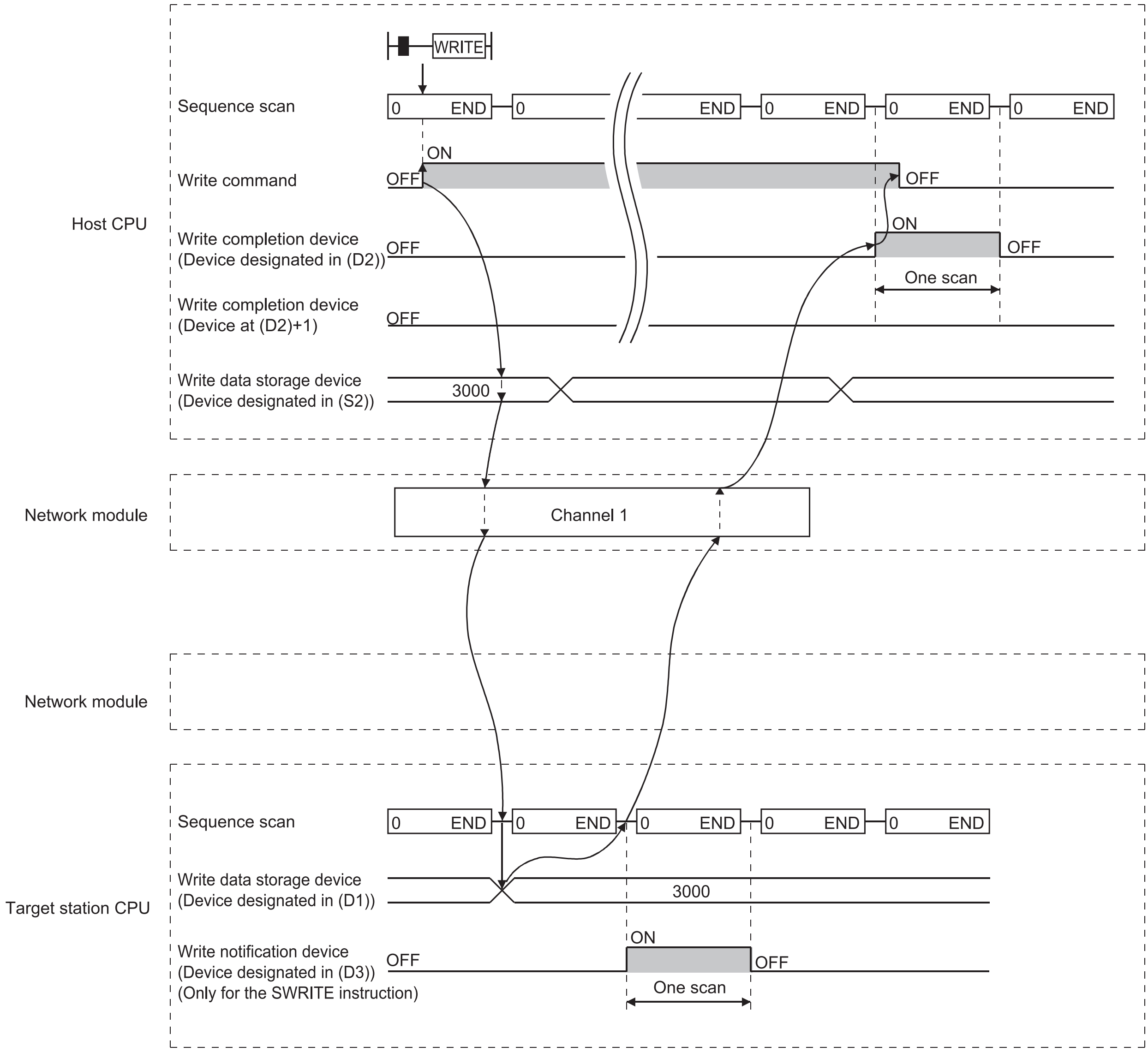
(3) Number of resends ((S1)+7) requires to be set every time an instruction is executed.

(b) Instruction execution timing

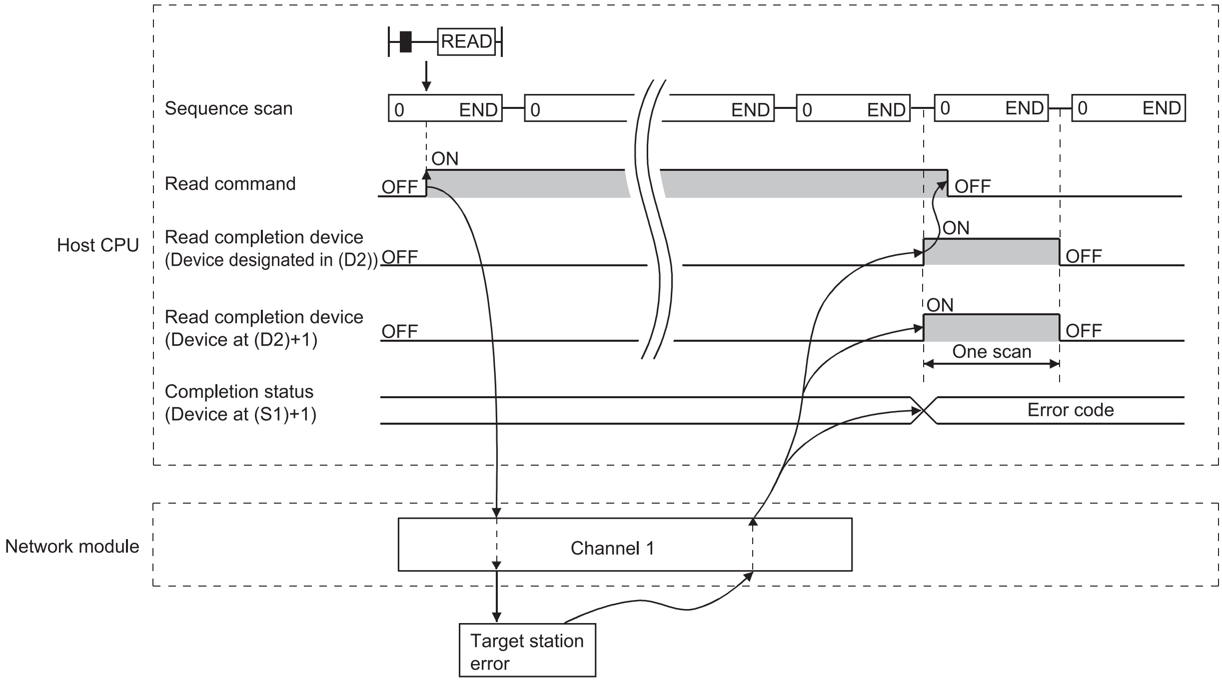
1) Normal completion
[READ and SREAD instructions]



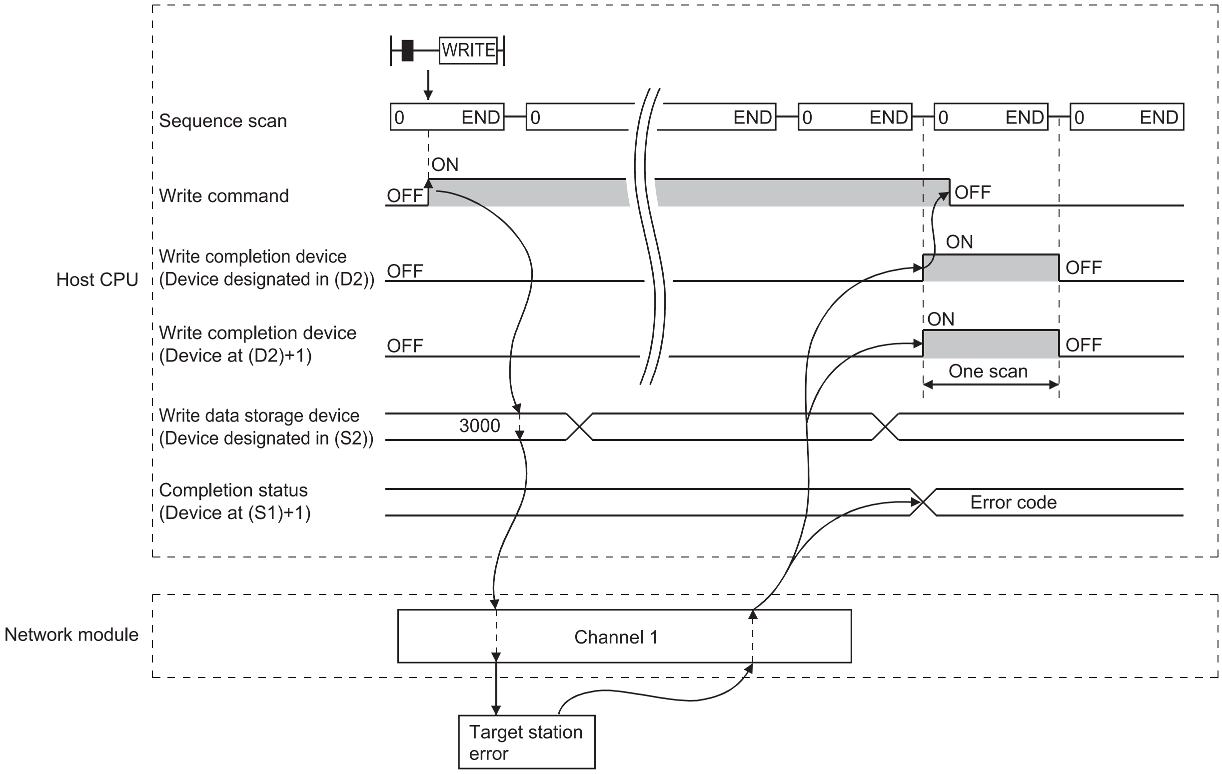
[WRITE and SWRITE instructions]



2) Abnormal completion
[READ and SREAD instructions]



[WRITE and SWRITE instructions]

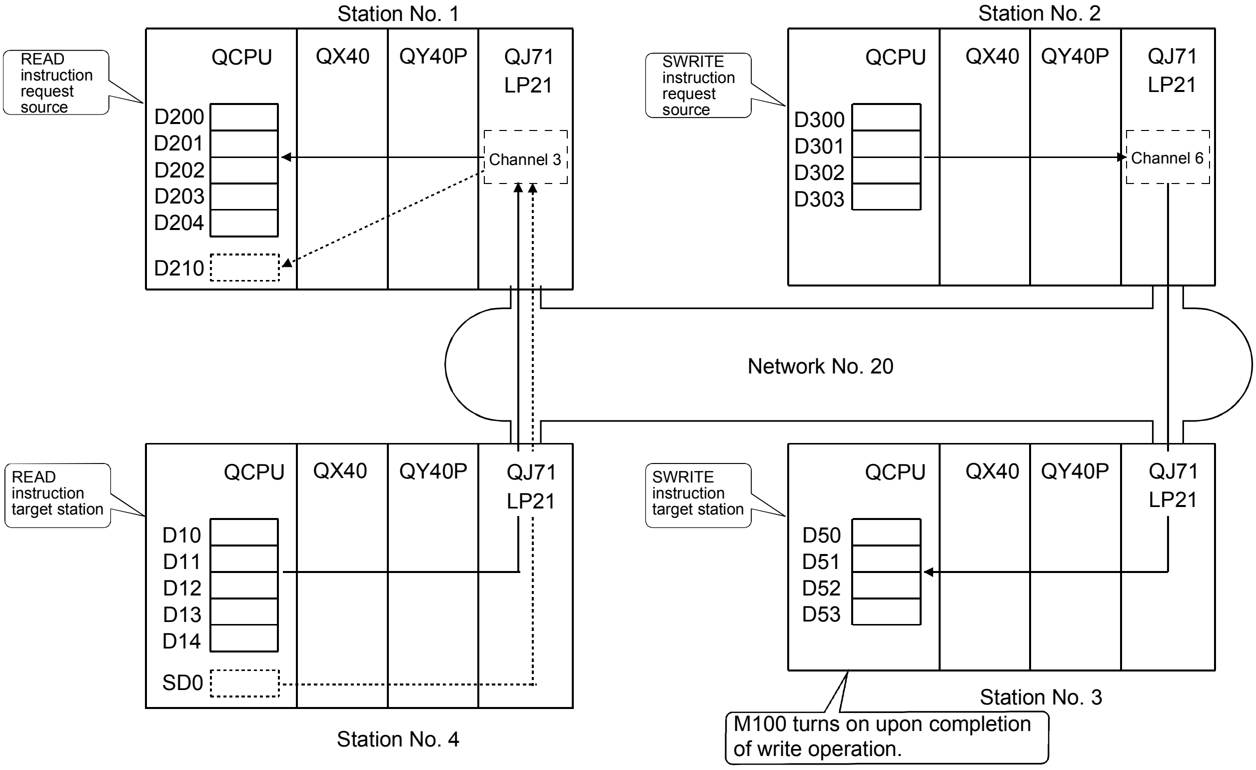


(c) Program example

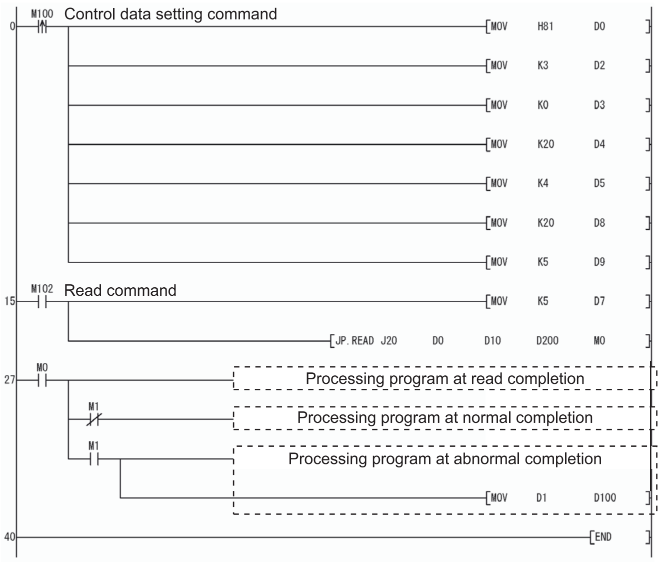
Read the data in D10 to D14 of station number 4 to D200 to D204 of station number 1.

Read the data in SD0 (diagnostic error) of station number 4 to D210 of station number 1.

Write the data stored in D300 to D303 of station number 2 to D50 to D53 of station number 3.



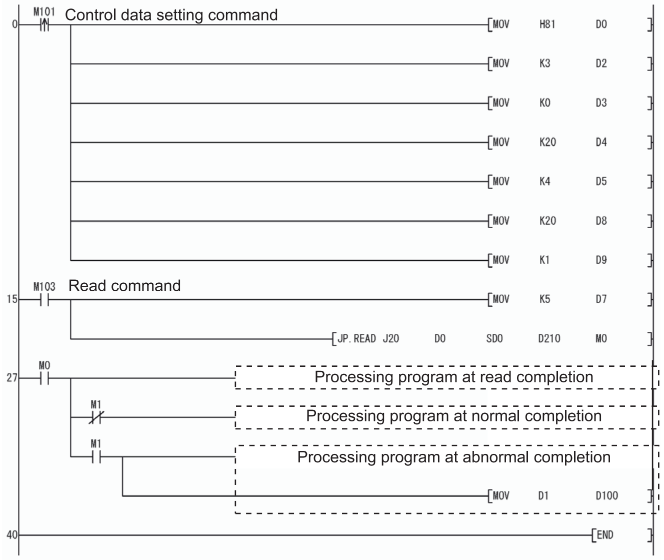
1) Program for station number 1 (READ instruction)
When actually using the following program, provide interlocks in the program referring to Section 6.1.
(When reading the data in D10 to D14 of station number 4 to D200 to D204 of station number 1)



Set clock data
Channel used by the host
Target station CPU type
Target station network No.
Target station number
Arrival monitoring time (20s)
Read data length (5 words)
Number of resends
Read error code, etc.

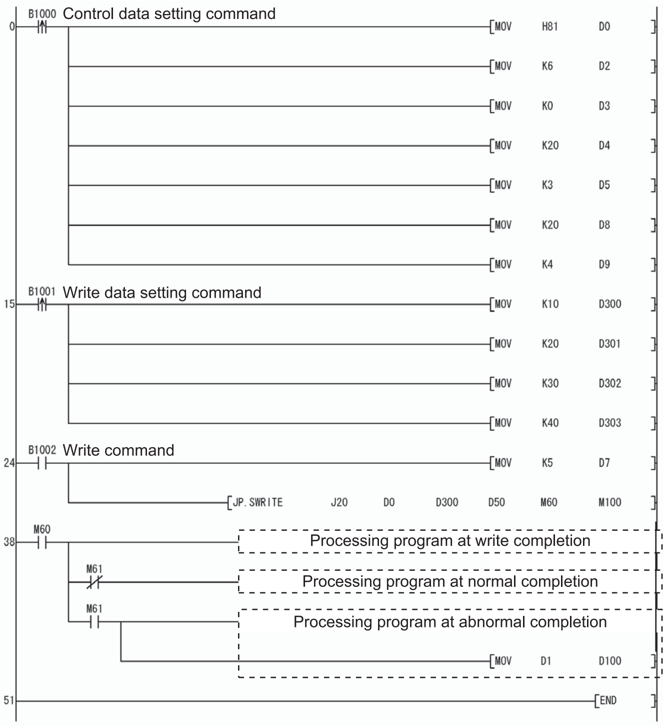
(When reading the data in SD0 (diagnostic error) of station number 4 to D210 of station number 1)

Read the data in SD0 of station number 4



Set clock data
Channel used by the host
Target station CPU type
Target station network No.
Target station number
Arrival monitoring time (20s)
Read data length (1 words)
Number of resends
Read error code, etc.

2) Program for station number 2 (SWRITE instruction)
When actually using the following program, provide interlocks in the program referring to Section 6.1.



With arrival confirmation/set clock data
Channel used by the host
Target station CPU type
Target station network No.
Target station number
Arrival monitoring time (20s)
Write data length (4 words)
Write data
Number of resends
Read error code, etc.

7.4.5 (3) Requesting transient transmission to other stations (J(P)/G(P).REQ)

Target station
Refer to Section 6.3.

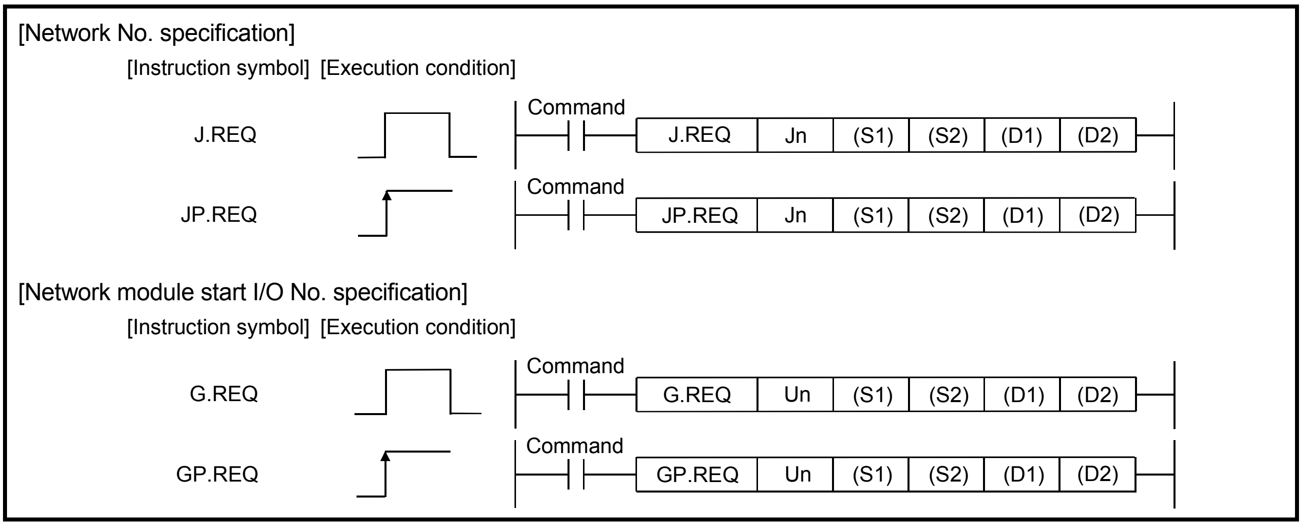
This instruction is used to send a transient transmission request to the programmable controller in other stations.

(a) Instruction format

Applicable device

Setting data	Applicable device								
	Internal device		File register	Link direct device J☐\☐		Intelligent function module device U☐\G☐	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
(S1)	–	○		–					
(S2)	–	○		–					
(D1)	–	○		–					
(D2)	○			–					

Instruction format



Setting data

Setting data ＊1	Description	Setting side ＊2	Data type
Jn	Network No. of the host station (1 to 239, 254) 254: The network specified in Valid module during other station access	User	Binary 16 bits
Un	Start I/O number of the host's station network module (00 to FE$_H$: The higher two digits of the 3-digit I/O number)		Character string
(S1)	Start device of the host station that stores control data	User, system	Device name
(S2)	Start device of the host station that stores request data	User	
(D1)	Start device of the host station that will store response data (Note that the data are stored only when reading the clock data)	System	
(D2)	The host station's device that is turned on for one scan upon completion of the instruction (D2)+1 also turns on if the instruction execution is failed.		Bit

＊1: Local devices and file registers for each program cannot be used as devices in setting data.

＊2: The setting side is as shown below.

User : It is data the user sets in the sequence program before execution of a link dedicated instruction.

System: The programmable controller CPU stores the execution result of the link dedicated instruction.

Control data

<table>
<tr><th>Device</th><th>Item</th><th>Setting data</th><th>Setting range</th><th>Setting side ＊2</th></tr>
<tr><td>(S1)+0</td><td>Error completion type</td><td>
<table>
<tr><td>b15</td><td>to</td><td>b7</td><td>to</td><td>b4</td><td>to</td><td>b0</td></tr>
<tr><td colspan="2">0</td><td>1)</td><td>0</td><td>1</td><td>0</td><td>1</td></tr>
</table>
1) Error completion type (bit 7)
Specify the clock data setup status for error completion.
0: Clock data at the time of error completion is not set in the area starting from (S1)+11.
1: Clock data at the time of error completion is set in the area starting from (S1)+11.</td><td>0011_H
0091_H</td><td>User</td></tr>
<tr><td>(S1)+1</td><td>Completion status</td><td>The instruction completion status is stored.
0 : Normal
Other than 0 : Error (Refer to Section 8.3 for error codes)</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+2</td><td>Channel used by host station</td><td>Specify the channel used by the host station.
1 to 8: Channel</td><td>1 to 8</td><td>User</td></tr>
<tr><td>(S1)+3</td><td>Target station's CPU type</td><td>Specify the CPU module on the station to be accessed.
<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>0000_H</td><td>Control CPU (The access target is the same as when "$03FF_H$" is specified.)</td></tr>
<tr><td>$03D0_H$ ＊3</td><td>Control system CPU</td></tr>
<tr><td>$03D1_H$ ＊3</td><td>Standby system CPU</td></tr>
<tr><td>$03D2_H$ ＊3</td><td>System A CPU</td></tr>
<tr><td>$03D3_H$ ＊3</td><td>System B CPU</td></tr>
<tr><td>$03E0_H$ ＊4</td><td>• Control CPU (single CPU system)
• Multiple CPU system No.1</td></tr>
<tr><td>$03E1_H$ ＊4</td><td>Multiple CPU system No.2</td></tr>
<tr><td>$03E2_H$ ＊4</td><td>Multiple CPU system No.3</td></tr>
<tr><td>$03E3_H$ ＊4</td><td>Multiple CPU system No.4</td></tr>
<tr><td>$03FF_H$ ＊3</td><td>Control CPU</td></tr>
</table>
When the instruction is executed with control system CPU ($03D0_H$) or standby system CPU ($03D1_H$) specified, if system switching occurs at the target station, the instruction execution may fail. (Error code: 4244_H, 4248_H)
If the instruction has failed with the above error, execute it again.</td><td>0000_H
$03D0_H$ to $03D3_H$
$03E0_H$ to $03E3_H$
$03FF_H$</td><td>User</td></tr>
<tr><td>(S1)+4</td><td>Target station network No.</td><td>Specify the network No. of the target station.
1 to 239 : Network No.
254 : Specify this when 254 has been set in Jn.</td><td>1 to 239
254</td><td>User</td></tr>
<tr><td>(S1)+5</td><td>Target station No. ＊5</td><td>Specify the station No. of the target station.
1) Station No. specification
1 to 64 : Station No.
2) Group specification
81_H to $A0_H$: All stations in group No.1 to 32
(Possible only for clock data write and remote RUN/STOP)
3) All stations specification
FF_H : All stations of the target network No. (Except the host station)
(Possible only for clock write read and remote RUN/STOP)
When a group is specified, set the group No. of the target station with the network parameters from GX Developer.</td><td>1 to 64
81_H to $A0_H$
FF_H</td><td>User</td></tr>
<tr><td>(S1)+6</td><td>(Use prohibited)</td><td>—</td><td>—</td><td>—</td></tr>
</table>

(Continued to the next page)

＊2: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

＊3: The CPU type can be specified when the host station is a network module of function version D or later.
- Network module: Serial number (first five digits) "10101" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

＊4: The CPU type can be specified when the QCPUs and network modules of the host station or target station are the following versions.
- Network module: Serial number (first five digits) "06092" or later
- QCPU: Serial number (first five digits) "06092" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

＊5: When a CPU in a multiple CPU system is specified for the target station CPU type ((S1)+3) and group specification (81_H to $A0_H$) or all stations (FF_H) is specified for the target station number ((S1)+5), the instruction is executed for only the system where the CPU in the multiple CPU system specified for the target station CPU type is the control CPU of the target station.
Refer to Section 2.2.2 (5) for details.

<table>
<tr><th>Device</th><th>Item</th><th>Setting data</th><th>Setting range</th><th>Setting side ＊2</th></tr>
<tr><td rowspan="2">(S1)+7</td><td rowspan="2">Number of resends</td><td>1) For instruction execution
Specify the number of times the instruction is to be resent when it is not completed within the monitoring time specified in (S1)+8.</td><td>0 to 15</td><td>User</td></tr>
<tr><td>2) At instruction completion
The number of resends executed (result) is stored.</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+8</td><td>Arrival monitoring time</td><td>Specify the monitoring time required for instruction completion.
If an instruction is not completed within this time, it will be resent the number of times specified in (S1)+7.
0 : 10 seconds
1 to 32767 : 1 to 32767 seconds</td><td>0 to 32767</td><td>User</td></tr>
<tr><td>(S1)+9</td><td>Request data length</td><td>Specify the request data size (words)
2: Clock data read
6: Clock data write
3: Remote STOP
4: Remote RUN</td><td>2 to 4, 6</td><td>User</td></tr>
<tr><td>(S1)+10</td><td>Response data length</td><td>The response data size (words) is stored.
6: Clock data read
2: Clock data write
2: Remote RUN/STOP</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+11</td><td>Clock set flag</td><td>The valid or invalid status of the data in the area starting from (S1)+12 is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
0: Invalid
1: Valid</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+12
to
(S1)+15</td><td>Clock data on error completion</td><td>Clock data on error completion are stored in BCD format.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
<table>
<tr><th></th><th>b15 to b8</th><th>b7 to b0</th></tr>
<tr><td>(S1)＋12</td><td>Month (01$_H$ to 12$_H$)</td><td>Year (00$_H$ to 99$_H$), Last 2 digits</td></tr>
<tr><td>(S1)＋13</td><td>Hour (00$_H$ to 23$_H$)</td><td>Day (01$_H$ to 31$_H$)</td></tr>
<tr><td>(S1)＋14</td><td>Second (00$_H$ to 59$_H$)</td><td>Minute (00$_H$ to 59$_H$)</td></tr>
<tr><td>(S1)＋15</td><td>Year (00$_H$ to 99$_H$), First 2 digits</td><td>Day of the week (00$_H$ to 06$_H$)</td></tr>
</table>
00$_H$ (Sun.) to 06$_H$ (Sat.)
When the target station is QnACPU, "00$_H$" is stored in the Year field (first two digits of the year).
(Clock data will not be stored when errors have been completed in the case of the ACPU.)</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+16</td><td>Error-detection network No. ＊6</td><td>Network No. of the station, where an error was detected, is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
1 to 239: Network No.</td><td>—</td><td>System</td></tr>
<tr><td>(S1)+17</td><td>Error-detection station No. ＊6</td><td>Station No. of the station, where an error was detected, is stored.
(Data are stored when "1: Clock data at the time of error completion is set in the area starting from (S1)+11." is set in the error completion type in (S1)+0).
Note that the stored value will not be cleared even after the dedicated instruction is completed.
1 to 64: Station No.</td><td>—</td><td>System</td></tr>
</table>

＊2: The setting side is as shown below.

User : It is data the user sets in the sequence program before execution of a link dedicated instruction.

System: The programmable controller CPU stores the execution result of the link dedicated instruction.

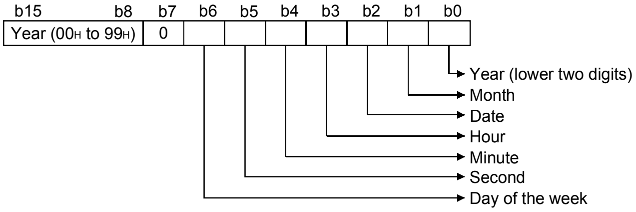
＊6: Data is not stored when Completion status (S1) + 1 is "Host station channel in use (F7C1$_H$)".

POINT

Number of resends ((S1)+7) requires to be set every time an instruction is executed.

1) Request data (S2)/response data(D1) (for reading/writing the clock data)

Request data (All set by the user)

Device	Item	Setting data	Clock data read	Clock data write
(S2)+0	Request type	0001_H: Clock data read 0011_H: Clock data write (when station No. is specified in (S1)+5) 0031_H: Clock data write (when all stations or a group is specified in (S1)+5)	○	○
(S2)+1	Sub-request type	0002_H: Clock data read 0001_H: Clock data write	○	○
(S2)+2	Change pattern, clock data to be changed	1) Change pattern (bit 0 to 7) Specify which items are to be written to the fields of (high byte of (S2)+2) to ((S2)+5). 0: Do not change 1: Change 2) Year data (bit 8 to 15) Specify the year (last two digits) as a BCD code. 	–	○
(S2) + 3	Clock data to be changed (continued)	Specify new clock data as BCD codes. b15 to b8 / b7 to b0 (S2)+3: Day (01_H to 31_H) / Month (01_H to 12_H) (S2)+4: Minute (00_H to 59_H) / Hour (00_H to 23_H) (S2)+5: Day of week (00_H to 06_H) / Second (00_H to 59_H) 00_H (Sun.) to 06_H (Sat.)	–	○
(S2) + 4			–	○
(S2) + 5			–	○

○: Set –: Not set

POINT

In clock data writing by the REQ instruction, the first two digits of the year cannot be changed.

To change the first two digits of the year data, modify the clock setting from GX Developer or with the RTMWR instruction.

- Setting the clock on the stations on a network with GX Developer (Refer to Section 7.4.6)
- Reading and writing clock data of other station CPU modules (Z(P).RTMRD, Z(P).RTMWR) (Refer to (6) of this section)

Response data (All set by the system) ∗7

<table>
<tr><th>Device</th><th>Item</th><th>Setting data</th><th>Clock data read</th><th>Clock data write</th></tr>
<tr><td>(D1)+0</td><td>Request type</td><td>0081$_H$: Clock data read
0091$_H$: Clock data write (when station No. is specified in (S1)+5)</td><td>○</td><td>○</td></tr>
<tr><td>(D1)+1</td><td>Sub-request type</td><td>0002$_H$: Clock data read
0001$_H$: Clock data write</td><td>○</td><td>○</td></tr>
<tr><td>(D1)+2</td><td rowspan="4">Clock data read</td><td rowspan="4">Clock data that have been read are stored as BCD codes.
<table>
<tr><th></th><th>b15 to b8</th><th>b7 to b0</th></tr>
<tr><td>(D1)+2</td><td>Month (01$_H$ to 12$_H$)</td><td>Year (00$_H$ to 99$_H$), Last 2 digits</td></tr>
<tr><td>(D1)+3</td><td>Hour (00$_H$ to 23$_H$)</td><td>Day (01$_H$ to 31$_H$)</td></tr>
<tr><td>(D1)+4</td><td>Second (00$_H$ to 59$_H$)</td><td>Minute (00$_H$ to 59$_H$)</td></tr>
<tr><td>(D1)+5</td><td>00$_H$</td><td>Day of week (00$_H$ to 06$_H$)
00$_H$ (Sun.) to 06$_H$ (Sat.)</td></tr>
</table></td><td>○</td><td>–</td></tr>
<tr><td>(D1)+3</td><td>○</td><td>–</td></tr>
<tr><td>(D1)+4</td><td>○</td><td>–</td></tr>
<tr><td>(D1)+5</td><td>○</td><td>–</td></tr>
</table>

○: Stored –: Not stored

∗7: When "all stations or a group (FF$_H$ or 81$_H$ to A0$_H$)" is specified in Target station No. ((S1)+5), no response data will be stored.

POINT

Clock data cannot be written when system protect is applied to the target station CPU module.

2) Request data (S2)/response data (D1) at remote RUN/STOP

Request data (All set by the user)

Device	Item	Setting data	Remote RUN	Remote STOP
(S2)+0	Request type	0010$_H$: When station No. is specified in (S1)+5 0030$_H$: When all stations or a group is specified in (S1)+5	○	○
(S2)+1	Sub-request type	0001$_H$: Remote RUN 0002$_H$: Remote STOP	○	○
(S2)+2	Operation mode	Specify whether to forcibly execute remote RUN/STOP or not. The forced execution is a function that forces a station which has stopped by remote STOP to RUN remotely from another station. • For remote RUN 0001$_H$: No forced execution 0003$_H$: Forced execution • For remote STOP 0003$_H$ (Fixed)	○	○
(S2)+3	Clear mode	Specify the CPU module device status for the case of remote RUN. 0000$_H$: Do not clear (Note that the local devices are cleared.) 0001$_H$: Clear (excluding the latch range) 0002$_H$: Clear (including the latch range) Clear mode ((S2)+3) allows specification of the CPU module device clear (initialization) process at the start of CPU module operation activated by remote RUN. The CPU module will perform the specified clear processing, and then it will run according to the setting that can be confirmed by [PLC parameters] - [PLC file] - [Initial Device value] in GX Developer.	○	—

○: Set —: Not set

Response data (All set by the system) ＊7

Device	Item	Setting data	Remote RUN	Remote STOP
(D1)+0	Request type	0090$_H$: When station No. is specified in (S1)+5	○	○
(D1)+1	Sub-request type	0001$_H$: Remote RUN 0002$_H$: Remote STOP	○	○

○: Stored —: Not stored

＊7: When "all stations or a group (FF$_H$ or 81$_H$ to A0$_H$)" is specified in Target station No. ((S1)+5), no response data will be stored.

POINT

(1) Remote RUN/STOP is available when the RUN/STOP switch of the target station CPU is set to "RUN".

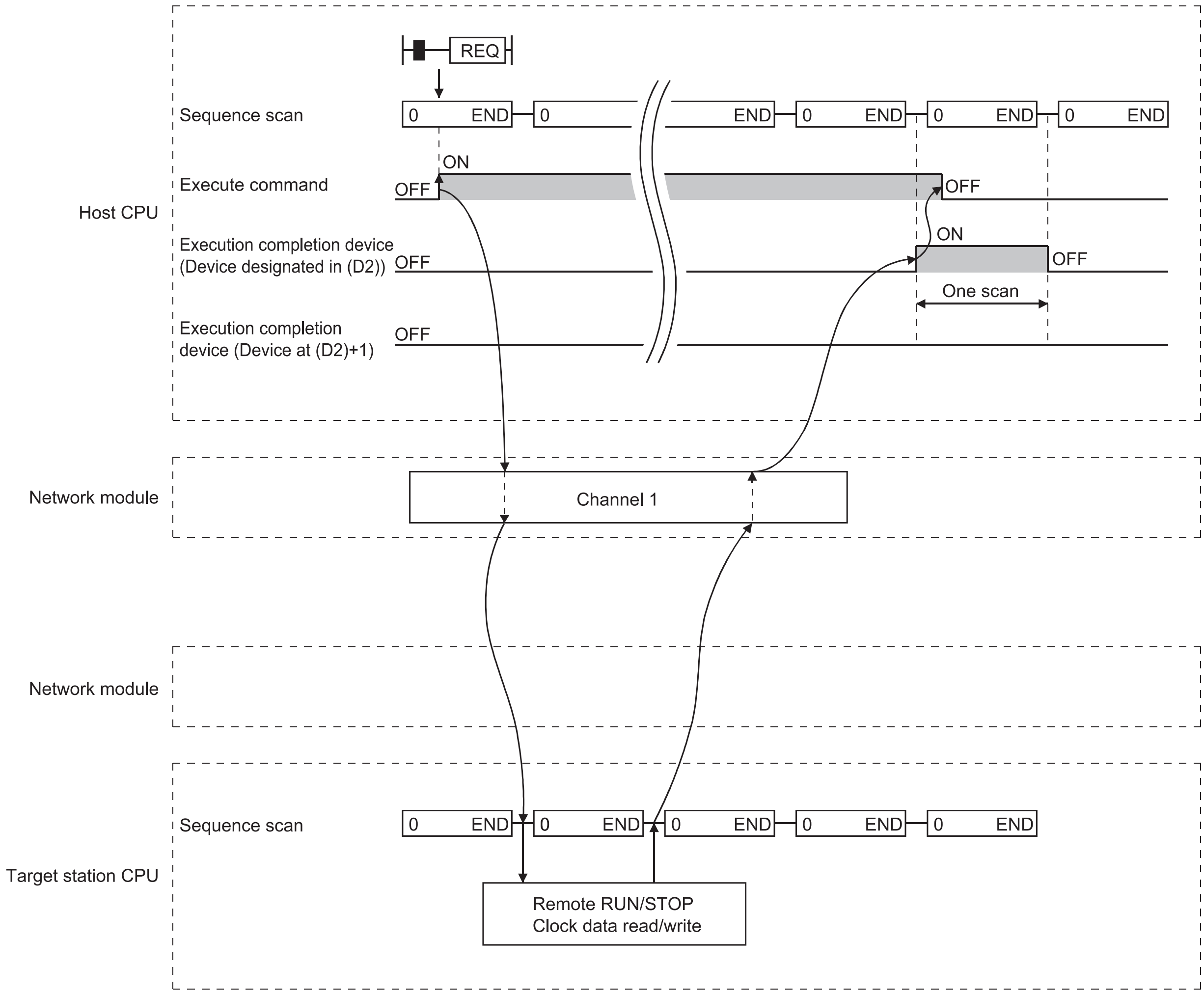
(2) Remote RUN/STOP is not executable when system protect is applied to the target station CPU module.

(3) When the target station CPU has been already in remote STOP/PAUSE state by a request from another station, it cannot enter RUN mode if Mode ((S2+2) is "No forced execution (0001$_H$)".

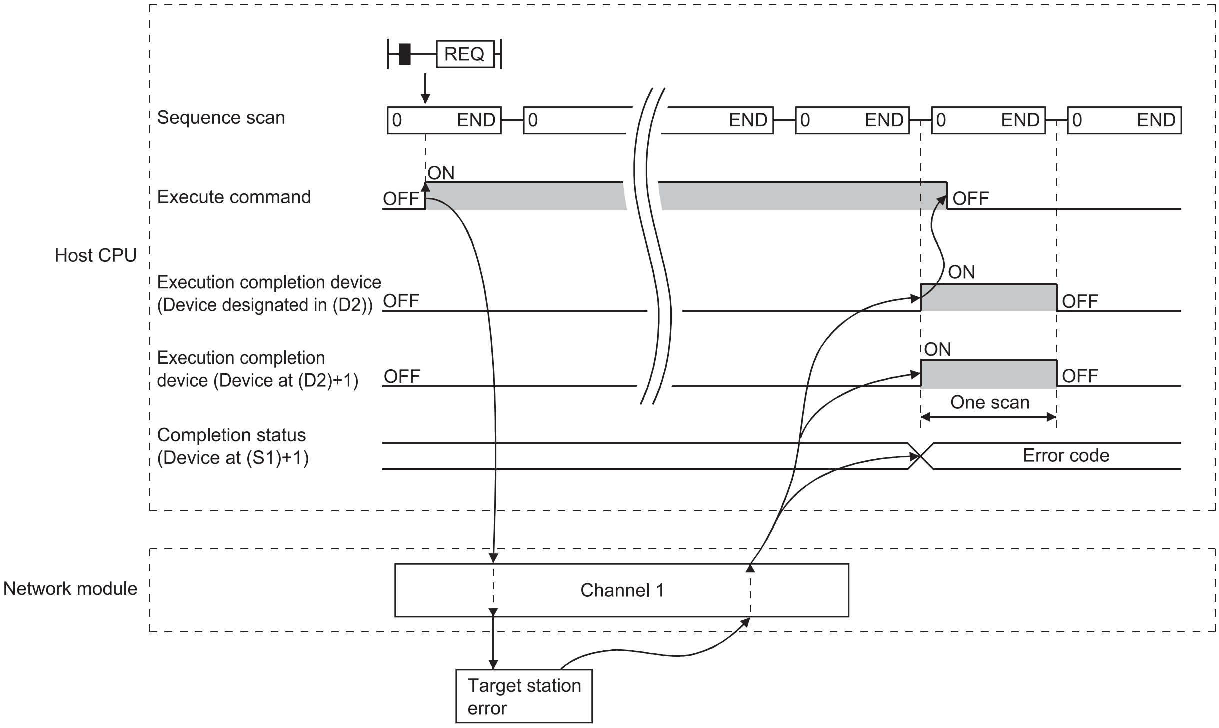
(4) If the target station CPU module, for which remote STOP was performed, is reset, the remote STOP information is erased.

(b) Instruction execution timing

1) Normal completion



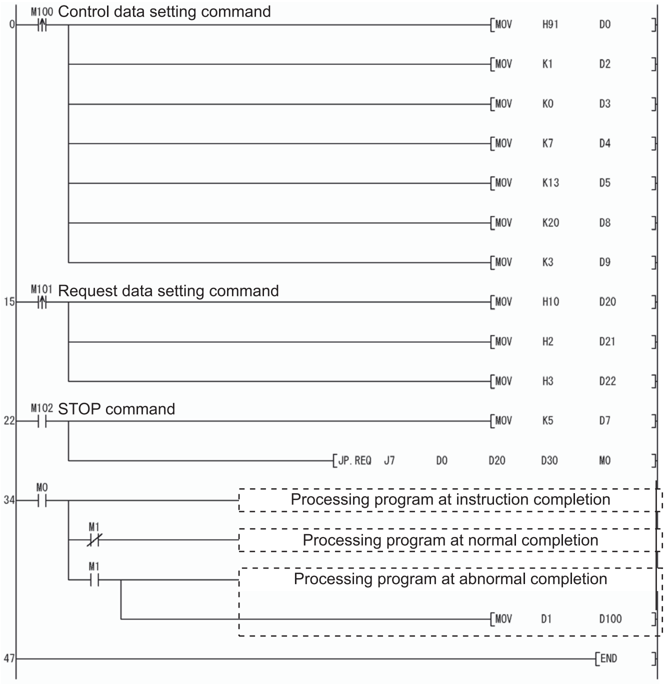
2) Abnormal completion



(c) Program example

The following example shows a program that stops the CPU module of station number 13 in network number 7.

When using the following program, provide interlocks in the program referring to Section 6.1.



Set clock data
Channel used by the host
Target station CPU type
Target station network No.
Target station number
Arrival monitoring time (20s)
Request data length (3 words)
Request type
Sub-request type
Mode
Number of resends
Read error code, etc.

7.4.5 (4) Reading/writing word devices of other stations (J(P).ZNRD, J(P).ZNWR)

Target station
Refer to Section 6.3.

(a) Instruction format

1) J(P).ZNRD

This instruction reads data from devices of a programmable controller on another station. (In units of words)

Applicable device

Setting data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
n1	○＊1			—				○	—
(S1)	—	○＊2	—	—				—	—
(D1)	—	○		—				—	—
n2	○＊1			—				○	—
(D2)	○			—				—	—

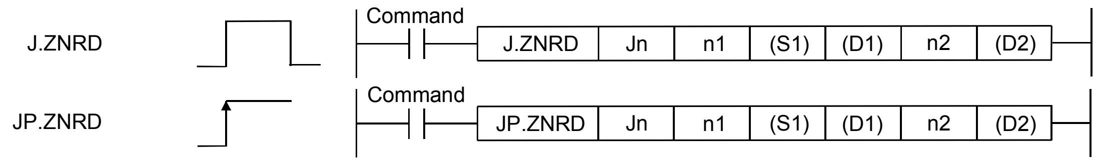
＊1: The number of digits of the bit device can be specified. (Number of digits of K, bit device start No.)

＊2: T, C, D or W can be used.

Instruction format

[Network No. specification]

[Instruction symbol] [Execution condition]



Setting data

Setting data ＊3 ＊4	Description	Setting side ＊5	Data type
Jn	Network No. of the target station (1 to 239)	User	Binary 16 bits
n1	Target station No. (1 to 64)		
(S1)	Target station's start device where data to be read are stored	—	Device name
(D1)	The host station's start device where readout data will be stored (A contiguous area for the read data length is required.)		
n2	Read data length When the target station is Q/R/L/QnA/AnUCPU: 1 to 230 words When the target station is other than Q/R/L/QnA/AnUCPU: 1 to 32 words	User	Binary 16 bits
(D2)	The own station's device that is turned on for one scan upon completion of the instruction (D2)+1 also turns on if the instruction execution is failed, and the error code is stored in the SW0031. (For the error code, refer to Section 8.3.)	System	Bit

＊3: Local devices and file registers for each program cannot be used as devices in setting data.

＊4: In addition to the setting data, the ZNRD instruction is executed using the following fixed values.
Channel used by host station: Channel 1
Arrival monitoring time (monitoring time until instruction completion): 10 seconds
Number of resends for arrival monitoring timeout: 0 times

＊5: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

POINT

(1) Specify the device of the other station CPU module to be read with the ZNRD instruction within the range available for the host CPU module.
(Head device No. (S1) of read target of other station CPU module) + (Number of read points - 1) ≤ (Last device No. of host CPU module ＊)
＊: Last device number at the host CPU module having the same device name as (S1)

(2) When a CPU module on another station read by the ZNRD instruction is an A2UCPU(S1), A3UCPU, A4UCPU, A2ASCPU(S1), or A2USCPU(S1), use the CPU module with the following version or later.
- A2UCPU(S1), A3UCPU, A4UCPU: Version AY (manufactured since July, 1995) or later
- A2ASCPU(S1), A2USCPU(S1): Version CP (manufactured since July, 1995) or later

2) J(P).ZNWR
This instruction writes data to devices of a programmable controller on another station. (In units of words)

Applicable device

<table>
<tr><th rowspan="3">Setting data</th><th colspan="9">Applicable device</th></tr>
<tr><th colspan="2">Internal device</th><th rowspan="2">File register</th><th colspan="2">Link direct device
J□\□</th><th rowspan="2">Intelligent function module device
U□\G□</th><th rowspan="2">Index register
Zn</th><th rowspan="2">Constant
K, H, $</th><th rowspan="2">Others</th></tr>
<tr><th>Bit</th><th>Word</th><th>Bit</th><th>Word</th></tr>
<tr><td>n1</td><td colspan="3">○ *1</td><td colspan="4">—</td><td>○</td><td>—</td></tr>
<tr><td>(D1)</td><td>—</td><td>○ *2</td><td>—</td><td colspan="4">—</td><td>—</td><td>—</td></tr>
<tr><td>(S1)</td><td>—</td><td colspan="2">○</td><td colspan="4">—</td><td>—</td><td>—</td></tr>
<tr><td>n2</td><td colspan="3">○ *1</td><td colspan="4">—</td><td>○</td><td>—</td></tr>
<tr><td>(D2)</td><td colspan="3">○</td><td colspan="4">—</td><td>—</td><td>—</td></tr>
</table>

＊1: The number of digits of the bit device can be specified. (Number of digits of K, bit device start No.)

＊2: T, C, D or W can be used.

Instruction format

[Network No. specification]

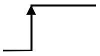
[Instruction symbol] [Execution condition]

J.ZNWR

Command

J.ZNWR	Jn	n1	(D1)	(S1)	n2	(D2)

JP.ZNWR



Command

JP.ZNWR	Jn	n1	(D1)	(S1)	n2	(D2)

Setting data

Setting data ＊3 ＊4	Description	Setting side ＊5	Data type
Jn	Network No. of the target station (1 to 239)	User	Binary 16 bits
n1	Target station No. Specify the station No. of the target station. 1) Station No. specification 1 to 64: Station No. 2) Group specification 81_H to $A0_H$: All stations of a group (No.1 to 32) 3) All stations specification FF_H: All stations of the target network No. (Except the host station) When a group is specified, set the group No. of the target station with the network parameters from GX Developer.		
(D1)	Target station's start device to which data are to be written. (A contiguous area for the write data length is required.)	—	Device name
(S1)	The host station's start device where write data are stored.		
n2	Write data length When the target station is Q/R/L/QnA/AnUCPU: 1 to 230 words When the target station is other than Q/R/L/QnA/AnUCPU: 1 to 32 words	User	Binary 16 bits
(D2)	The host station's device that is turned on for one scan upon completion of the instruction (D2)+1 also turns on if the instruction execution is failed, and the error code is stored in the SW0033. (For the error code, refer to Section 8.3.)	System	Bit

＊3: Local devices and file registers for each program cannot be used as devices in setting data.

＊4: The ZNWR instruction is executed using the following fixed values as well as setting data.
Channel used by host station: Channel 2
Arrival monitoring time (monitoring time until instruction completion): 10 seconds
Number of resends for arrival monitoring timeout: 0 times

＊5: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

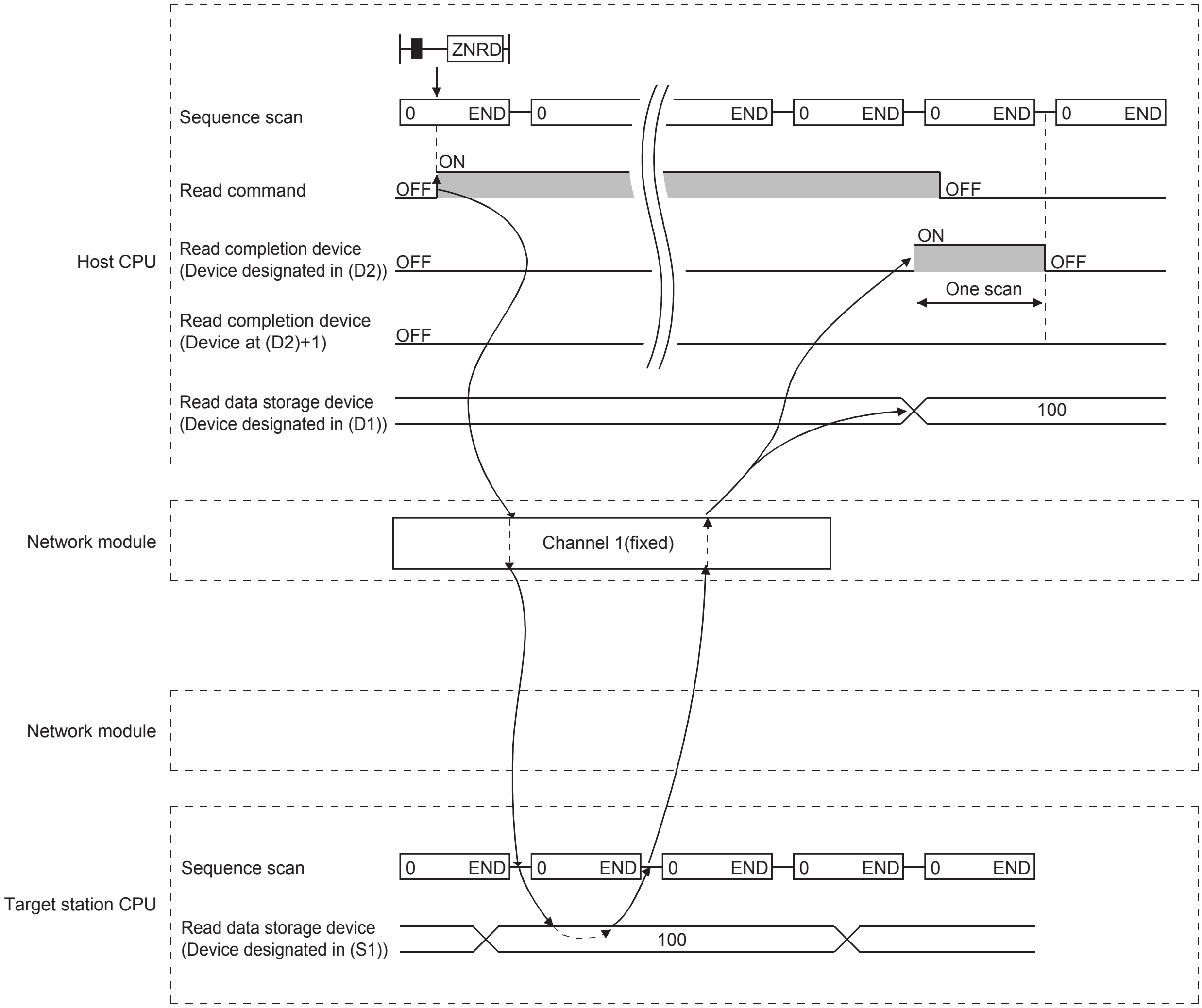
POINT

(1) Specify the device of the other station CPU module to be written with the ZNWR instruction within the range available for the host CPU module.
(Head device No. (D1) of write target of other station CPU module) + (Number of write points - 1) ≤ (Last device No. of host CPU module ＊)
＊: Last device number at the host CPU module having the same device name as (D1)

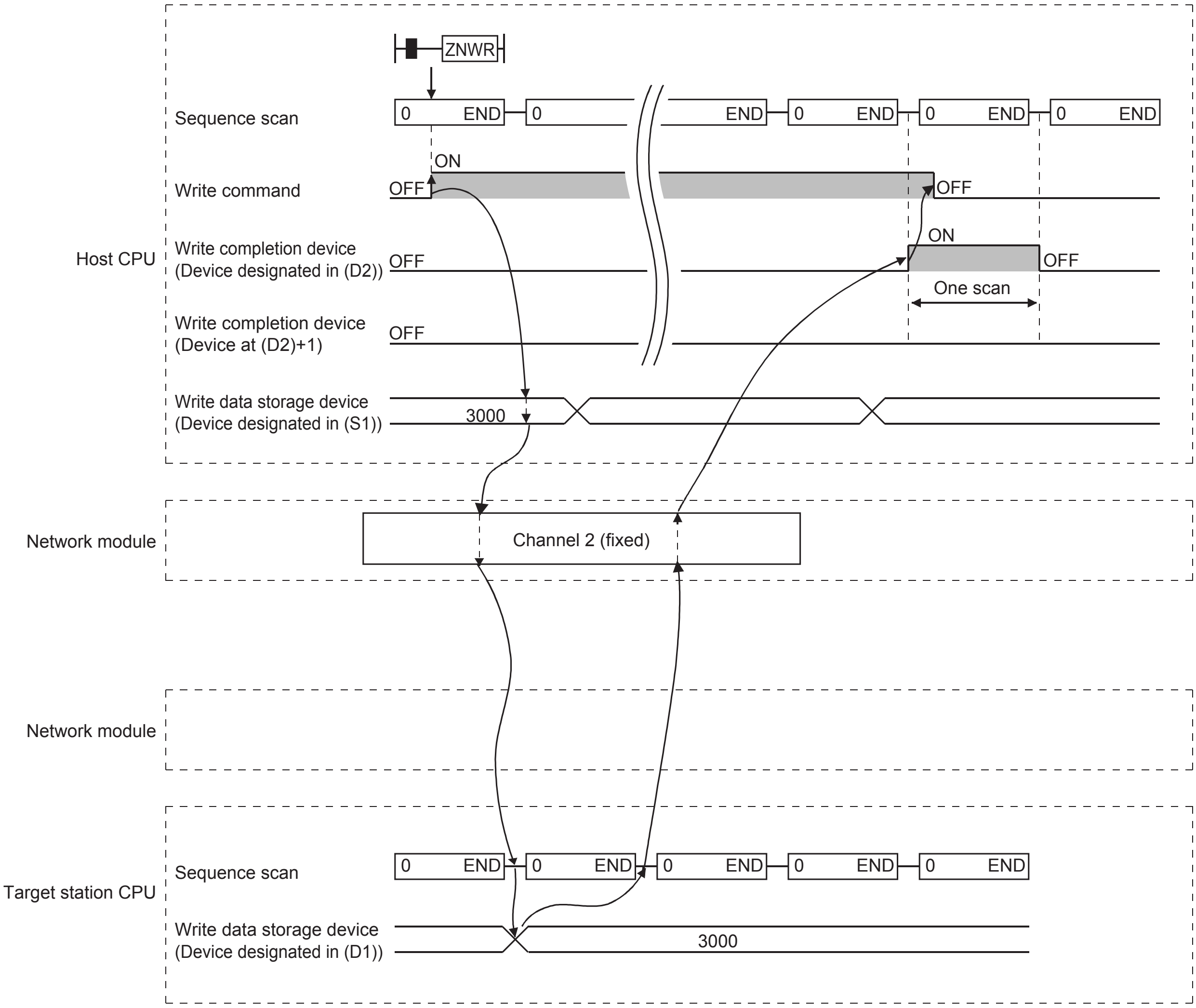
(2) When a CPU module on another station written by the ZNWR instruction is an A2UCPU(S1), A3UCPU, A4UCPU, A2ASCPU(S1), or A2USCPU(S1), use the CPU module with the following version or later.
- A2UCPU(S1), A3UCPU, A4UCPU: Version AY (manufactured since July, 1995) or later
- A2ASCPU(S1), A2USCPU(S1): Version CP (manufactured since July, 1995) or later

(b) Instruction execution timing

1) Normal completion
[ZNRD instruction]

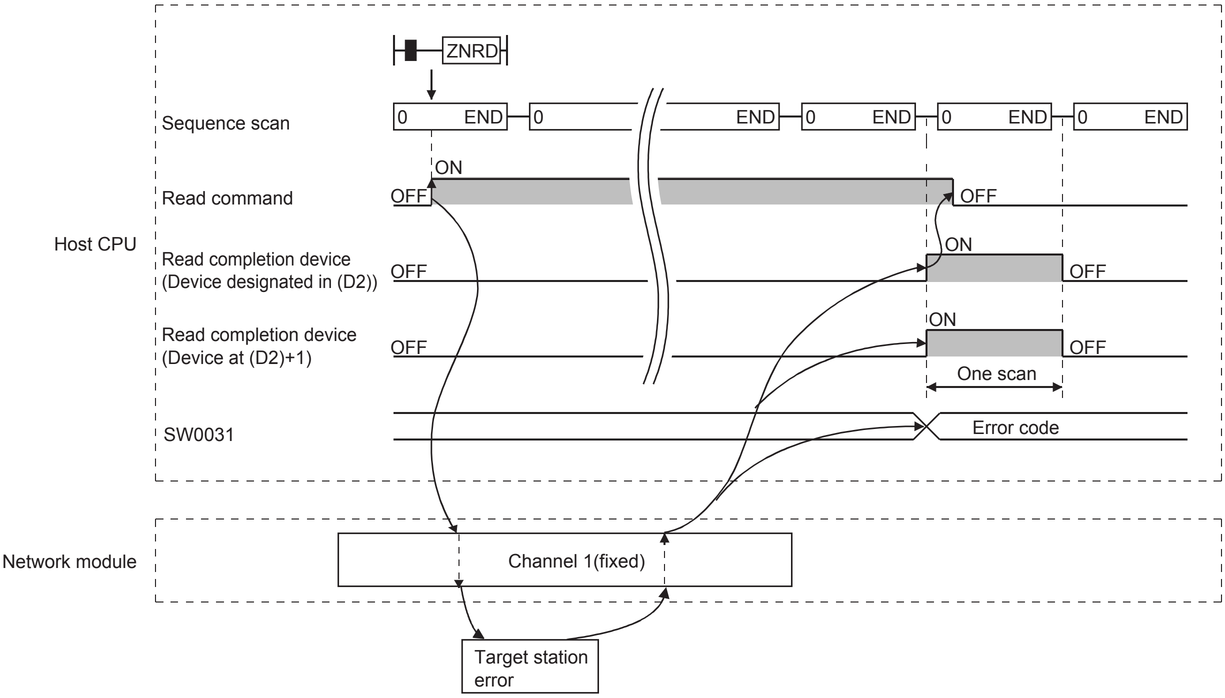


[ZNWR instruction]

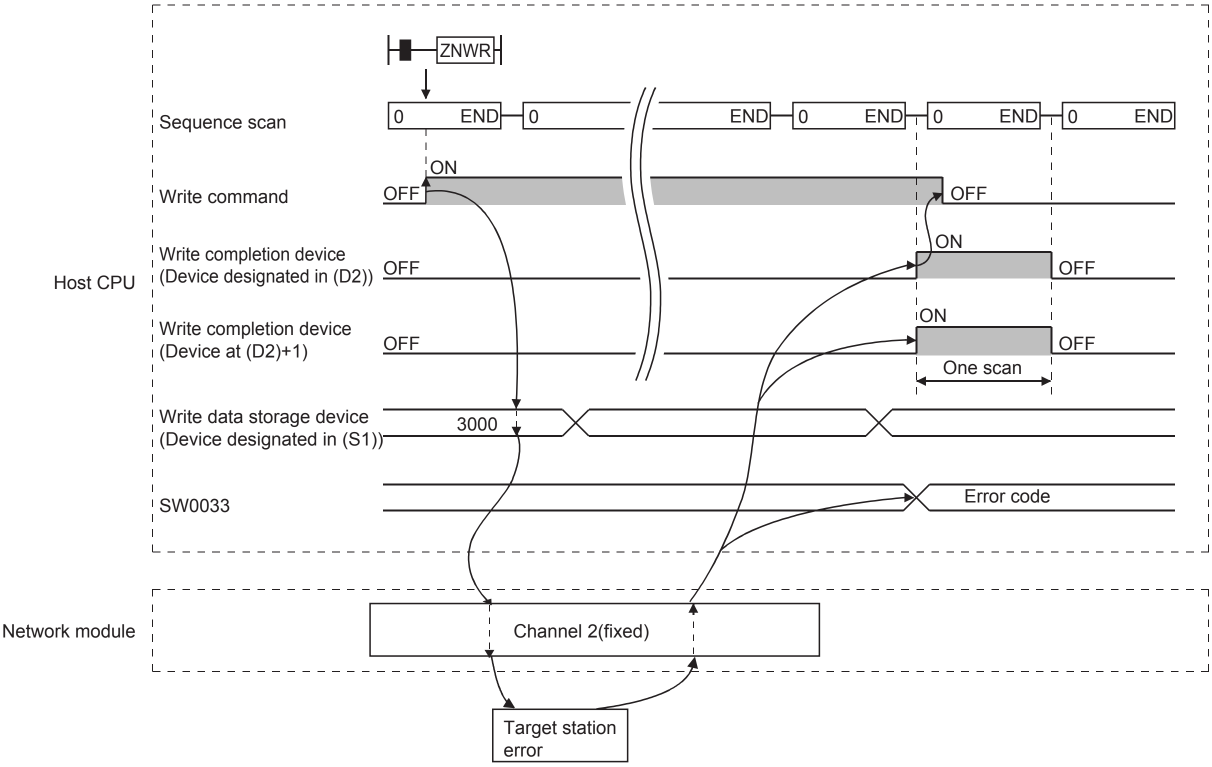


2) Abnormal completion

[ZNRD instruction]



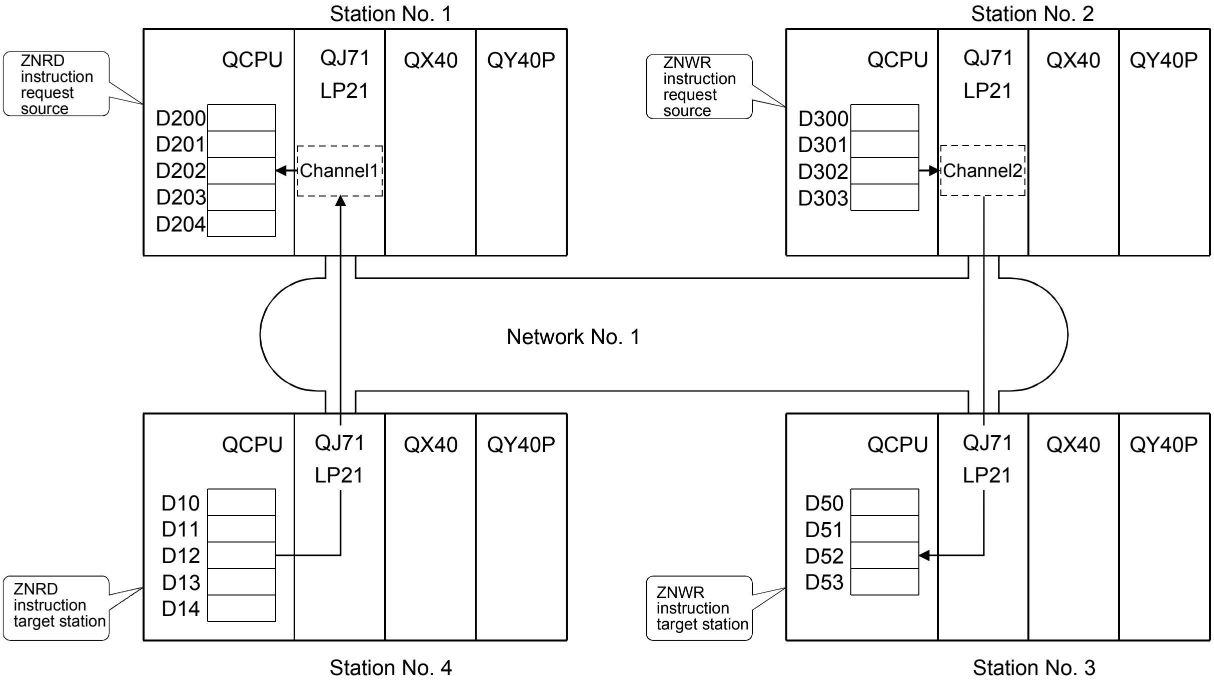
[ZNWR instruction]



(c) Program example 1 (When a system other than the redundant system is the target system)

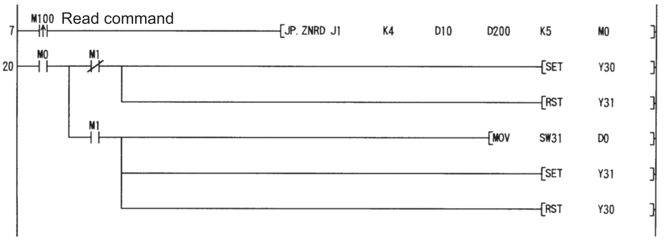
The program examples shown below are programmed for the following system configuration.

When actually using the programs below, provide interlocks in the program referring to Section 6.1.



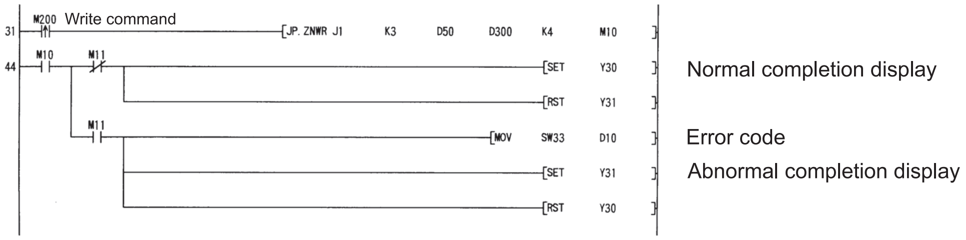
1) ZNRD instruction

The following program reads the contents of D10 to D14 of station number 4 to D200 to D204 of station number 1.



2) ZNWR instruction

The following program writes the contents of D300 to D303 of station number 2 to D50 to D53 of station number 3.

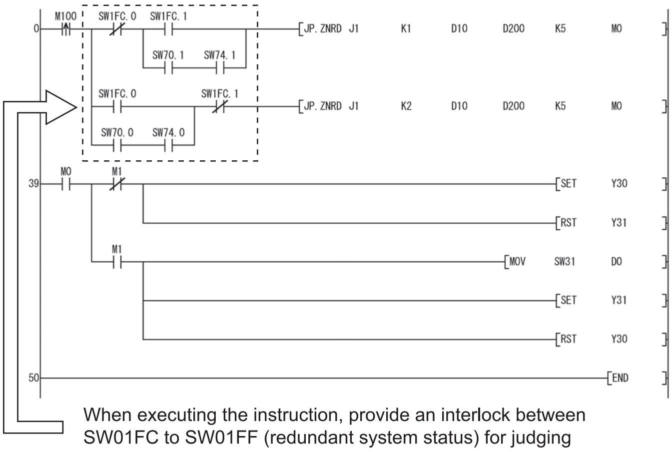


(d) Program example 2 (when a redundant system is the target system)

When the target station is in a redundant system, the ZNRD instruction must be executed after judging whether it is a control system.

The program example shown below is an interlock program for reading D10 to D14 of the control system CPU of the redundant system consisting of station Nos. 1 and 2 into D200 to D204 of the host station.

Provide the identical interlock for the ZNWR instruction.



The ZNRD instruction is executed to station No. 1 (when station No. 1 is a control system)

The ZNRD instruction is executed to station No. 2 (when station No. 2 is a control system)

When executing the instruction, provide an interlock between SW01FC to SW01FF (redundant system status) for judging whether the target station is a control system.

7.4.5 (5) Remote RUN/Remote STOP (Z(P).RRUN, Z(P).RSTOP)

Target station
Refer to Section 6.3.

(a) Instruction format

1) Z(P).RRUN

This instruction is used to remotely stop a programmable controller on another station.

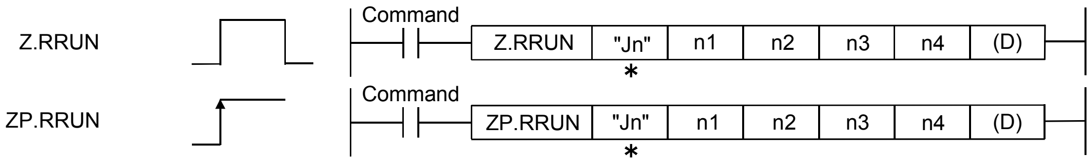
Applicable device

Setting data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
n1	—	○		—				○	—
n2	—	○		—				—	—
n3	—	○		—				—	—
n4	○			—				○	—
(D)	○			—				—	—

Instruction format

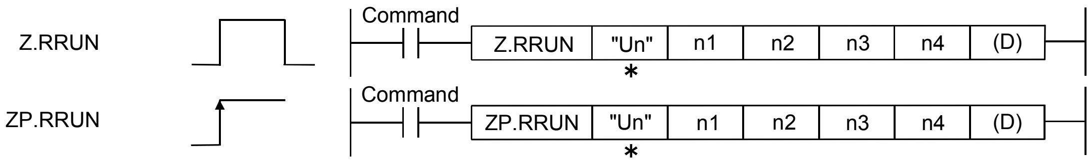
[Network No. specification]

[Instruction symbol] [Execution condition]



[Network module starting I/O number specification]

[Instruction symbol] [Execution condition]



*: If the host is the Basic model QCPU (function version B or later) or Universal model QCPU, " "(double quotation) for the first argument can be omitted.

Setting data

<table>
<tr><th>Setting data ✻1</th><th>Description</th><th>Setting side ✻2</th><th>Data type</th></tr>
<tr><td>"Jn"/Jn</td><td>Network No. of the target station (1 to 239, 254)
254: The network specified in Valid module during other station access</td><td rowspan="7">User</td><td rowspan="2">String/Binary 16 bits</td></tr>
<tr><td>"Un"/Un</td><td>Start I/O number of the host station's network module
(00 to FE$_H$: The higher two digits of the 3-digit I/O number)</td></tr>
<tr><td>n1</td><td>Channel used by host station (1 to 8)
Specify the channel used by the host station.
Specify the channel used by host station that is the same as the one used for the RSTOP instruction.</td><td rowspan="5">Binary 16 bits</td></tr>
<tr><td>n2 ✻3</td><td>Target station No.
Specify the station No. of the target station.
1) Station No. specification
1 to 64: Station No.
2) Group specification
81$_H$ to A0$_H$: All stations of a group (No.1 to 32)
3) All stations specification
FF$_H$: All stations of the target network No. (Except the host station)
When a group is specified, set the group No. of the target station with the network parameters from GX Developer.</td></tr>
<tr><td>n3</td><td>Target station's CPU type
Specify the CPU module on the station to be accessed.
<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>0000$_H$ ✻4</td><td>Control CPU (The access target is the same as when "03FF$_H$" is specified.)</td></tr>
<tr><td>03D0$_H$ ✻4</td><td>Control system CPU</td></tr>
<tr><td>03D1$_H$ ✻4</td><td>Standby system CPU</td></tr>
<tr><td>03D2$_H$ ✻4</td><td>System A CPU</td></tr>
<tr><td>03D3$_H$ ✻4</td><td>System B CPU</td></tr>
<tr><td>03E0$_H$ ✻5</td><td>• Control CPU (single CPU system)
• Multiple CPU system No.1</td></tr>
<tr><td>03E1$_H$ ✻5</td><td>Multiple CPU system No.2</td></tr>
<tr><td>03E2$_H$ ✻5</td><td>Multiple CPU system No.3</td></tr>
<tr><td>03E3$_H$ ✻5</td><td>Multiple CPU system No.4</td></tr>
<tr><td>03FF$_H$</td><td>Control CPU</td></tr>
</table>
When the instruction is executed with control system CPU (03D0$_H$) or standby system CPU (03D1$_H$) specified, if system switching occurs at the target station, the instruction execution may fail. (Error code: 4244$_H$, 4248$_H$)
If the instruction has failed with the above error, execute it again.</td></tr>
<tr><td rowspan="2">n4</td><td>Mode
Specify options for the operation mode and clear mode.
<table>
<tr><th>b15 to b8</th><th>b7 to b4</th><th>b3 to b0</th></tr>
<tr><td>0</td><td>2)</td><td>1)</td></tr>
</table>
1) Operation mode
Specify whether to forcibly execute remote RUN or not.
1$_H$: No forced execution
3$_H$: Forced execution
The forced execution is a function that forces a station, which has stopped by remote STOP, to RUN remotely from another station.</td></tr>
<tr><td>2) Clear mode
Specify the CPU module device status for the case of remote RUN.
0$_H$: Do not clear (Note that the local devices are cleared.)
1$_H$: Clear (excluding the latch range)
2$_H$: Clear (including the latch range)
Clear mode allows specification of the CPU module device clear (initialization) process at the start of CPU module operation activated by remote RUN.
The CPU module will perform the specified clear processing, and then it will run according to the setting that can be confirmed by [PLC parameters] - [PLC file] - [Initial Device value] in GX Developer.</td></tr>
<tr><td>(D)</td><td>The host station's device that is turned on for one scan upon completion of the instruction (D1)+1 also turns on if the instruction execution is failed, and the error code is stored in the SW0031 to SW003F.
(For the error code, refer to Section 8.3.)</td><td>System</td><td>Bit</td></tr>
</table>

＊1: Local devices and file registers for each program cannot be used as devices in setting data.

＊2: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

＊3: When a CPU in a multiple CPU system is specified for the target station CPU type ((S1)+3) and group specification (81_H to $A0_H$) or all stations (FF_H) is specified for the target station number ((S1)+5), the instruction is executed for only the system where the CPU in the multiple CPU system specified for the target station CPU type is the control CPU of the target station.
Refer to Section 2.2.2 (5) for details.

＊4: The CPU type can be specified when the host station is a network module of which function version is either D or later or the following.
- Network module: Serial number (first five digits) "10101" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

＊5: The CPU type can be specified when the QCPUs of the host station and target station are the following versions.
- QCPU: Serial number (first five digits) "06092" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

POINT

(1) Remote RUN is available when the RUN/STOP switch of the target station CPU is set to "RUN".

(2) Remote RUN is not executable when system protect is applied to the target station CPU module.

(3) When the target station CPU has been already in remote STOP/PAUSE state by a request from another station, it cannot enter RUN mode if Mode (n4) is "No forced execution (0001_H)".

2) Z(P).RSTOP
This instruction is used to remotely stop a programmable controller on another station.

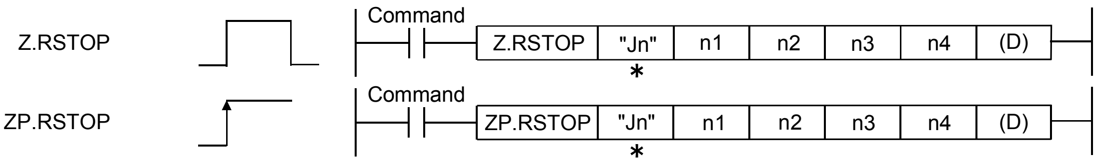
Applicable device

Setting data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
n1	—	○		—				○	—
n2	—	○		—				—	—
n3	—	○		—				—	—
n4	○			—				○	—
(D)	○			—				—	—

Instruction format

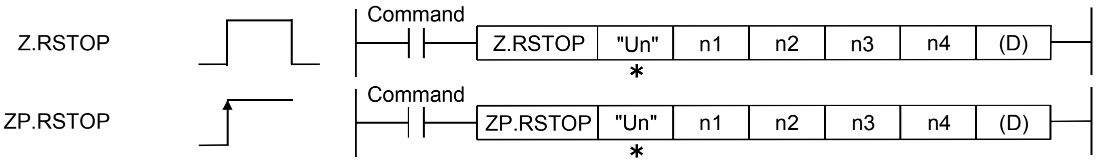
[Network No. specification]

[Instruction symbol] [Execution condition]



[Network module starting I/O number specification]

[Instruction symbol] [Execution condition]



∗: If the host station is the Basic model QCPU (function version B or later) or Universal model QCPU, " "(double quotation) for the first argument can be omitted.

Setting data

<table>
<tr><th>Setting data ＊1</th><th>Description</th><th>Setting side ＊2</th><th>Data type</th></tr>
<tr><td>"Jn"/Jn</td><td>Network No. of the target station (1 to 239, 254)
254: The network specified in Valid module during other station access</td><td rowspan="6">User</td><td rowspan="2">String/Binary 16 bits</td></tr>
<tr><td>"Un"/Un</td><td>Start I/O number of the host station's network module
(00 to FE$_H$: The higher two digits of the 3-digit I/O number)</td></tr>
<tr><td>n1</td><td>Channel used by host station (1 to 8)
Specify the channel used by the host station.</td><td rowspan="4">Binary 16 bits</td></tr>
<tr><td>n2 ＊3</td><td>Target station No.
Specify the station No. of the target station.
1) Station No. specification
1 to 64: Station No.
2) Group specification
81_H to $A0_H$: All stations of a group (No.1 to 32)
3) All stations specification
FF_H: All stations of the target network No. (Except the host station)
When a group is specified, set the group No. of the target station with the network parameters from GX Developer.</td></tr>
<tr><td>n3</td><td>Target station's CPU type
Specify the CPU module on the station to be accessed.
<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>0000_H ＊4</td><td>Control CPU (The access target is the same as when "$03FF_H$" is specified.)</td></tr>
<tr><td>$03D0_H$ ＊4</td><td>Control system CPU</td></tr>
<tr><td>$03D1_H$ ＊4</td><td>Standby system CPU</td></tr>
<tr><td>$03D2_H$ ＊4</td><td>System A CPU</td></tr>
<tr><td>$03D3_H$ ＊4</td><td>System B CPU</td></tr>
<tr><td>$03E0_H$ ＊5</td><td>• Control CPU (single CPU system)
• Multiple CPU system No.1</td></tr>
<tr><td>$03E1_H$ ＊5</td><td>Multiple CPU system No.2</td></tr>
<tr><td>$03E2_H$ ＊5</td><td>Multiple CPU system No.3</td></tr>
<tr><td>$03E3_H$ ＊5</td><td>Multiple CPU system No.4</td></tr>
<tr><td>$03FF_H$</td><td>Control CPU</td></tr>
</table>
When the instruction is executed with control system CPU ($03D0_H$) or standby system CPU ($03D1_H$) specified, if system switching occurs at the target station, the instruction execution may fail. (Error code: 4244_H, 4248_H)
If the instruction has failed with the above error, execute it again.</td></tr>
<tr><td>n4</td><td>Operation mode
1_H: Fixed
<table>
<tr><th>b15 to b4</th><th>b3 to b0</th></tr>
<tr><td>0</td><td>1)</td></tr>
</table></td></tr>
<tr><td>(D)</td><td>The host station's device that is turned on for one scan upon completion of the instruction
(D)+1 also turns on if instruction execution is failed, and the error code is stored in the SW0031 to SW003F.
(For the error code, refer to Section 8.3.)</td><td>System</td><td>Bit</td></tr>
</table>

＊1: Local devices and file registers for each program cannot be used as devices in setting data.

＊2: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

＊3: When a CPU in a multiple CPU system is specified for the target station CPU type ((S1)+3) and group specification (81_H to $A0_H$) or all stations (FF_H) is specified for the target station number ((S1)+5), the instruction is executed for only the system where the CPU in the multiple CPU system specified for the target station CPU type is the control CPU of the target station.
Refer to Section 2.2.2 (5) for details.

＊4: The CPU type can be specified when the host station is a network module of which function version is either D or later or the following.
• Network module: Serial number (first five digits) "10101" or later
(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

＊5: The CPU type can be specified when the QCPUs of the host station and target station are the following versions.
• QCPU: Serial number (first five digits) "06092" or later
(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

POINT

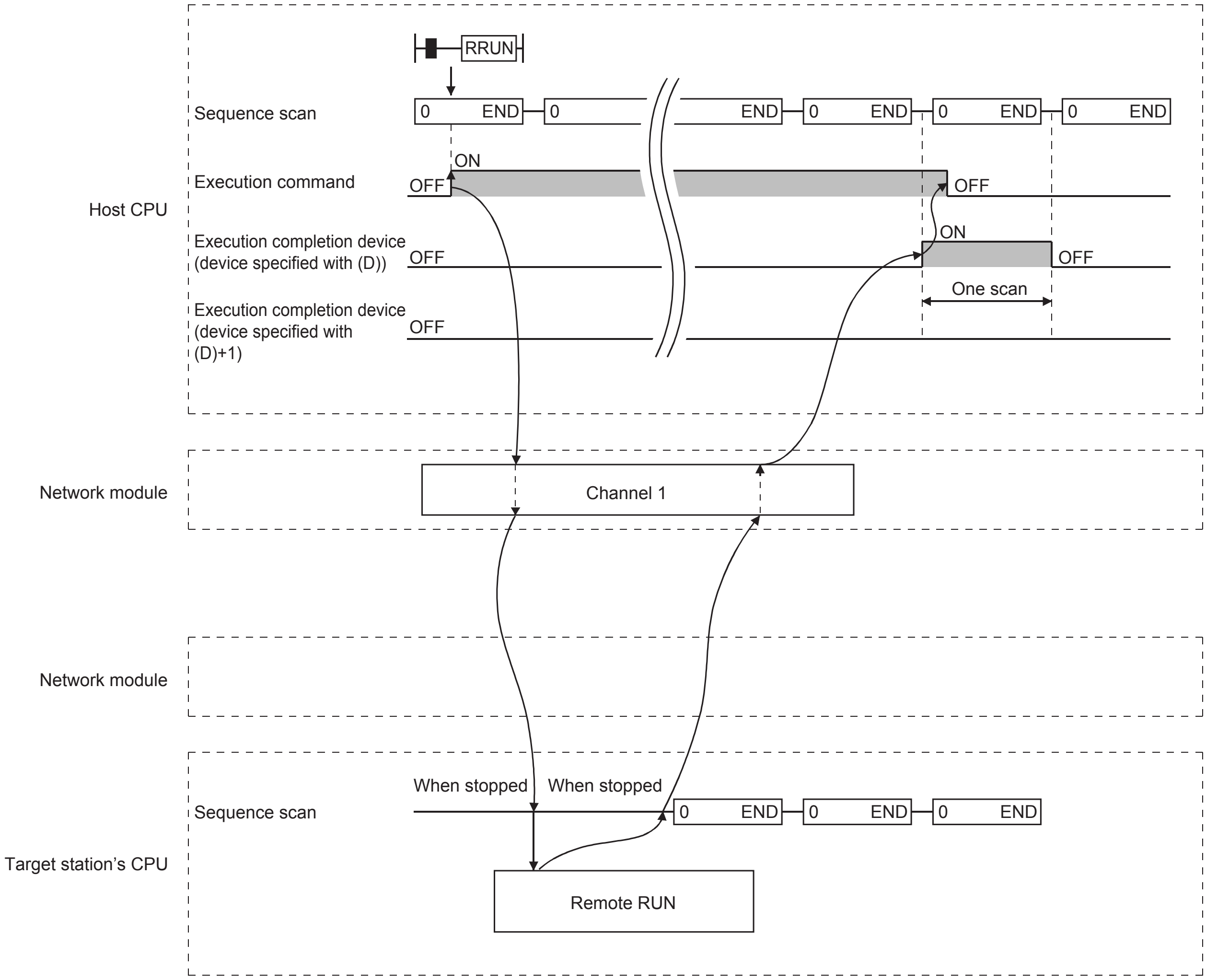
(1) Remote STOP is available when the RUN/STOP switch of the target station CPU is set to "RUN".

(2) Remote STOP is not executable when system protect is applied to the target station CPU.

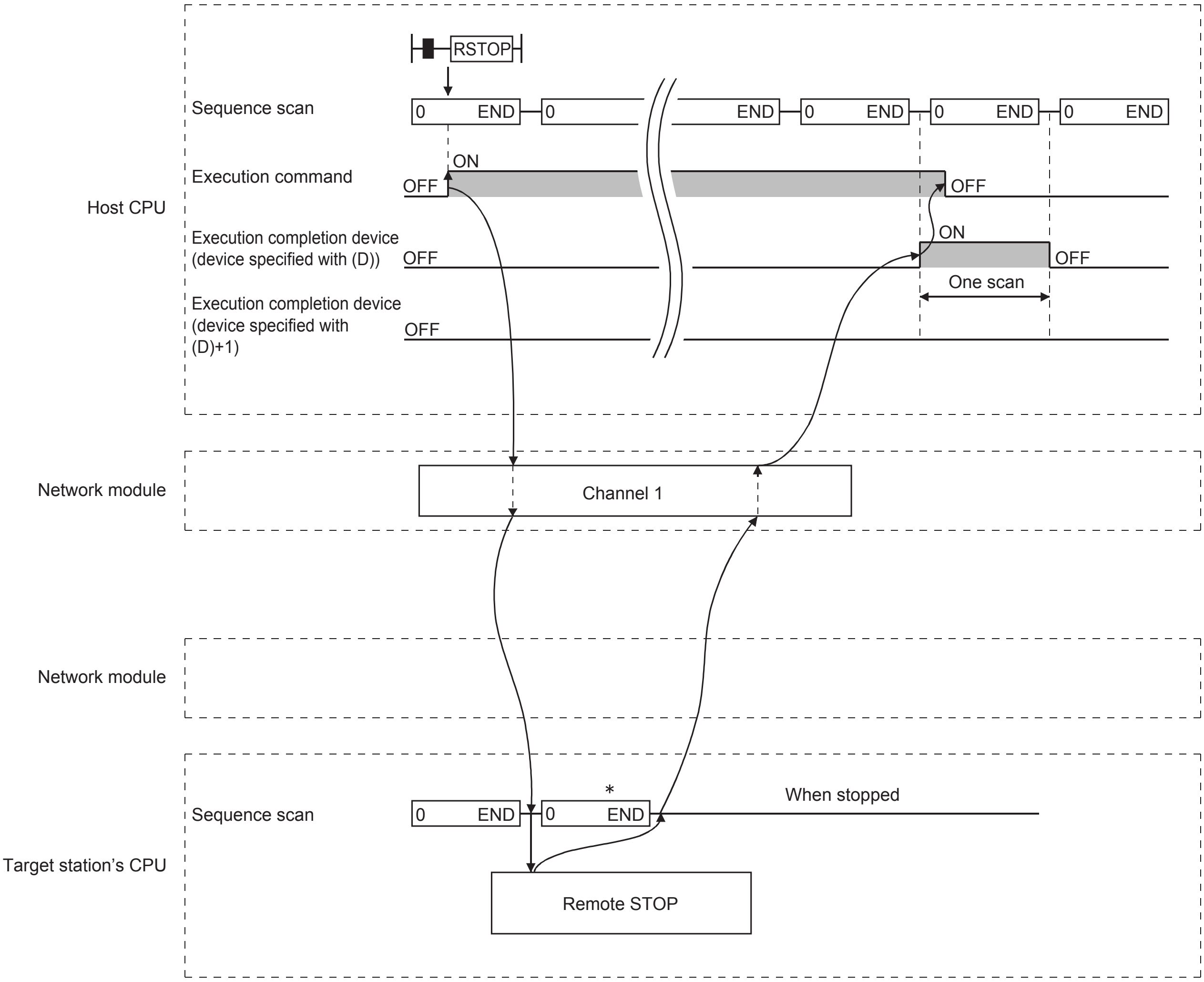
(3) If the target station CPU, for which remote STOP was performed, is reset, the remote STOP information is erased.

(b) Instruction execution timing

1) Normal completion
[RRUN instruction]

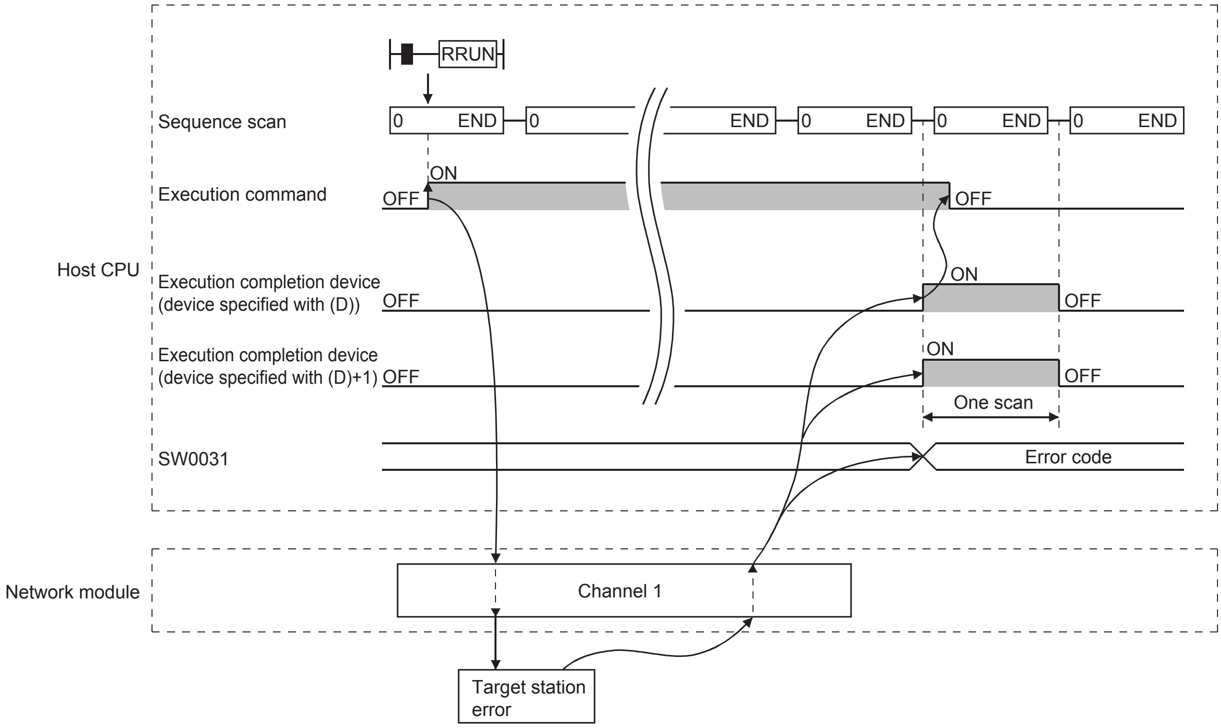


[RSTOP instruction]

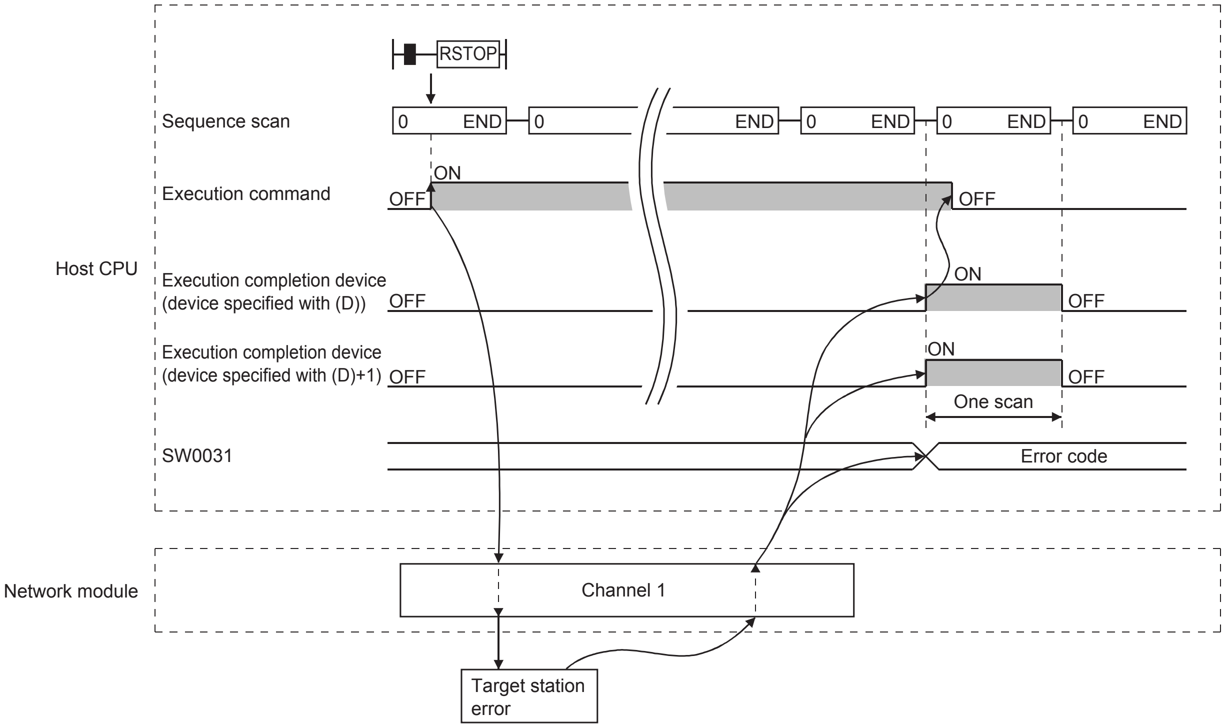


＊ According to the system organization, sequence scan time, etc., several scans will be run until the sequence scan STOP instruction is given.

2) Abnormal completion
[RRUN instruction]



[RSTOP instruction]



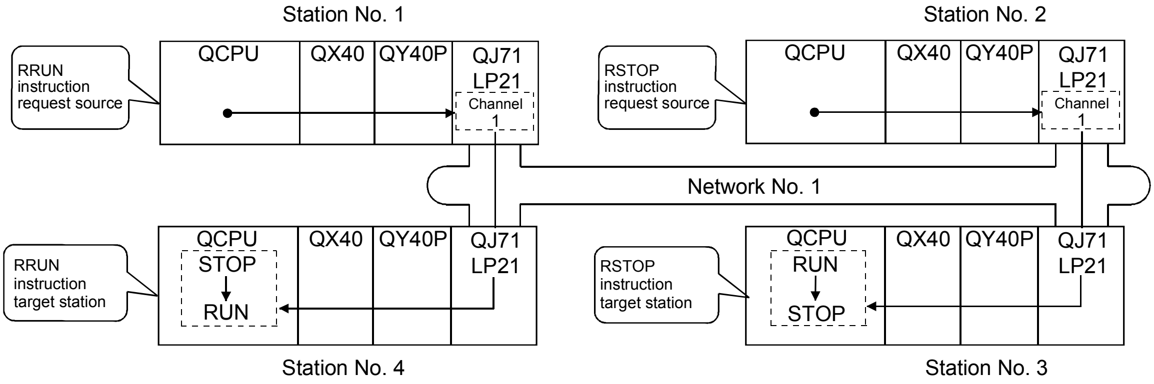
POINT

The error code will be stored in SW0031 to SW003F depending on the channel number in use. For details, refer to section 8.3 (3).

(c) Program examples

The program examples shown below are programmed for the following system configuration.

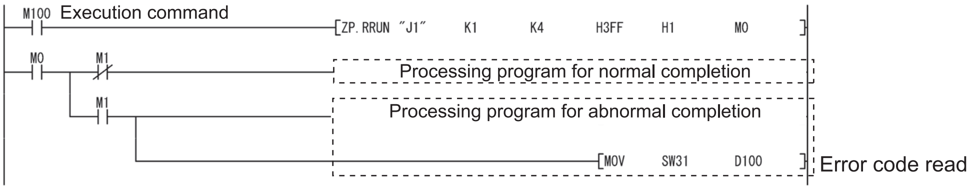
When actually using the programs below, provide interlocks in the program referring to Section 6.1.



1) RRUN instruction

A program to execute the remote RUN instruction using channel 1 for the station No.4 control CPU is shown below.

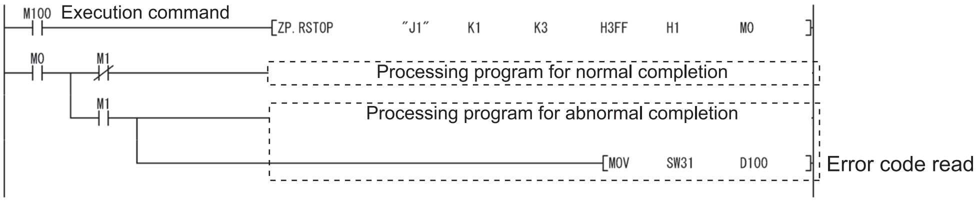
M0 is used as the completion device.



2) RSTOP instruction

A program to execute the remote STOP instruction using channel 1 for the station No.3 control CPU is shown below.

M0 is used as the completion device.



7.4.5 (6) Reading and writing clock data of other station CPU modules (Z(P).RTMRD, Z(P).RTMWR)

Target station
Refer to Section 6.3.

(a) Instruction format

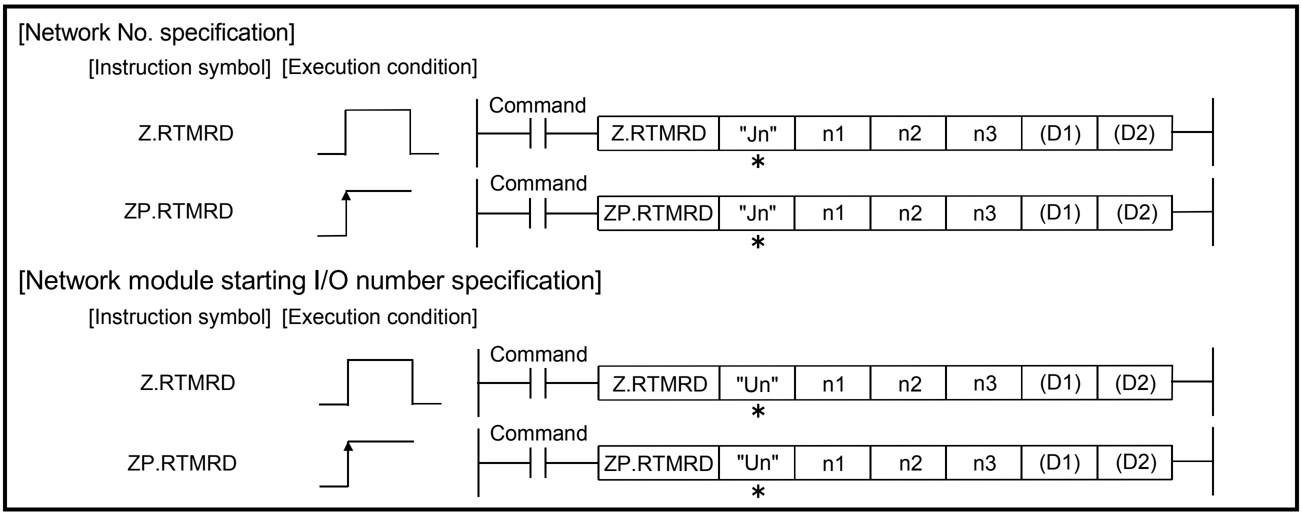
1) Z(P).RTMRD

This instruction is used to read clock data from a programmable controller on another station.

Applicable device

Setting data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
n1	—	○		—				○	—
n2	—	○		—				○	—
n3	—	○		—				○	—
(D1)	—	○		—				—	—
(D2)	○			—				—	—

Instruction format



*: If the host is the Basic model QCPU (function version B or later) or Universal model QCPU, " "(double quotation) for the first argument can be omitted.

Setting data

<table>
<tr><th>Setting data ✻1</th><th>Description</th><th>Setting side ✻2</th><th>Data type</th></tr>
<tr><td>"Jn"/Jn</td><td>Network No. of the target station (1 to 239, 254)
254: The network specified in Valid module during other station access</td><td rowspan="5">User</td><td rowspan="2">String/Binary 16 bits</td></tr>
<tr><td>"Un"/Un</td><td>Start I/O number of the host station's network module
(00 to FE$_H$: The higher two digits of the 3-digit I/O number)</td></tr>
<tr><td>n1</td><td>Channel used by host station (1 to 8)
Specify the channel used by the host station.</td><td rowspan="3">Binary 16 bits</td></tr>
<tr><td>n2</td><td>Target station No. (1 to 64)</td></tr>
<tr><td>n3</td><td>Target station's CPU type
Specify the CPU module on the station to be accessed.
<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>0000$_H$ ✻3</td><td>Control CPU (The access target is the same as when "03FF$_H$" is specified.)</td></tr>
<tr><td>03D0$_H$ ✻3</td><td>Control system CPU</td></tr>
<tr><td>03D1$_H$ ✻3</td><td>Standby system CPU</td></tr>
<tr><td>03D2$_H$ ✻3</td><td>System A CPU</td></tr>
<tr><td>03D3$_H$ ✻3</td><td>System B CPU</td></tr>
<tr><td>03E0$_H$</td><td>• Control CPU (single CPU system)
• Multiple CPU system No.1</td></tr>
<tr><td>03E1$_H$</td><td>Multiple CPU system No.2</td></tr>
<tr><td>03E2$_H$</td><td>Multiple CPU system No.3</td></tr>
<tr><td>03E3$_H$</td><td>Multiple CPU system No.4</td></tr>
<tr><td>03FF$_H$</td><td>Control CPU</td></tr>
</table>
When the instruction is executed with control system CPU (03D0$_H$) or standby system CPU (03D1$_H$) specified, if system switching occurs at the target station, the instruction execution may fail. (Error code: 4244$_H$, 4248$_H$)
If the instruction has failed with the above error, execute it again.</td></tr>
<tr><td>(D1)</td><td>Start device of the host station, in which clock data are stored
(Refer to the clock data table.)</td><td rowspan="2">System</td><td>Device name</td></tr>
<tr><td>(D2)</td><td>The host station's device that is turned on for one scan upon completion of the instruction (D2)+1 also turns on if the instruction execution is failed, and the error code is stored in the SW0031 to SW003F.
(For the error code, refer to Section 8.3.)</td><td>Bit</td></tr>
</table>

✻1: Local devices and file registers for each program cannot be used as devices in setting data.

✻2: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

✻3: The CPU type can be specified when the host station is a network module of which function version is either D or later or the following
Network module: Serial number (first five digits) "10101" or later
(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

Clock data

<table>
<tr><th>Device</th><th>Item</th><th>Setting data</th></tr>
<tr><td>(D1)+0</td><td rowspan="4">Clock data</td><td rowspan="4">Clock data that have been read are stored as BCD codes. (all set by the system)
The range available for 4-digit year reading is 1980 to 2079.
<table>
<tr><th></th><th>b15 to b8</th><th>b7 to b0</th></tr>
<tr><td>(D1)＋0</td><td>Year (00$_H$ to 99$_H$), Last 2 digits</td><td>Month (01$_H$ to 12$_H$)</td></tr>
<tr><td>(D1)＋1</td><td>Day (01$_H$ to 31$_H$)</td><td>Hour (00$_H$ to 23$_H$)</td></tr>
<tr><td>(D1)＋2</td><td>Minute (00$_H$ to 59$_H$)</td><td>Second (00$_H$ to 59$_H$)</td></tr>
<tr><td>(D1)＋3</td><td>Year (19$_H$ to 20$_H$), First 2 digits</td><td>Day of week (00$_H$ to 06$_H$)</td></tr>
</table>
00$_H$ (Sun.) to 06$_H$ (Sat.)</td></tr>
<tr><td>(D1)+1</td></tr>
<tr><td>(D1)+2</td></tr>
<tr><td>(D1)+3</td></tr>
</table>

2) Z(P).RTMWR

This instruction is used to write clock data to a programmable controller on another station.

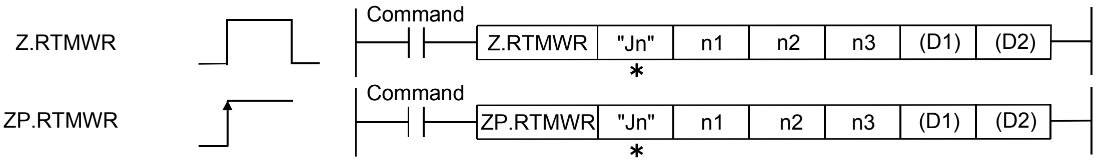
Applicable device

Setting data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
n1	—	○		—				○	—
n2	—	○		—				○	—
n3	—	○		—				○	—
(D1)	—	○		—				—	—
(D2)	○			—				—	—

Instruction format

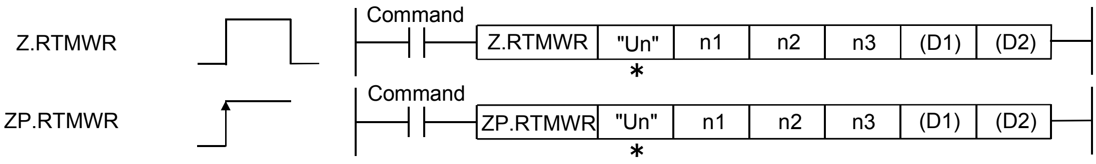
[Network No. specification]

[Instruction symbol] [Execution condition]



[Network module starting I/O number specification]

[Instruction symbol] [Execution condition]



＊: If the host station is the Basic model QCPU (function version B or later), Universal model QCPU, or safety CPU, " " (double quotation) of the first argument can be omitted.

Setting data

<table>
<tr><th>Setting data ＊1</th><th>Description</th><th>Setting side ＊2</th><th>Data type</th></tr>
<tr><td>"Jn"/Jn</td><td>Network No. of the target station (1 to 239, 254)
254: The network specified in Valid module during other station access</td><td rowspan="6">User</td><td rowspan="2">String/Binary 16 bits</td></tr>
<tr><td>"Un"/Un</td><td>Start I/O number of the host station's network module
(00 to FE_H: The higher two digits of the 3-digit I/O number)</td></tr>
<tr><td>n1</td><td>Channel used by host station (1 to 8)
Specify the channel used by the host station.</td><td rowspan="3">Binary 16 bits</td></tr>
<tr><td>n2 ＊3</td><td>Target station No.
Specify the station No. of the target station.
1) Station No. specification
1 to 64: Station No.
2) Group specification
81_H to $A0_H$: All stations of a group (No.1 to 32)
3) All stations specification
FF_H: All stations of the target network No. (Except the host station)
When a group is specified, set the group No. of the target station with the network parameters from GX Developer.</td></tr>
<tr><td>n3</td><td>Target station's CPU type
Specify the CPU module on the station to be accessed.
<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>0000_H ＊4</td><td>Control CPU (The access target is the same as when "$03FF_H$" is specified.)</td></tr>
<tr><td>$03D0_H$ ＊4</td><td>Control system CPU</td></tr>
<tr><td>$03D1_H$ ＊4</td><td>Standby system CPU</td></tr>
<tr><td>$03D2_H$ ＊4</td><td>System A CPU</td></tr>
<tr><td>$03D3_H$ ＊4</td><td>System B CPU</td></tr>
<tr><td>$03E0_H$ ＊5</td><td>• Control CPU (single CPU system)
• Multiple CPU system No.1</td></tr>
<tr><td>$03E1_H$ ＊5</td><td>Multiple CPU system No.2</td></tr>
<tr><td>$03E2_H$ ＊5</td><td>Multiple CPU system No.3</td></tr>
<tr><td>$03E3_H$ ＊5</td><td>Multiple CPU system No.4</td></tr>
<tr><td>$03FF_H$</td><td>Control CPU</td></tr>
</table>
When the instruction is executed with control system CPU ($03D0_H$) or standby system CPU ($03D1_H$) specified, if system switching occurs at the target station, the instruction execution may fail. (Error code: 4244_H, 4248_H)
If the instruction has failed with the above error, execute it again.</td></tr>
<tr><td>(D1)</td><td>Start device of the host station, in which clock data are stored
(Refer to the clock data table.)</td><td>Device name</td></tr>
<tr><td>(D2)</td><td>The host station's device that is turned on for one scan upon completion of the instruction
(D2)+1 also turns on if the instruction execution is failed, and the error code is stored in the SW0031 to SW003F.
(For the error code, refer to Section 8.3.)</td><td>System</td><td>Bit</td></tr>
</table>

＊1: Local devices and file registers for each program cannot be used as devices in setting data.

＊2: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

＊3: When a CPU in a multiple CPU system is specified for the target station CPU type ((S1)+3) and group specification (81_H to $A0_H$) or all stations (FF_H) is specified for the target station number ((S1)+5), the instruction is executed for only the system where the CPU in the multiple CPU system specified for the target station CPU type is the control CPU of the target station.
Refer to Section 2.2.2 (5) for details.

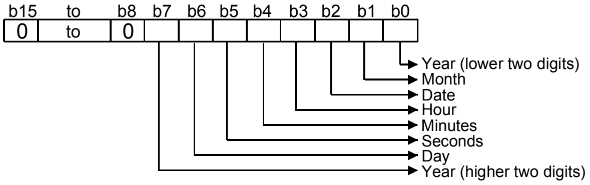
＊4: The CPU type can be specified when the host station is a network module of function version D or later.
- Net work module: Serial number (first five digits) "10101" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

＊5: The CPU type can be specified when the QCPUs of the host station and target station are the following versions.
- QCPU: Serial number (first five digits) "06092" or later

(The CPU module cannot be specified in the case other than the above. Only access to the control CPU is available.)

Clock data

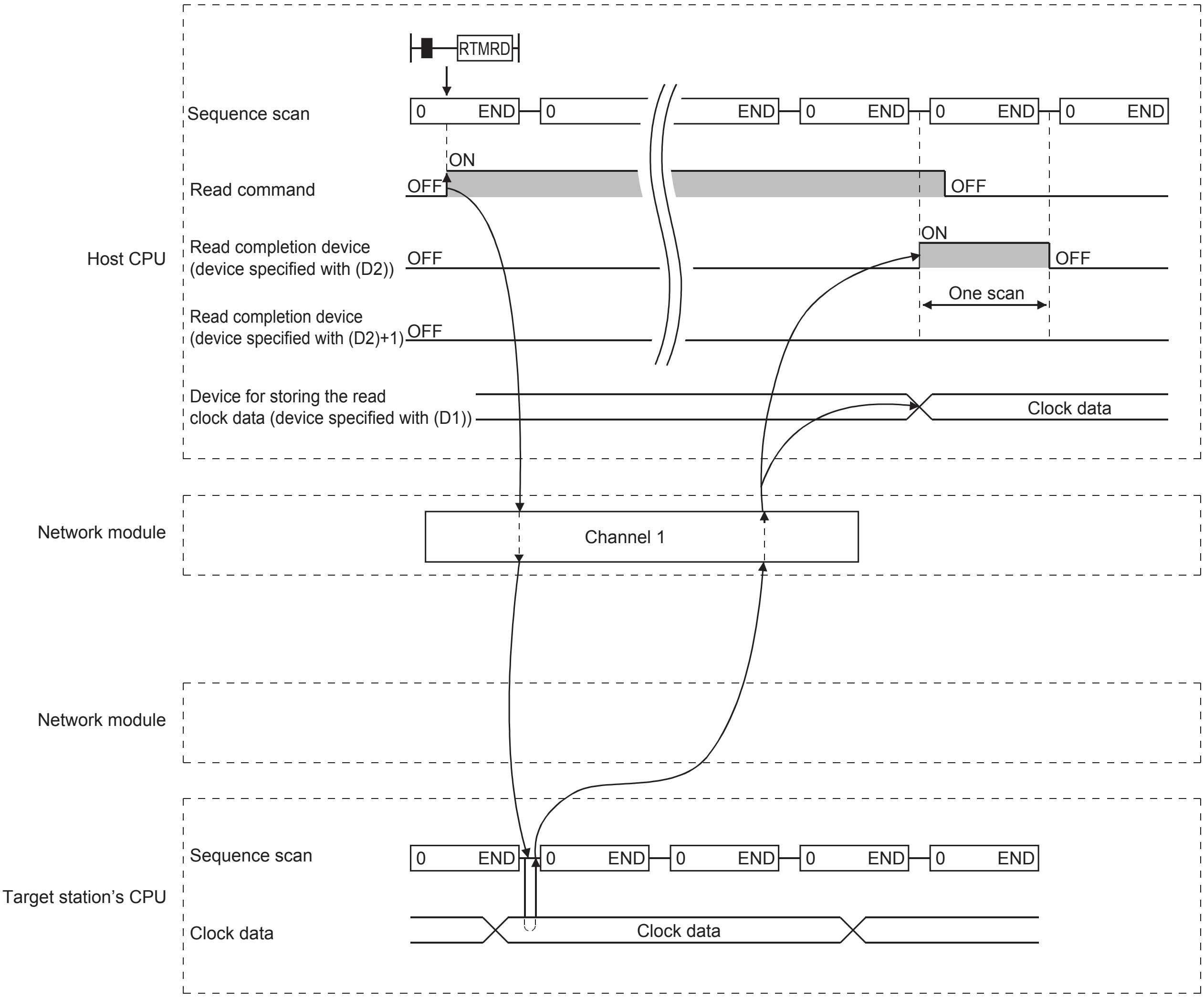
Device	Item	Setting data
(D1)+0	Change pattern	In (D1)+1 to (D1)+4, specify data to be changed. (all set by the user) 0: Do not change 1: Change 
(D1)+1	Clock data	Specify new clock data as BCD codes. The range available for 4-digit year writing is 1980 to 2079. b15 to b8 / b7 to b0 (D1)+1: Year (00_H to 99_H), Last 2 digits / Month (01_H to 12_H) (D1)+2: Day (01_H to 31_H) / Hour (00_H to 23_H) (D1)+3: Minute (00_H to 59_H) / Second (00_H to 59_H) (D1)+4: Year (19_H to 20_H), First 2 digits / Day of week (00_H to 06_H) 00_H (Sun.) to 06_H (Sat.)
(D1)+2		
(D1)+3		
(D1)+4		

POINT

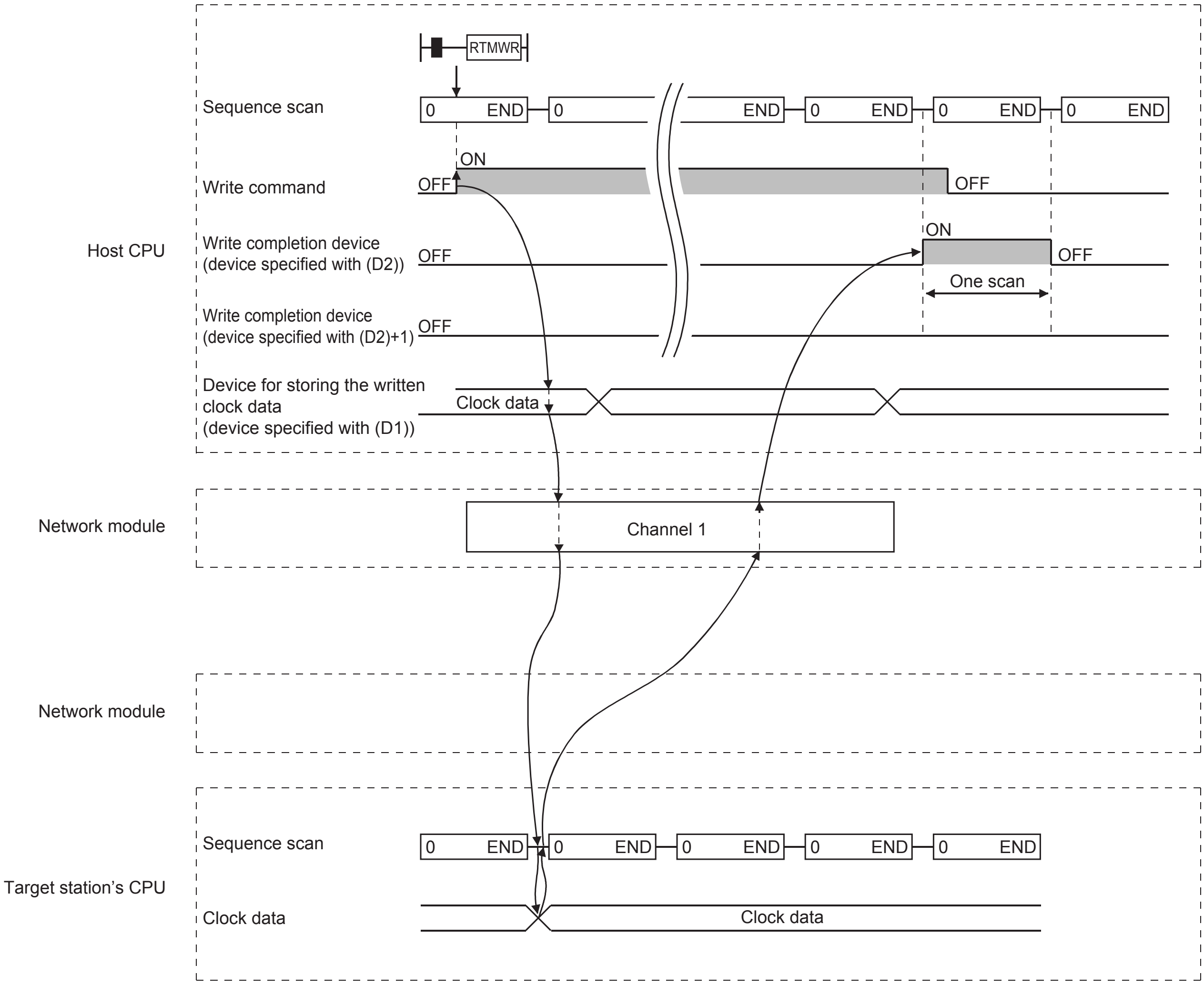
Clock data cannot be written when system protect is applied to the target station CPU.

(b) Instruction execution timing

1) Normal completion
[RTMRD instruction]

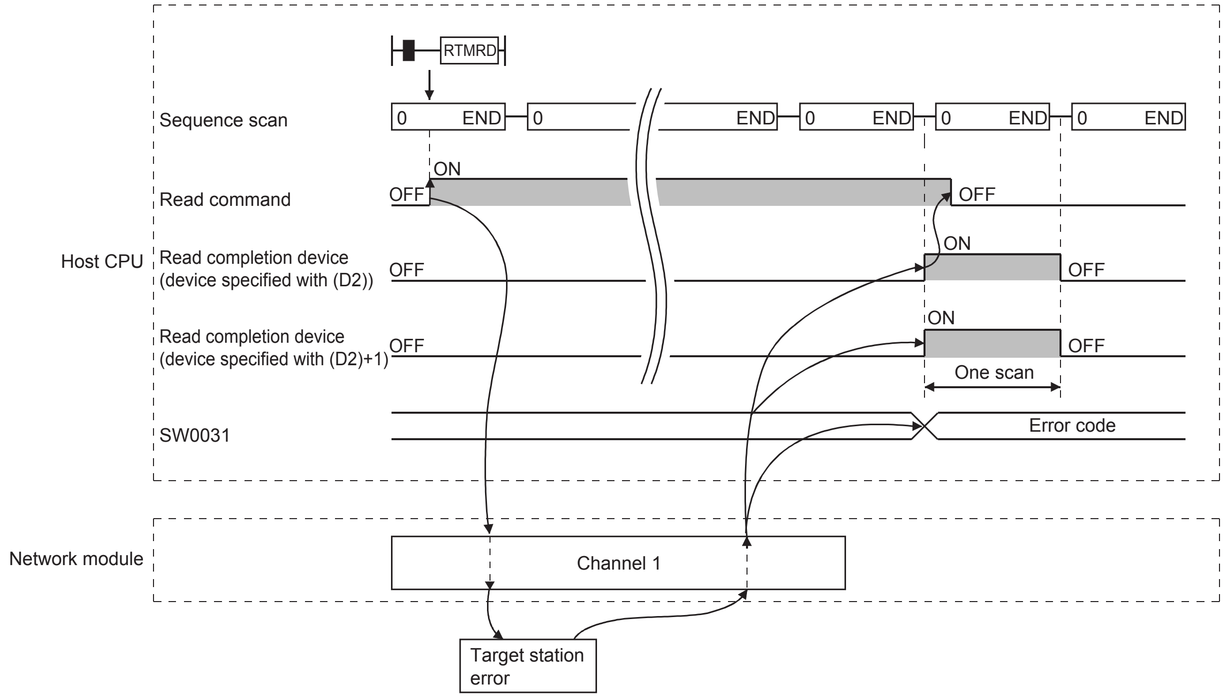


[RTMWR instruction]

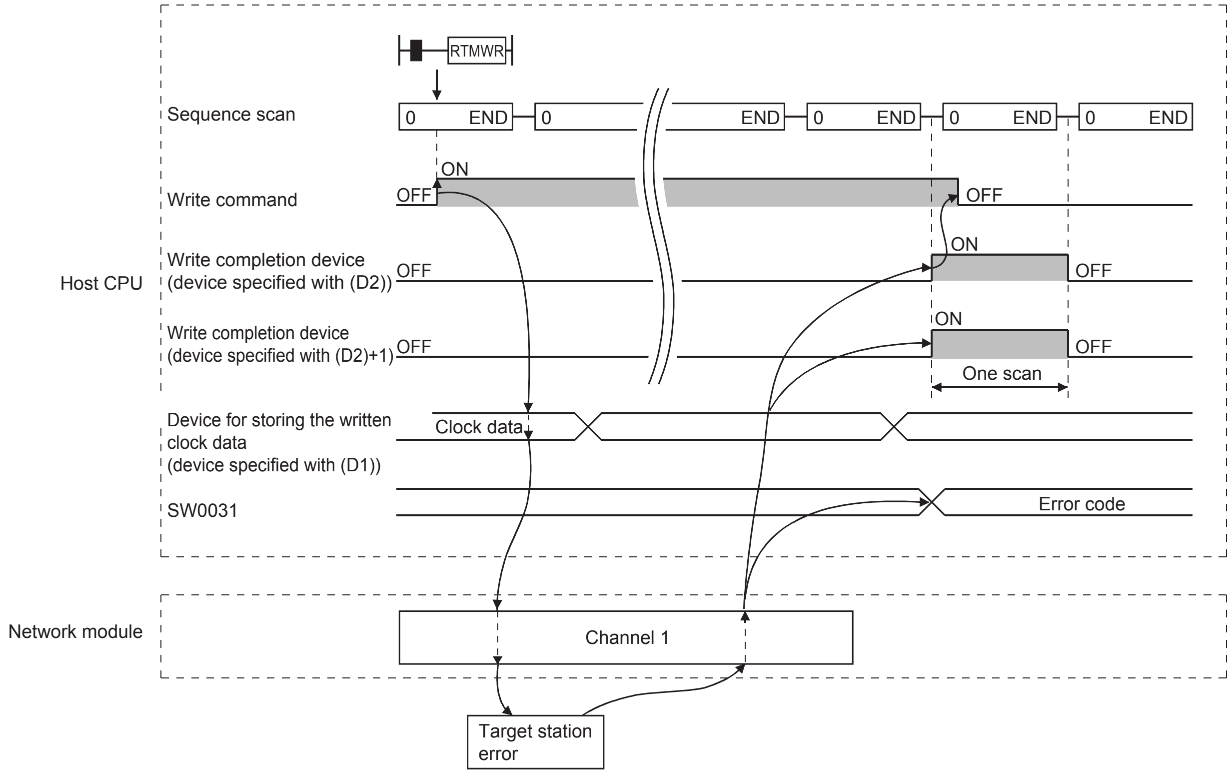


2) Abnormal completion

[RTMRD instruction]



[RTMWR instruction]



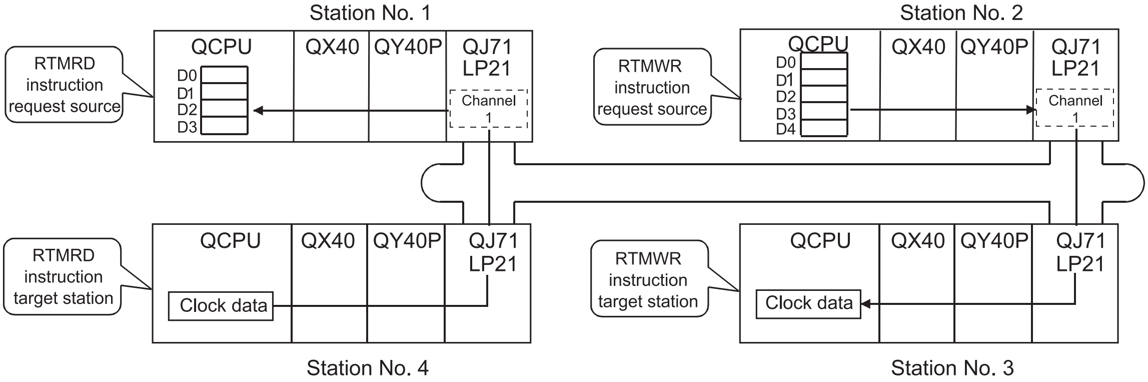
POINT

The error code will be stored in SW0031 to SW003F depending on the channel number in use. For details, refer to section 8.3 (3).

(c) Program examples

The program examples shown below are programmed for the following system configuration.

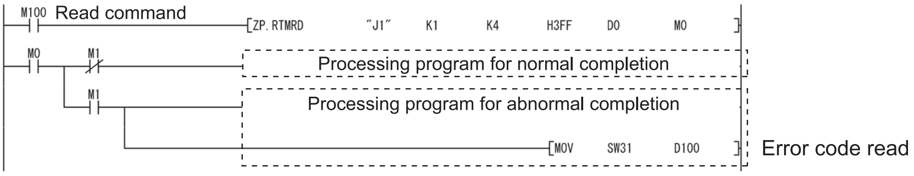
When actually using the programs below, interlock the programs referring Section 6.1.



1) RTMRD instruction

A program to execute the clock data read instruction with the use of channel 1 for the station No.4 control CPU and storing the result in D0 is shown below.

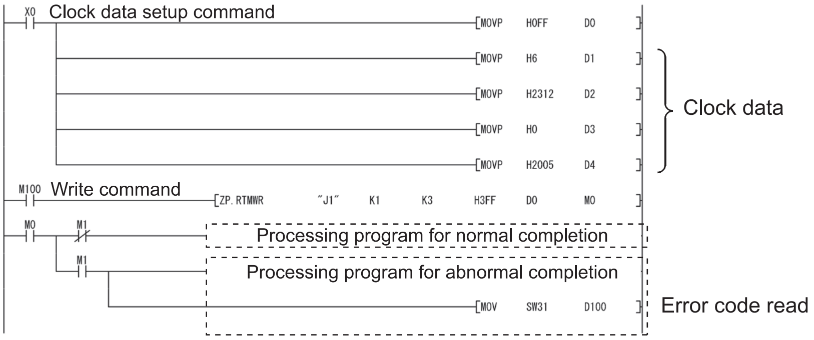
M0 is used as the completion device.



2) RTMWR instruction

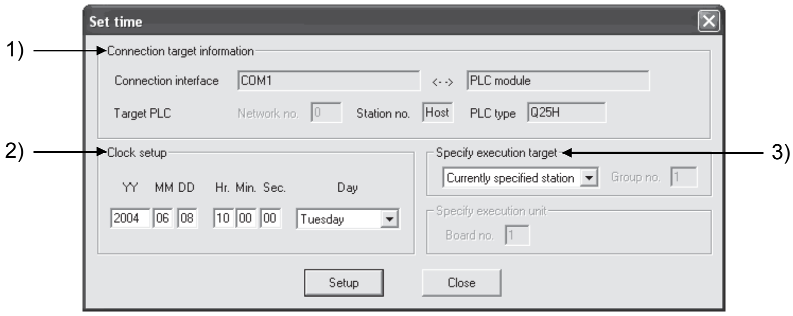
A program for writing the clock data stored in the host's D0 with the use of channel 1 into the station No.3 control CPU is shown below.

M0 is used as the completion device.



7.4.6 Setting the clock to stations on a network with GX Developer

The clock can be set on the CPU modules that are connected on a network using GX Developer.
By specifying the execution destination to all stations or a group, the clock can be set on multiple stations at the same time.
Select [Online] → [Set time] on the GX Developer screen to display the following screen. First, check the connection destination and set the clock. Then, after selecting the execution destination, click the [Setup] button to execute.



Connection interface: COM1 <--> PLC module

Target PLC: Network no. 0 Station no. Host PLC type Q25H

YY 2004 MM 06 DD 08 Hr. 10 Min. 00 Sec. 00 Day Tuesday

Currently specified station Group no. 1

Board no. 1

1) Connection target information
The current connection destination information is displayed.

2) Clock setup
Enter the date, time and day of the week.

3) Specify execution target
Select the target for the clock setup.
Currently specified station:
Sets the clock only on the station currently specified as the connection destination.
Specify all stations:
Sets the clock on all stations on the network of the currently specified station.
Select a module from Modules 1 to 4 in the execution module specification.
Specify group:
Sets the clock on all stations in a specific group on the network of the currently specified station.
Specify the execution module (Modules 1 to 4) and the Group No.

POINT

(1) The clock can be set regardless of the on/off status of the device "SM210" that is used for the clock setting.
The on/off status of the "SM210" does not change after the execution.

(2) The time set is not reflected on SD210 to SD213 (clock data) of the CPU module. The time is written to the time element of the CPU module.
To store the set time to SD210 to SD213 of the CPU module, turn SM213 (clock data read request) on.

(3) After the clock setting, errors that are equal to the transfer time will occur.

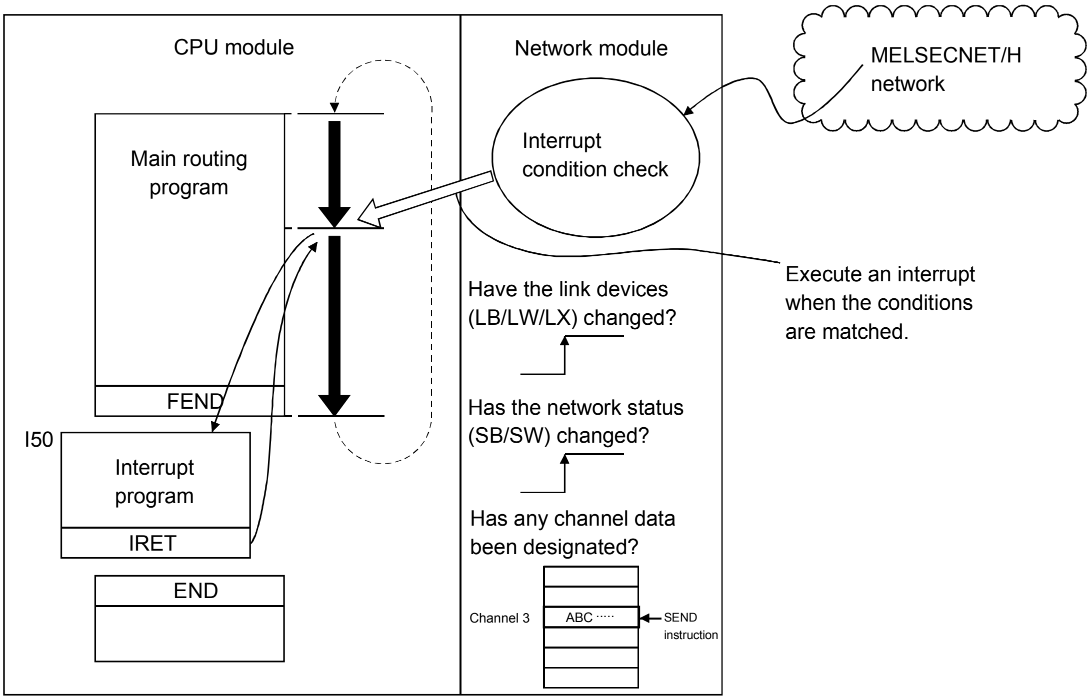
7.5 Starting the Interrupt Sequence Program

This function checks the interrupt conditions at data receiving from other stations using the interrupt setting parameters of the host. When the interrupt conditions are matched, it issues an interrupt request to the CPU module from the network module and starts the interrupt sequence program of the host's CPU.

[Advantages]

1) The startup of the interrupt sequence program of the applicable station can be instructed from other stations.
2) The number of programming steps is reduced and the scan time is shortened because the programming for the startup conditions is not required in the sequence program.

[Visual representation of the function]



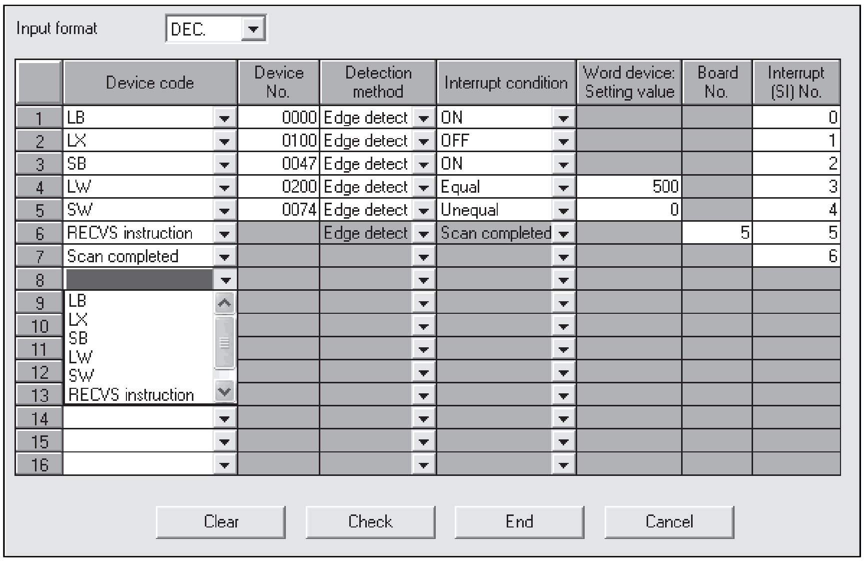
POINT

(1) The Basic model QCPU of function version B or later allows the setting of the interrupt setting parameters.
(2) When multiple interrupt conditions are set, the operation may be delayed if an interrupt request is issued from other stations at the same time because other interrupts have to wait to be processed.
(3) When executing the interrupt sequence program, it is necessary to execute "EI" (Enable Interrupt) with the main routine program.

7.5.1 Interrupt setting parameters

A maximum of 16 interrupt conditions can be set for each device code of the interrupt setting conditions on the following setting screen.

Click the Interrupt settings button to display the setting screen.



Input format DEC.

	Device code	Device No.	Detection method	Interrupt condition	Word device: Setting value	Board No.	Interrupt (SI) No.
1	LB	0000	Edge detect	ON			0
2	LX	0100	Edge detect	OFF			1
3	SB	0047	Edge detect	ON			2
4	LW	0200	Edge detect	Equal	500		3
5	SW	0074	Edge detect	Unequal	0		4
6	RECVS instruction		Edge detect	Scan completed		5	5
7	Scan completed						6
8							
9							
10							
11							
12							
13							
14							
15							
16							

[Selections of interrupt conditions for interrupt device codes and valid setting ranges]

Setting condition / Device code	Device No.	Detection method	Interrupt condition	Word device setting value	Board No.	Interrupt (SI) No.
RECVS instruction	—	Edge detection fixed	Scan completion fixed An interrupt occurs when the specified channel receives data.	—	1 to 8	0 to 15
LB	0 to 3FFF$_H$	Edge detection/level detection + on/off An interrupt occurs under the following conditions: At on : (on + level ＊1) At off : (off + level ＊1) At rise : (on + edge) At fall : (off + edge)		—	—	0 to 15
LX	0 to 1FFF$_H$			—	—	0 to 15
SB	0 to 1FF$_H$			—	—	0 to 15
LW	0 to 3FFF$_H$	Edge detection/level detection + equal to/not equal to An interrupt occurs under the following conditions: Values match : (equal to + level ＊1) Values mismatch : (not equal to + level ＊1) Values match (only for the first time) : (equal to + edge) Values mismatch (only for the first time) : (not equal to + edge)		0 to 65535	—	0 to 15
SW	0 to 1FF$_H$			0 to 65535	—	0 to 15
Scan completion ＊2	—	—	—	—	—	0 to 15

＊1: When the level detection is selected as the detection method, an interrupt occurs after the specified device's level condition is checked for each link scan of the set network module.

＊2: When the scan completion is selected, an interrupt occurs for each link scan of the set network module.

REMARKS

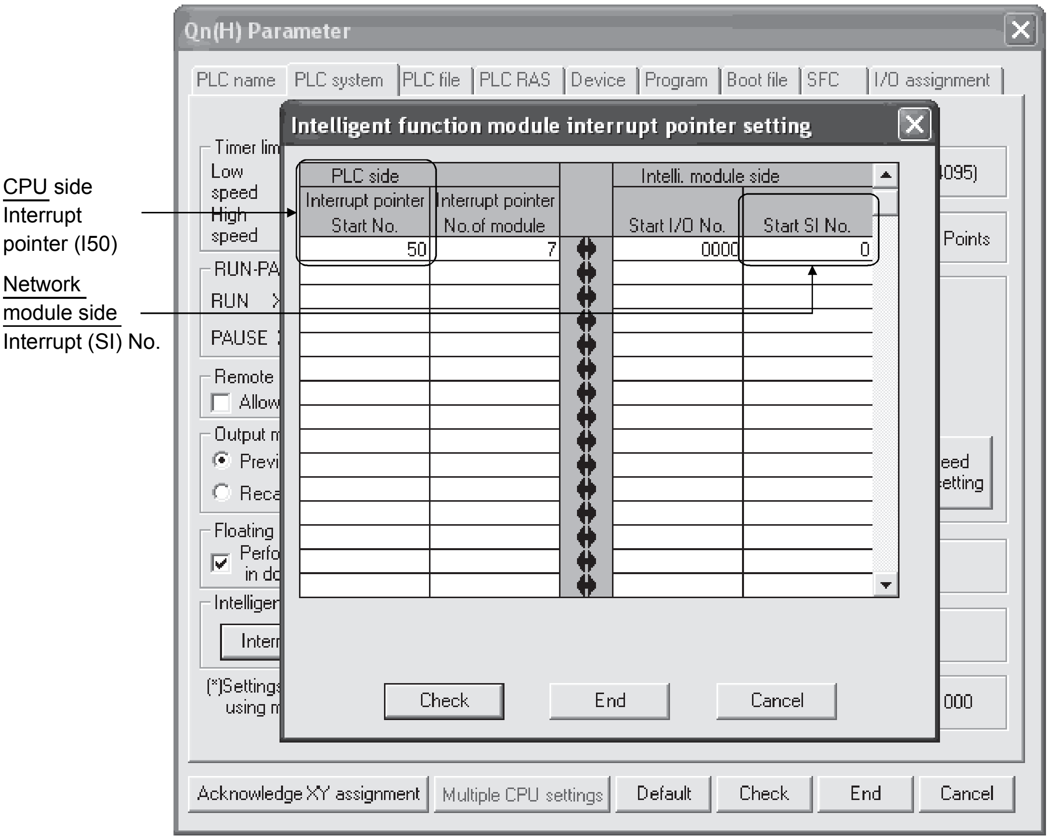
The correspondence between the interrupt (SI) No. of the network module and the interrupt pointer (I□□)[∗1] on the CPU side are set on the PLC system setting screen on the PLC parameters as shown below.

∗1: Number used for the actual interrupt program (I□□)

The following shows how to set these parameters on the PC system setting screen using the interrupt setting parameters shown on the previous page.
The interrupt (S1) No. (0 to 6) of the network module side are assigned to the interrupt pointers (I50 to I56) of the CPU side:

Intelligent module side
(1) Start I/O No. : 0000 ······· Network module installation position
(2) Start SI No. : 0 ············ Start number (0 to 6) of interrupt (SI) number

CPU side
(1) Interrupt pointer start No.: 50 Start No. (I50 to I56) of the interrupt program
(2) Interrupt pointer count: 7 Number of interrupt setting conditions



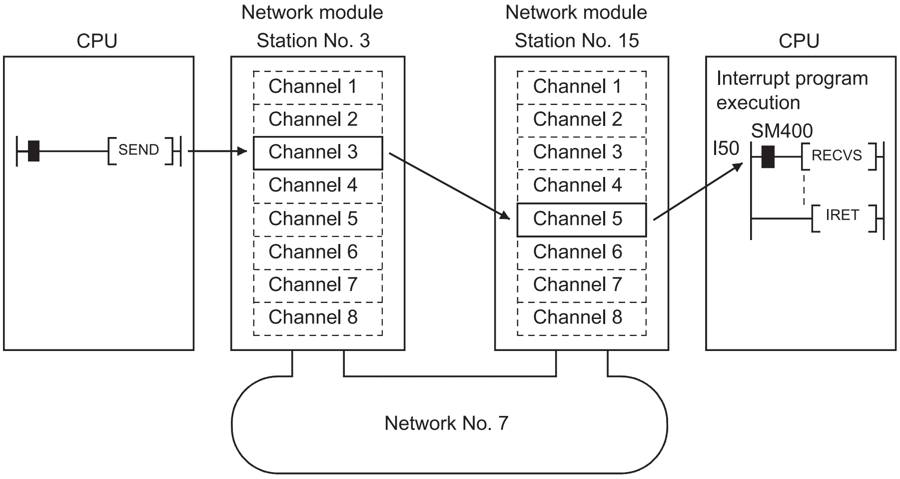
Intelligent function module interrupt pointer setting

PLC side		Intelli. module side	
Interrupt pointer Start No.	Interrupt pointer No.of module	Start I/O No.	Start SI No.
50	7	0000	0

7.5.2 Interrupts using the RECVS instruction

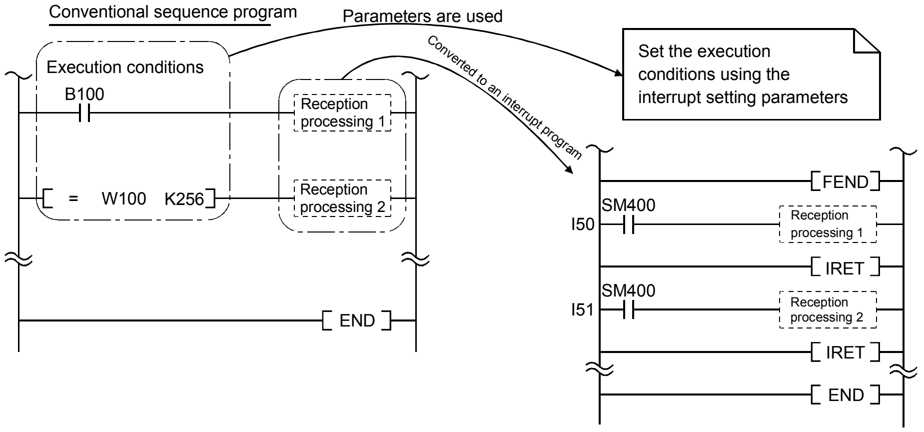
An interrupt program can be started when the SEND instruction is received at the channel whose parameters are specified with the RECVS instruction.
When "RECV instruction" is selected as the device code, the settings of "Channel No." and "Interrupt (SI) No." are enabled.

In the example below, data is sent from station number 3 to channel 5 of station number 15 using the SEND instruction.
The interrupt program setting parameters of station number 15 are set so that the interrupt program is started by the SEND instruction to channel 5.



7.5.3 Interrupts by the link devices (LB/LW/LX) for cyclic transmission

The specified interrupt sequence program can be executed from other stations when the conditions of "rise/fall" of the link devices (LB/LW) and "equal to/not equal to" of the link register (LW) are matched.
The following figure shows the comparison between the conventional and new interrupt sequence programs.



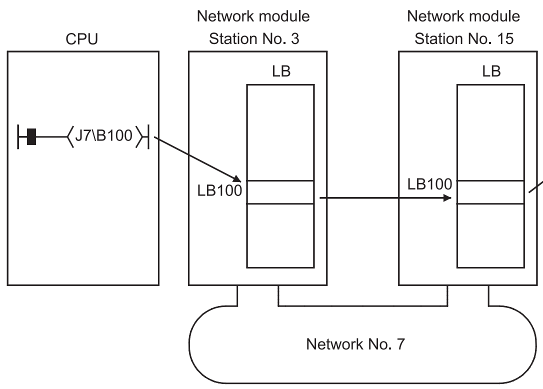
Interrupts generated by the link devices (LB/LW/LX) can be used for normal cyclic transmission and direct access destinations.
In the example below, the link device LB100 of station number 15 is turned on (1) using direct access (specify outside the set refresh range but within the host's send range) to the link device of station number 3. Also, the interrupt setting parameters are set for station number 15 so that the interrupt program is started when LB100 of station number 15 turns on.

[Interrupt setting parameters]

Device code	Device No.	Detection method	Interrupt condition	Word device setting value	Channel No./ connection No.	Interrupt (SI) No.
LB	100	Edge detection	On	—	—	0

[Interrupt pointer settings]

CPU side			Intelligent module side	
Interrupt pointer start No.	Interrupt pointer count		Start I/O No.	Start SI No.
50	1	⇔	0000	0



REMARKS

(1) When the sequence program executes at high speed, the scan time may take longer because the execution time of the interrupt program affects the performance of the interrupt program.

(2) When multiple interrupts occur at the same time, the operation delay may occur.

(3) This function cannot be used during offline or online testing.

(4) Do not start the interrupt sequence program by the specified device's rise (PLS instruction, etc.) and fall (PLF instruction, etc.); the change in the device may not be read.

7.5.4 Interrupts by the link special device (SB/SW)

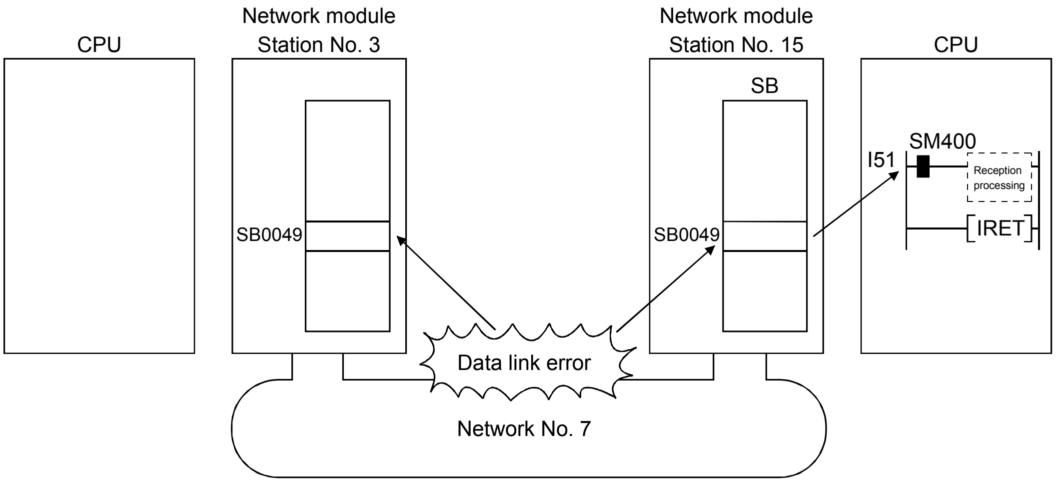
The specified interrupt sequence program can be executed when the conditions of the control information (SB/SW) during data linking match.
In the example below, specify the interrupt setting parameters for station number 15 so that the interrupt program is started when SB0049 turns on (data link error occurred).

[Interrupt setting parameters]

Device code	Device No.	Detection method	Interrupt condition	Word device setting value	Channel No./ connection No.	Interrupt (SI) No.
SB	49	Edge detection	On	–	–	0

[Interrupt pointer settings]

CPU side			Intelligent module side	
Interrupt pointer start No.	Interrupt pointer count		Start I/O No.	Start SI No.
51	1	⟷	0000	0



REMARKS

(1) When the sequence program executes at high speed, the scan time may take longer because the execution time of the interrupt program affects the performance of the interrupt program.

(2) When multiple interrupts occur at the same time, the operation delay may occur.

(3) This function cannot be used during offline or online testing.

7.5.5 Message reception "one scan completion" instruction (Z.RECVS)

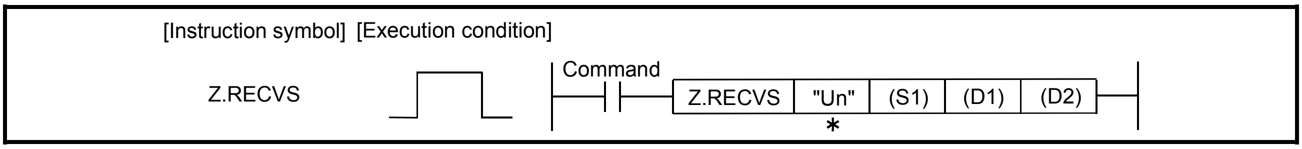
This instruction reads the channel data that is sent to the host with the SEND instruction.
The processing completes at the execution of this instruction; thus, the processing speed of this instruction is faster than that of the RECV instruction.

(1) The instruction format of RECVS

Applicable device

Setting data	Applicable device								
	Internal device		File register	Link direct device J☐\☐		Intelligent function module device U☐\G☐	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—				—	—
(D1)	—	○		—				—	—
(D2)	○			—				—	—

Instruction format



∗: If the host station is the Basic model QCPU (function version B or later) or Universal model QCPU, " "(double quotation) for the first argument can be omitted.

Setting data

Setting data ∗1	Description	Setting side ∗2	Data type
"Un"/Un	Start I/O number of the own station's network module (00 to FE$_H$: The higher two digits of the 3-digit I/O number)	User	String/ Binary 16 bits
(S1)	Start device of the own station that stores control data	User, system	Device name
(D1)	Start device of the own station that stores receive data (A contiguous area for the receive data length is required.)	System	
(D2)	Dummy		Bit

∗1: Local devices and file registers for each program cannot be used as devices in setting data.
∗2: The setting side is as shown below.
User : It is data the user sets in the sequence program before execution of a link dedicated instruction.
System: The programmable controller CPU stores the execution result of the link dedicated instruction.

Control data

Device	Item	Setting data	Setting range	Setting side ＊2
(S1)+0	Error completion type	b15 to b8 b7 b6 to b0 0 to 0 1 0 to 0 1) Error completion type (bit 7) Specify the clock data setup status for error completion. 0: Clock data at the time of error completion is not set in the area starting from (S1)+11. 1: Clock data at the time of error completion is set in the area starting from (S1)+11.	0000_H 0080_H	User
(S1)+1	Completion status	The instruction completion status is stored. 0 : Normal Other than 0 : Error (Refer to Section 8.3 for error codes)	–	System
(S1)+2	Own station channel	Specify the channel of the own station, where receive data are stored. 1 to 8: Channel	1 to 8	User
(S1)+3	Channel used by sending station	Stores the channel used by the sending station. 1 to 8: Channel	–	System
(S1)+4	Network No. of sending station	Stores network No. of the sending station. 1 to 239: Network No.	–	System
(S1)+5	Sending station No.	Stores station No. of the sending station. 1 to 64: Station No.	–	System
(S1)+6	(Use prohibited)	–	–	–
(S1)+7	(Use prohibited)	–	–	–
(S1)+8	(Use prohibited)	–	–	–
(S1)+9	Receive data length	Stores the receive data size stored in (D1) to (D1) + n. 1 to 960: Receive data size (words)	–	System
(S1)+10 to (S1)+17	(Use prohibited)	–	–	–

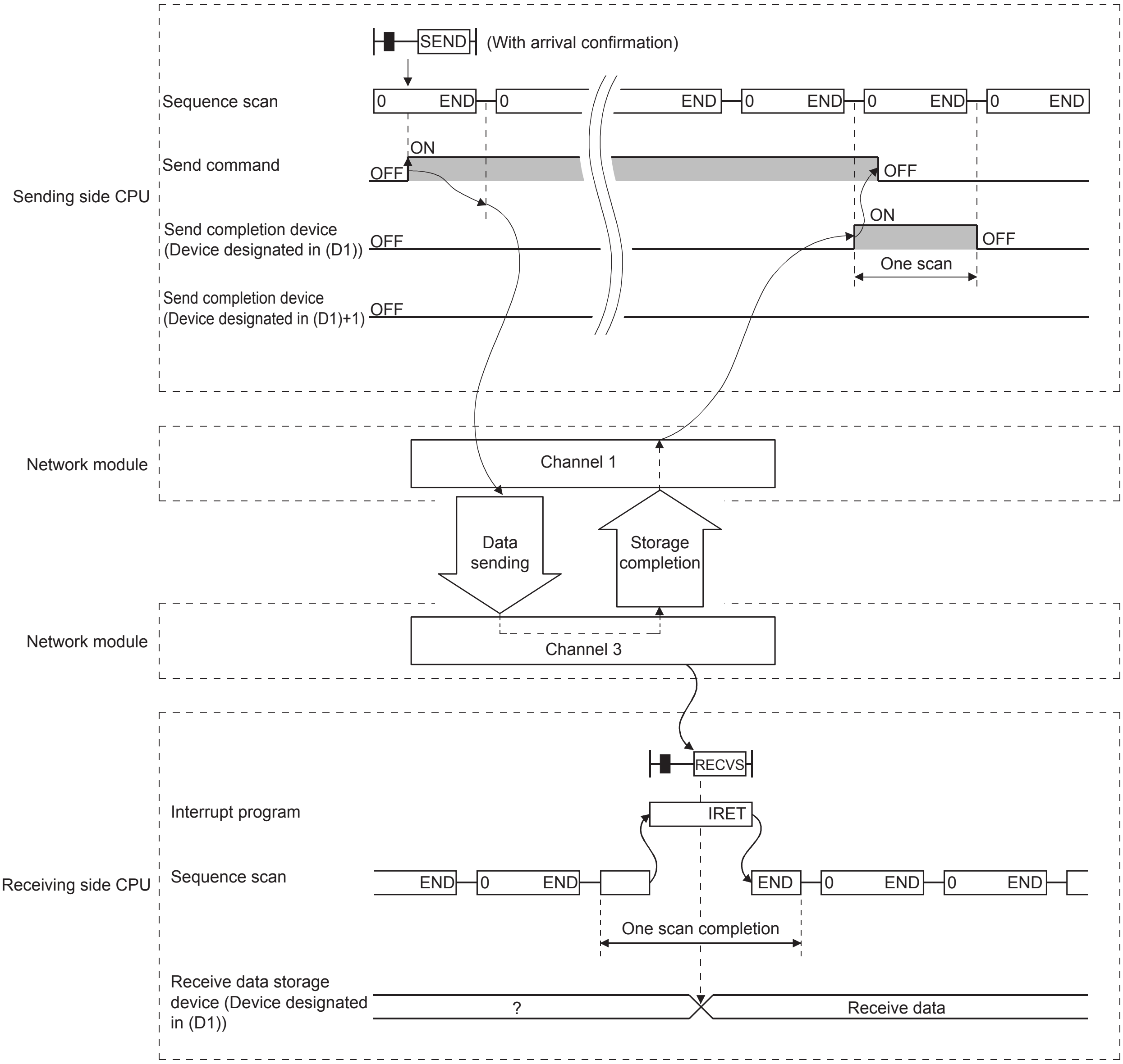
＊2: The setting side is as shown below.

User : It is data that the user sets in the sequence program before execution of a link dedicated instruction.

System: The programmable controller CPU stores the execution result of the link dedicated instruction.

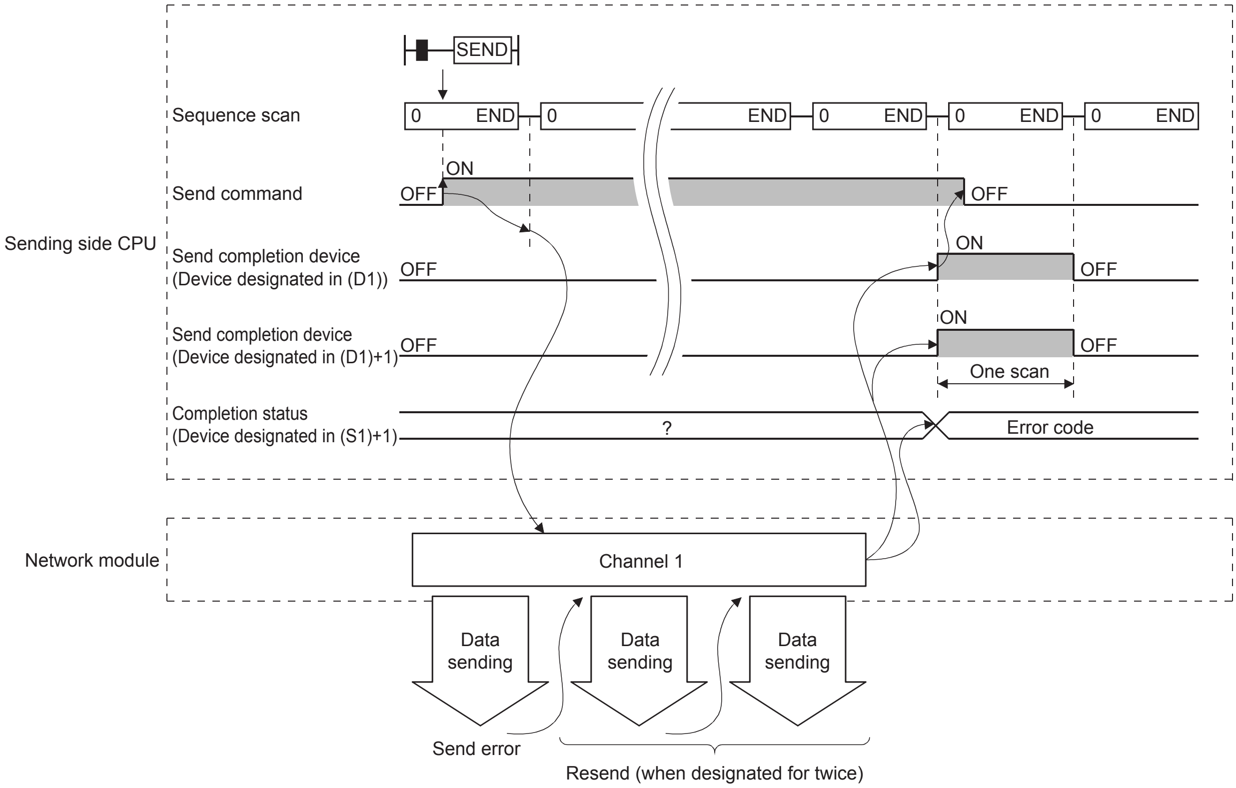
(2) Instruction execution timing

(a) Normal completion

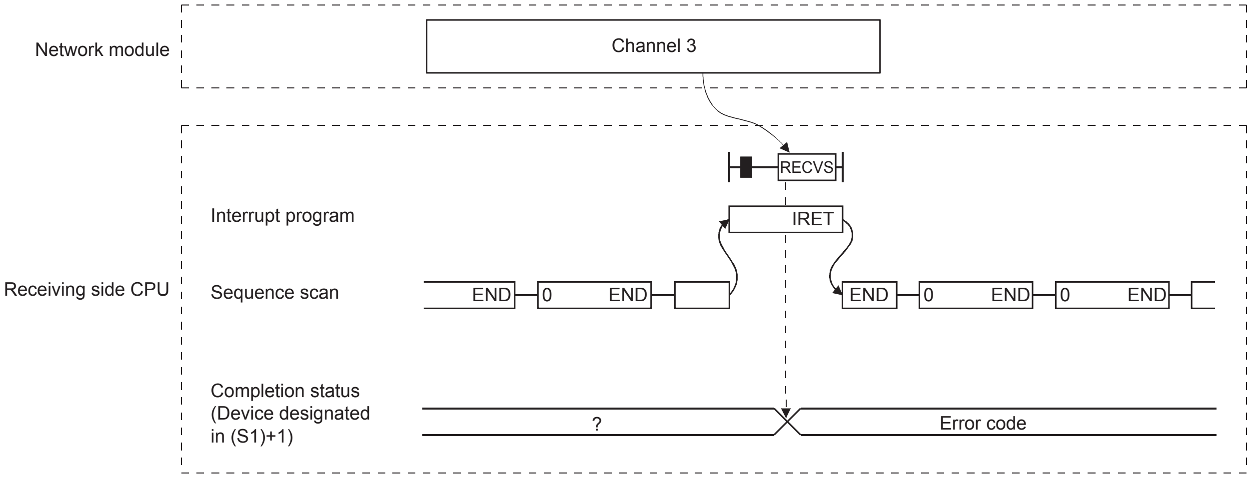


(b) Abnormal completion

1) In case of the SEND instruction

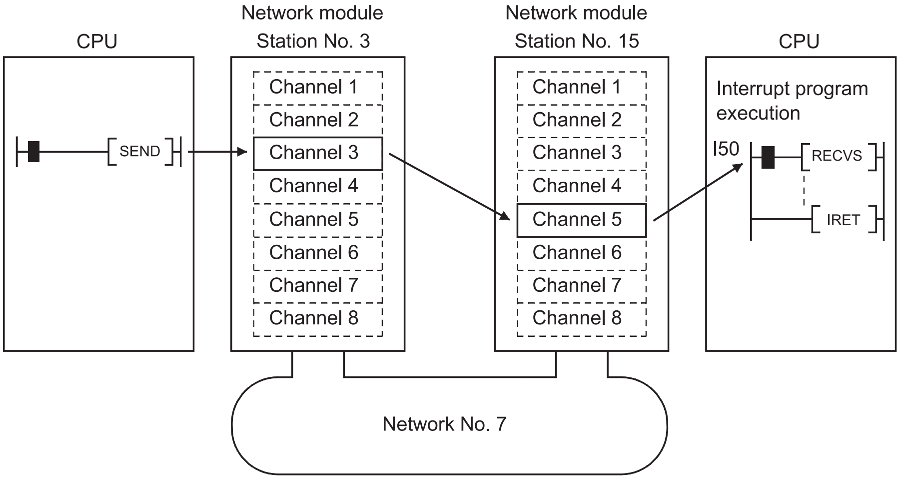


2) In case of the RECVS instruction



7.5.6 Application example

The following explains the parameter settings and program examples.



(1) How to set the parameters on the interrupt setting screen (network parameters)

Set the device code, channel No., and interrupt (SI) No. so that an event is issued to the CPU side when data are received at channel 5 of the network module in the station number 15.

Device code	Device No.	Detection method	Interrupt condition	Word device Setting value	Board No.	Interrupt (SI) No.
RECVS instruction	–	(Edge detection)	(Scan completed)	–	5	0

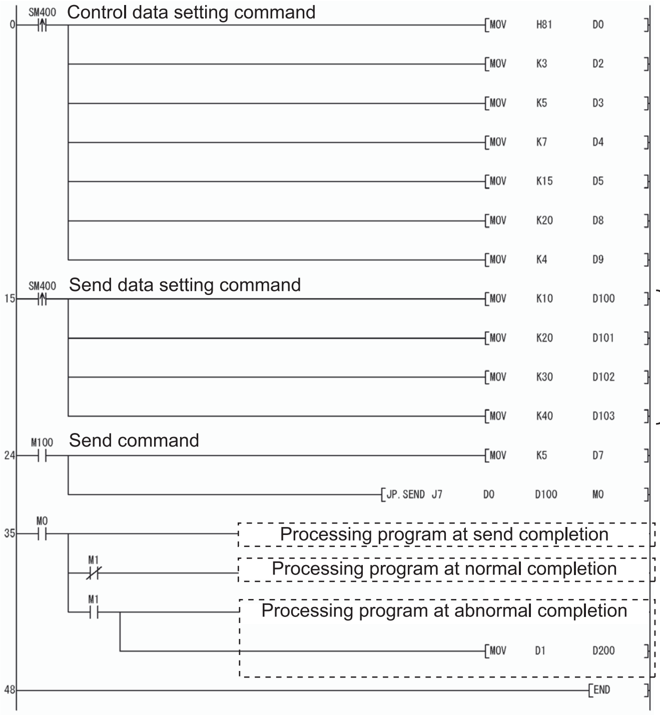
(2) How to set the parameters on the interrupt pointer setting screen (PC parameters)

Set the start I/O No. (0000) of the I/O where the network module is loaded and the interrupt SI No. (0) on the intelligent module side, and the interrupt pointer (I50) that is used for even issue on the CPU side. It is also possible to start multiple interrupt programs by setting the interrupt pointer No. of units (setting count of interrupt conditions).

PLC side			Intelli. module side	
Interrupt pointer Start No.	Interrupt pointer No. of module		Start I/O No.	Start SI No.
50	1	⟺	0000	0

(3) Program examples

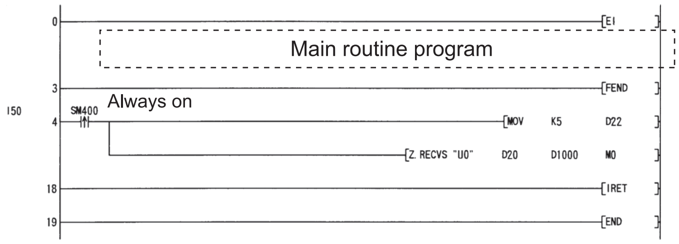
(a) Program for station number 3
When actually using the following program, provide interlocks in the program referring to Section 6.1.



With arrival confirmation/set clock data
Channel used by the host
Target station storage channel
Target station network No.
Target station number
Arrival monitoring time (20s)
Send data length (4 words)
Send data
Number of resend
Read error code

(b) Program for station number 15
When using the program below, provide interlocks in the program referring to Section 6.1.

Interrupt program



Enable interrupt
Completion of the main routine program
Host's storage channel number for reception confirmation
4 words will be stored to D1000 to D1003 from channel 5 of the network module

REMARKS

(1) The RECV instruction execution request flag corresponding to the channel number used in data reception (SB00A0 to SB00A7) is not set.

(2) When the sequence program executes at high speed, the scan time may take longer because the execution time of the interrupt program affects the performance of the interrupt program.

(3) When multiple interrupts occur at the same time, the operation delay may occur.

(4) This function cannot be used during offline or online testing.

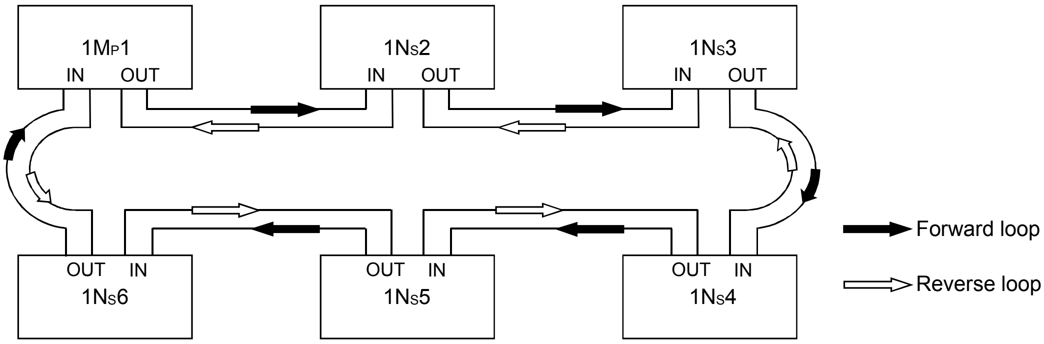
POINT

Since the RECVS instruction starts the interrupt program according to the parameter settings, it is necessary to execute "EI" (Enable Interrupt) with the main routine program. If the enable interrupt has not been executed at the data receiving, the status of "channel being used" is maintained.

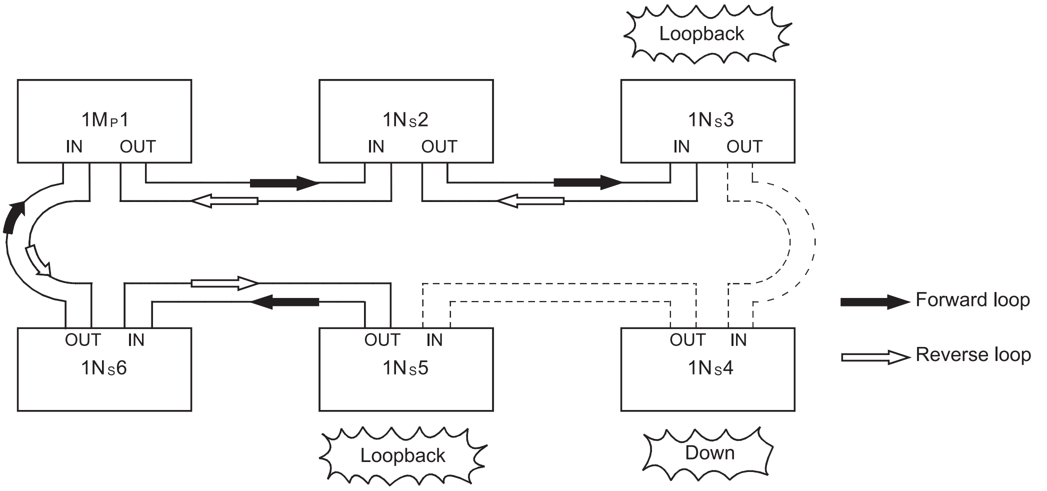
7.6 Multiplex Transmission Function (Optical Loop System)

The multiplex transmission function allows high-speed communications using duplex transmission paths (both the forward and reverse loops) in the optical loop system.
In order to execute the multiplex transmission function, setting for the "Supplementary settings" of the common parameters is required. Note that this setting is not allowed unless the total number of link stations is four stations or more.

(1) Using the multiplex transmission function, the high-speed communication is performed using both the forward and reverse loops effectively.



(2) If an error occurs in the transmission path while the multiplex transmission function is used, data linking continues by communicating only using the transmission path on one side of either the forward or reverse loop, or by switching to the communication using loopback. The transmission speed in this case is 10 Mbps/25 Mbps.



REMARKS

The multiplex transmission function is effective only in reducing the link scan time when the number of connected stations is 16 or more and the link devices assigned with common parameters is 2,048 bytes or more. The link scan time will be 1.1 to 1.3 times faster compared to when the multiplex transmission function is not used.
If the multiplex transmission function is used in the configuration where the number of connected stations or the assigned link devices is less than the above, the link scan time may be increased compared to the case where the function is not used.

7.7 Simple Dual-Structured Network (High Performance model QCPU and Process CPU)

By installing two network modules, a regular network module and a standby network module, to each CPU module, data linking can be continued by switching to link data refreshing with the standby network when a faulty area is detected on the regular network due to wire breakage, etc. When there is no error, both the regular and standby network modules will be executing data linking at the same time.

POINT

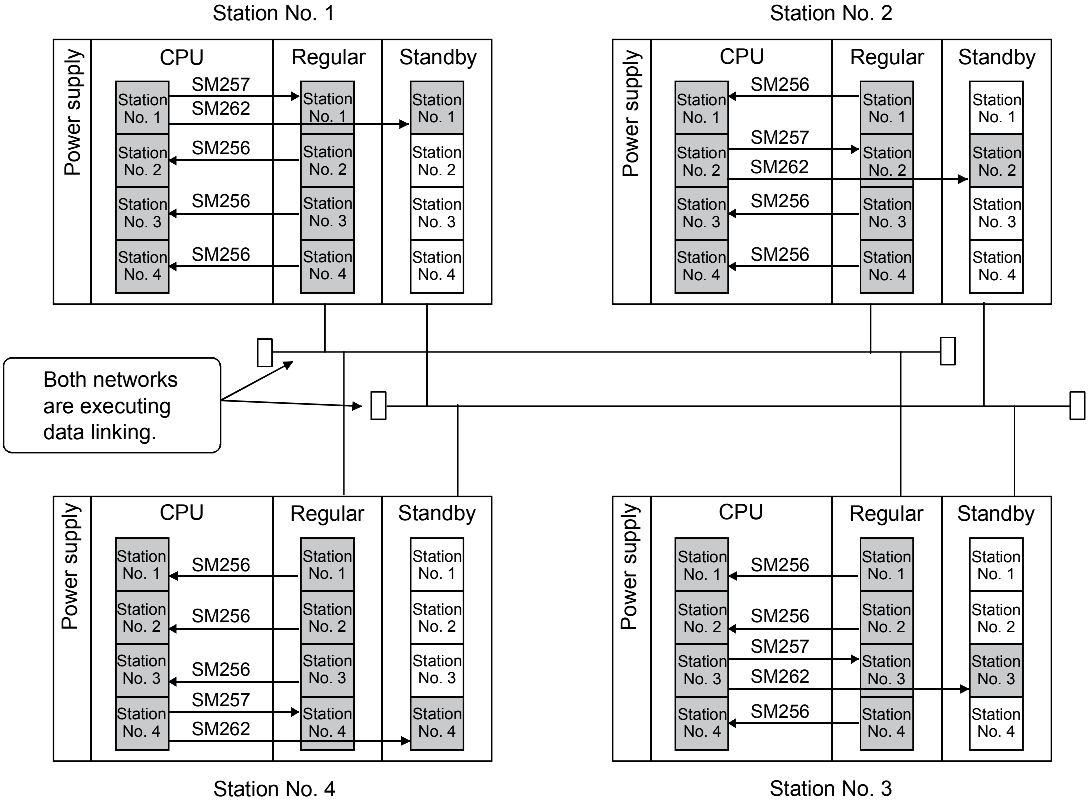
A simple dual-structured system cannot be configured with the Simple dual-structured system cannot be configured with the Basic model QCPU, Redundant CPU, and Universal model QCPU. These CPUs are applicable for a single network system.

(1) The switching between the regular and standby networks (i.e., which network the CPU module refreshes) is performed by the sequence program.
By checking the data link status (SB0074, SW0074 to 0077) of each station, the sequence program refreshes with the standby network modules when an error is detected in the regular network.

(2) Set different network Nos. for the regular and standby network modules.

[When the regular network is normal]
At the initial startup, the CPU module controls the on/off status of the special relay (SM).

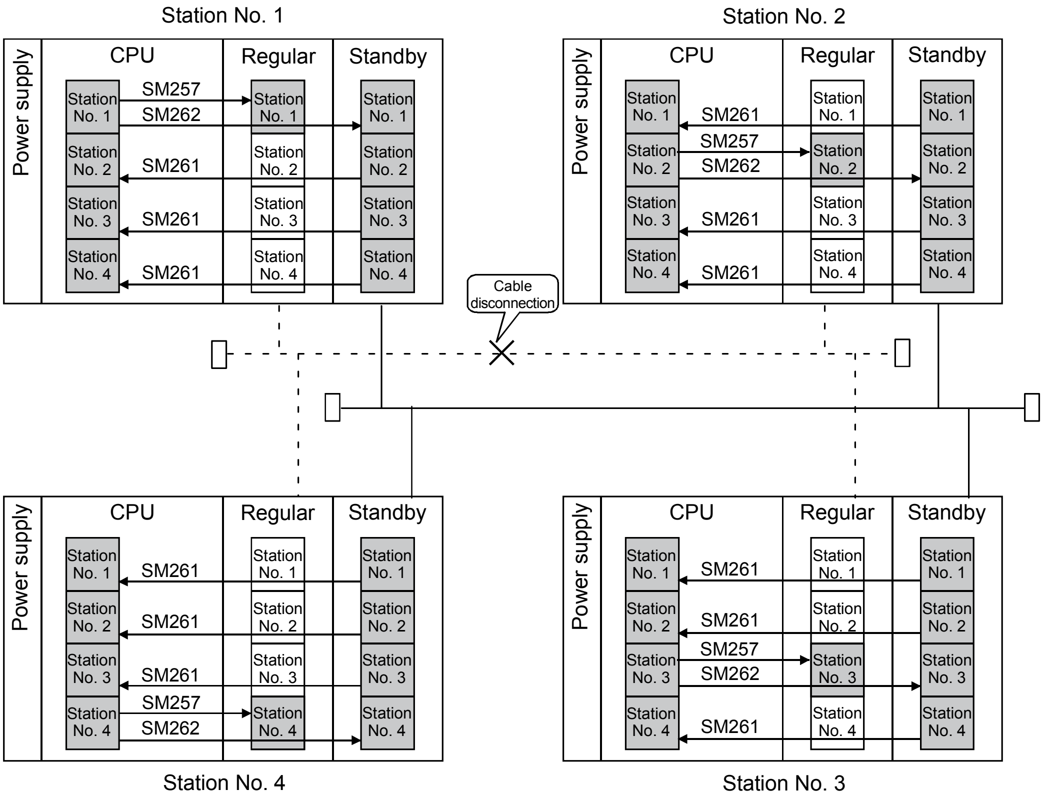
Signal		Status	Remarks
Module 1	SM255 (Distinction between regular/standby network)	Off (Regular)	Controlled by the CPU.
	SM256 (Refresh from the network modules to the CPU)	Off (Refreshes)	Controlled by the user. (Initially controlled by the CPU)
	SM257 (Refresh from the CPU to the network modules)	Off (Refreshes)	
Module 2	SM260 (Distinction between regular/standby network)	On (Standby)	Controlled by the CPU.
	SM261 (Refresh from the network modules to the CPU)	On (Does not refresh)	Controlled by the user. (Initially controlled by the CPU)
	SM262 (Refresh from the CPU to the network modules)	Off (Refreshes)	



[When the regular network is faulty]

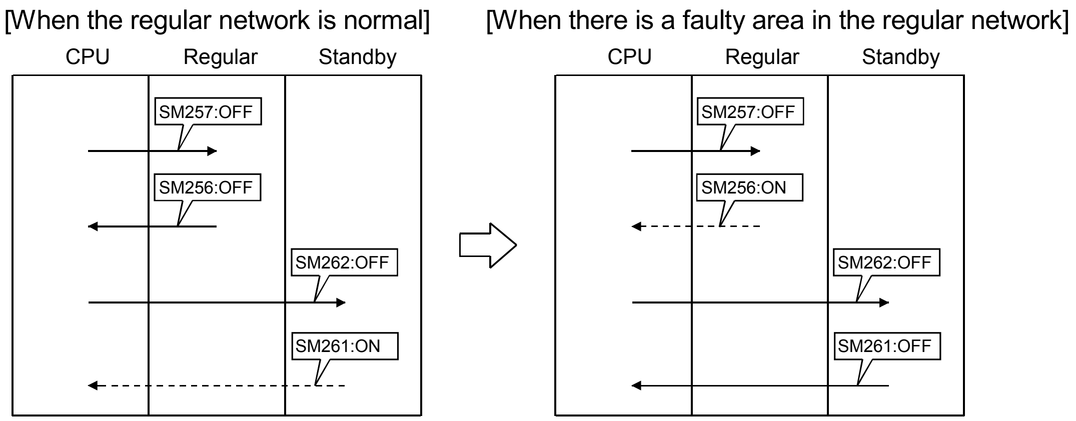
The CPU module does not control the special relay (SM) automatically; thus, must be controlled by the sequence program.

Signal		Status	Remarks
Module 1	SM255 (distinction between regular/standby network)	Off (Regular)	Controlled by the CPU.
	SM256 (Refresh from the network modules to the CPU)	On (Does not refresh)	Controlled by the user. (Initially controlled by the CPU)
	SM257 (Refresh from the CPU to the network modules)	Off (Refreshes)	
Module 2	SM260 (distinction between regular/standby network)	On (Standby)	Controlled by the CPU.
	SM261 (Refresh from the network modules to the CPU)	Off (Refreshes)	Controlled by the user. (Initially controlled by the CPU)
	SM262 (Refresh from the CPU to the network modules)	Off (Refreshes)	

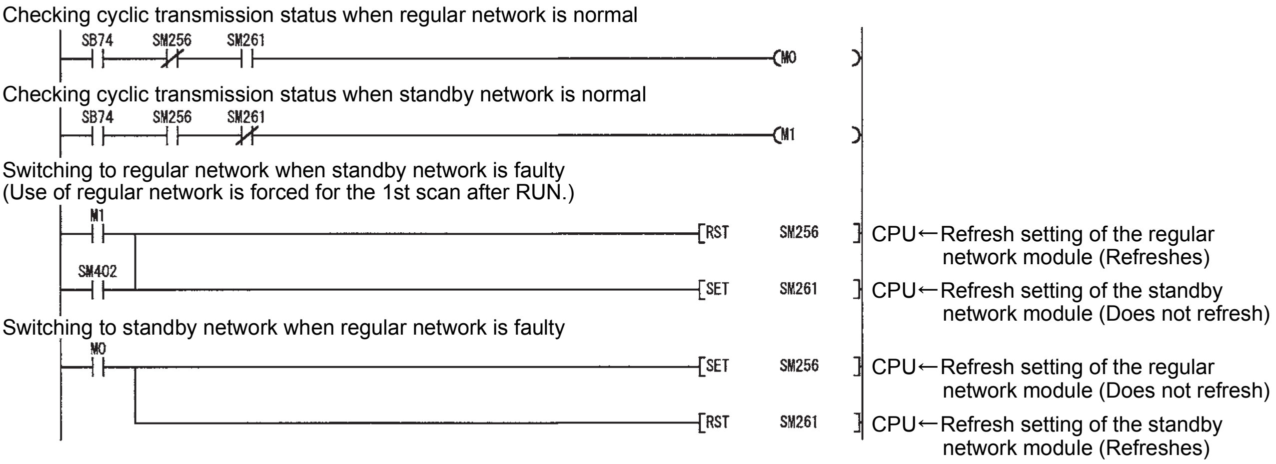


(3) Program for the simple dual-structured system

The following explains the program that performs refresh switching between the regular and standby networks.



(a) The following shows the program that switches to refresh the standby side when a faulty station is detected in the regular network. It is necessary to write the same program to all of the stations in the network.

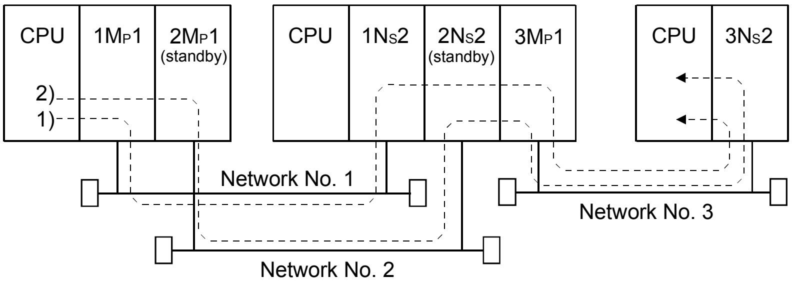


(b) The following table lists the refresh setting devices (SM) for each network.

	Module 1	Module 2	Module 3	Module 4
Regular/standby network setting status (Off: Regular On: Standby)	SM255	SM260	SM265	SM270
Refreshing from the network modules to the CPU (Off: Refreshes On: Does not refresh)	SM256	SM261	SM266	SM271
Refreshing from the CPU to the network modules (Off: Refreshes On: Does not refresh)	SM257	SM262	SM267	SM272

(c) The target network No. in the routing parameters must be rewritten with the RTWRITE instruction because the same number cannot be set twice.

1) When the regular network is normal
2) When the regular network is faulty



	Target network No.	Relay network No.	Relay station No.
1)	3	1	2
2)	3	2	2

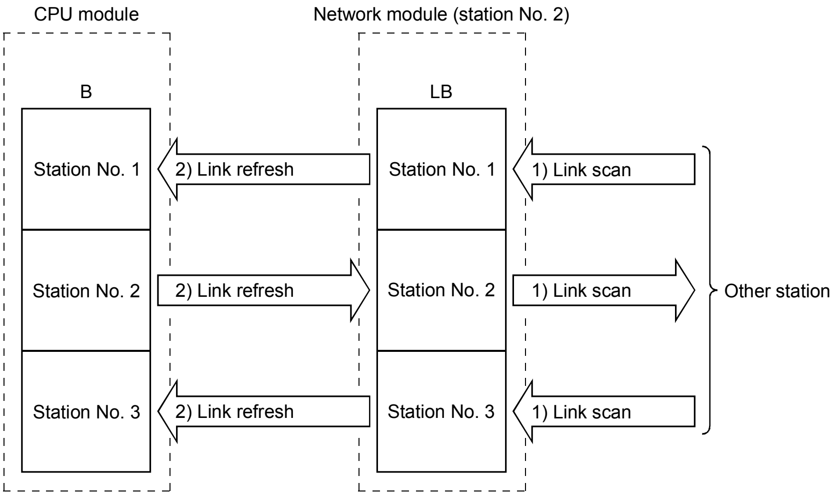
(d) The network No. (Jn) of the dedicated link instruction must be changed as follows.

1) When the regular network is normal

2) When the regular network is faulty

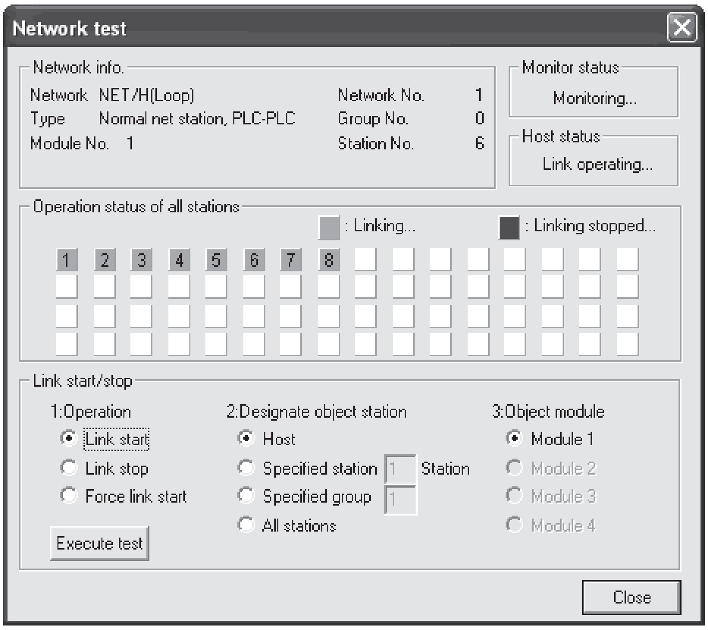
7.8 Stopping/Restarting the Cyclic Transmission and Stopping Link Refreshing (Network Test)

The cyclic transmission can be stopped or restarted using the "Network test" function of GX Developer.
This function is useful for not receiving other station's data or for not sending the host's data at system startup (when debugging), etc.



1) Stopping/restarting the cyclic transmission stops or restarts the data receiving (link scan) between the network modules of the applicable station. However, the data receiving (link refresh) between the CPU module and network modules cannot be stopped or restarted by this processing.

2) Execution using GX Developer
Through the network test, link startup, link stop and forced link startup can be performed using GX Developer. For details of the network testing methods, refer to the GX Developer Operating Manual.



Network test

Network info.
Network NET/H(Loop)
Type Normal net station, PLC-PLC
Module No. 1
Network No. 1
Group No. 0
Station No. 6

Monitor status
Monitoring...

Host status
Link operating...

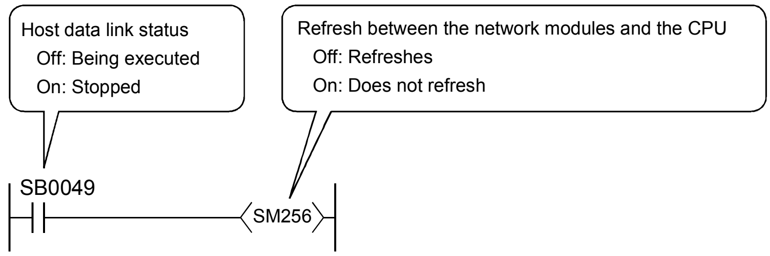
Operation status of all stations
▨ : Linking... ■ : Linking stopped...
1 2 3 4 5 6 7 8

Link start/stop
1:Operation
● Link start
○ Link stop
○ Force link start

2:Designate object station
● Host
○ Specified station 1 Station
○ Specified group 1
○ All stations

3:Object module
● Module 1
○ Module 2
○ Module 3
○ Module 4

3) Execution using the sequence program (Not allowed for the Basic model QCPU and safety CPU)
The data receiving between the CPU module and network modules (link refreshing) is not stopped or restarted by stopping/restarting the cyclic transmission.
Thus, it is necessary to stop/restart link refreshing by the sequence program using the CPU module's special relay (SM).
Link refreshing is stopped or restarted by Host data link status (SB0049) as shown in the following program.



4) Whether or not the restart operation is possible as determined by the stop operation method
The priority order of startup and stop is as follows:
Link startup < Link stop < Forced link startup.

Type of restart operation / Target station / Status of target station	Link startup			Forced link startup		
	Host	Designated station	All stations	Host	Specified station	All stations
Stop link by specifying host	○	×	×	○	○	○
Stop link by specifying specified station	×	○	×	○	○	○
Stop link by specifying all the stations	×	×	○	×	×	○

○: Startup possible ×: Startup not possible

POINT

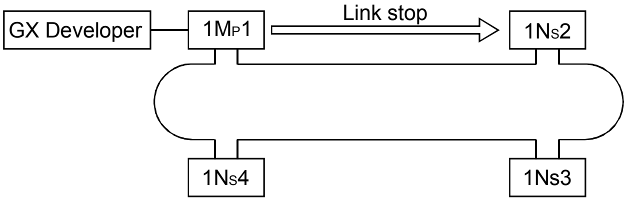
Link start cannot be done even if the link start operation is performed to an offline-mode station (disconnected from the network).
No error will be detected, in this case, because no response is returned from the target station.

(1) Stop/startup operation within a network

The following shows an example in which 1MP1 issues a stop request to 1NS2 and then restarts the data link.

(a) Stop

Stop the cyclic transmission of 1Ns2 with GX Developer.



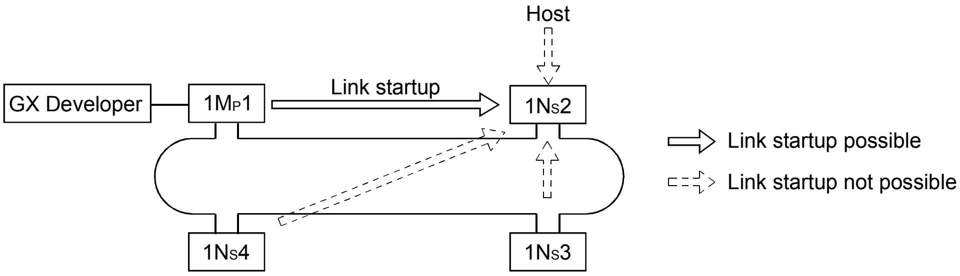
(b) Restart

There are two methods to restart the cyclic transmission of the stopped station: "Link startup" and "Forced link startup."

1) In case of "Link startup"

The stopped station (1NS2) can be restarted only from the station (1MP1) that stopped the link.

The link cannot be started from stations (such as the host, 1NS3 and 1NS4) other than the stop requesting station.



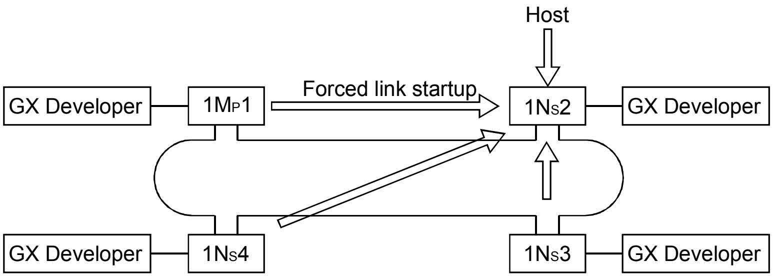
2) In case of "Forced link startup"

The cyclic transmission of the stopped station (1NS2) can also be started from stations (including the host) other than the stop requesting station.

This startup method is used when the stop requesting station is down.

The startup can be executed from the host as well as other stations regardless of the stopped station.

However, the forced startup cannot be executed per station while the link is stopped by specifying all stations at the same time (specifying the host or one station).

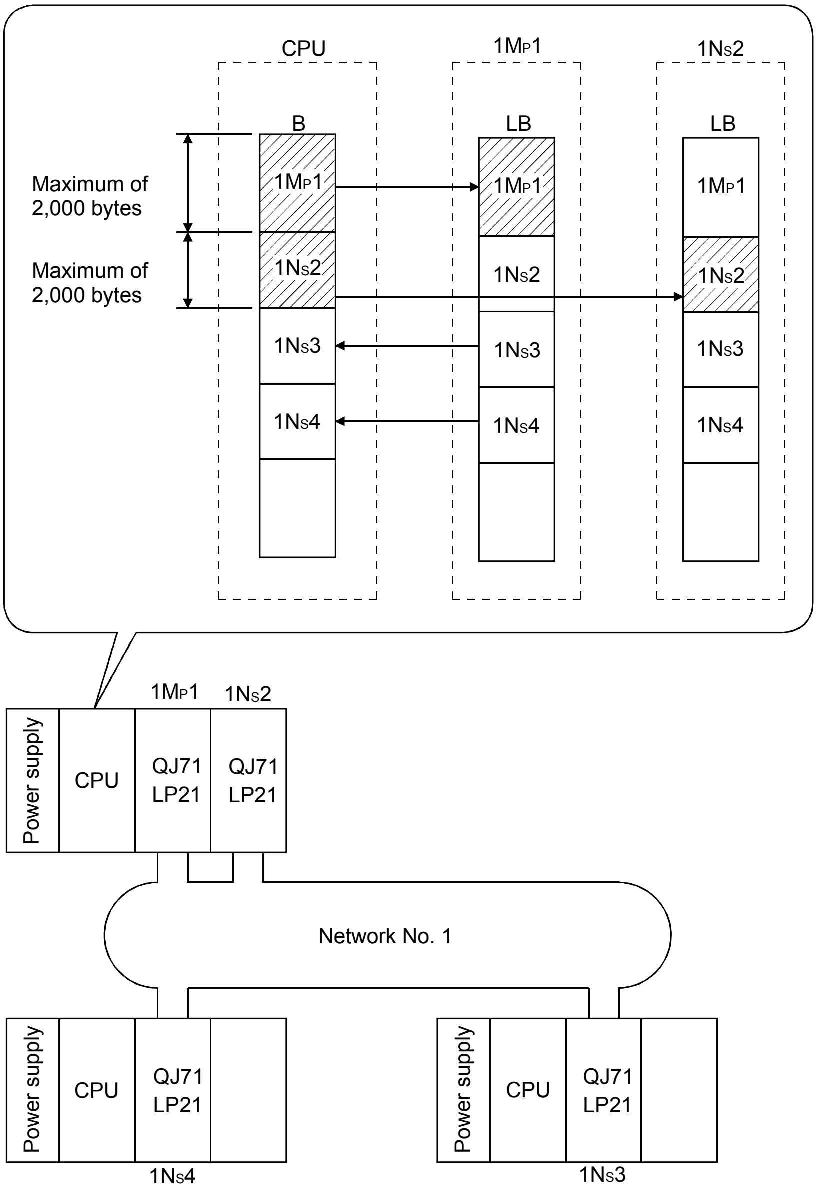


7.9 Increasing the Number of Send Points by Installing Multiple Modules with the Same Network (High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU)

The number of send points (maximum of 2,000 bytes per station) can be increased up to a maximum of 8,000 bytes (when four cards are installed) by installing multiple network modules with the same network number to one CPU module.

[Example]

In the system configuration shown below, a maximum of 4,000 bytes can be send by installing station 1Mp1 and station 1Ns2 on one CPU module.



POINT

The Basic model QCPU, Q00UJCPU, Q00UCPU, Q01UCPU, and safety CPU accept only one network module.

Hence, the number of send points cannot be increased by installing multiple modules on the same network.

POINT

Observe the following precautions when installing multiple network modules with the same network number to one CPU module:

(1) They cannot be set to the same station number.

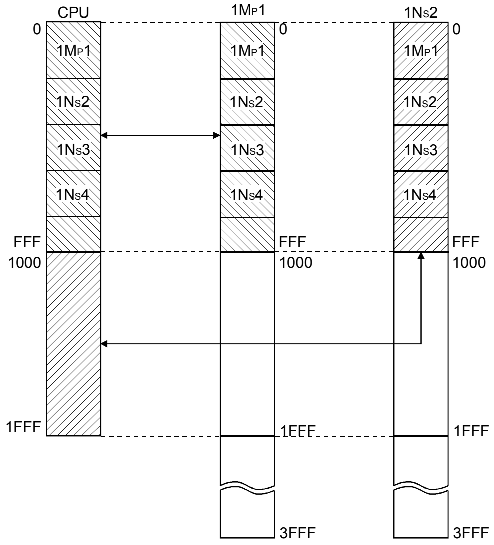
(2) Multiple stations cannot be set as control stations.

(3) When using a function such as the link direct device that specifies the network module by a network No., the execution target is as follows.

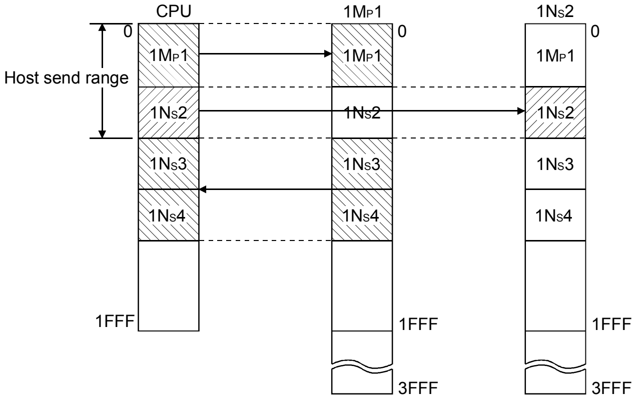
Item	Description
Link direct devices	The module mounted on the slot with the smallest slot No. in the base unit is targeted.
Dedicated instruction	When the host station is the Universal model QCPU: The module which is mounted on the slot with the smallest slot No. in a base unit is targeted. When the host station is other than the Universal model QCPU: The module to which the smallest start I/O address has been assigned in the I/O assignment tab of the PLC parameter dialog box is targeted.

(4) It is necessary to change the settings of the refresh parameters.

1) By default, the refresh range is equally divided for each module. (In this example shown below, only the range of 1MP1 can be transmitted.)



2) It is necessary to change the setting so that the entire host send range (both 1MP1 and 1NS2) can be refreshed.



7.10 Configuring a Network with a Redundant System

This section outlines the operation of a redundant system and describes the network parameters to be set to configure a redundant system with the MELSECNET/H.

7.10.1 Outline of the redundant system operation

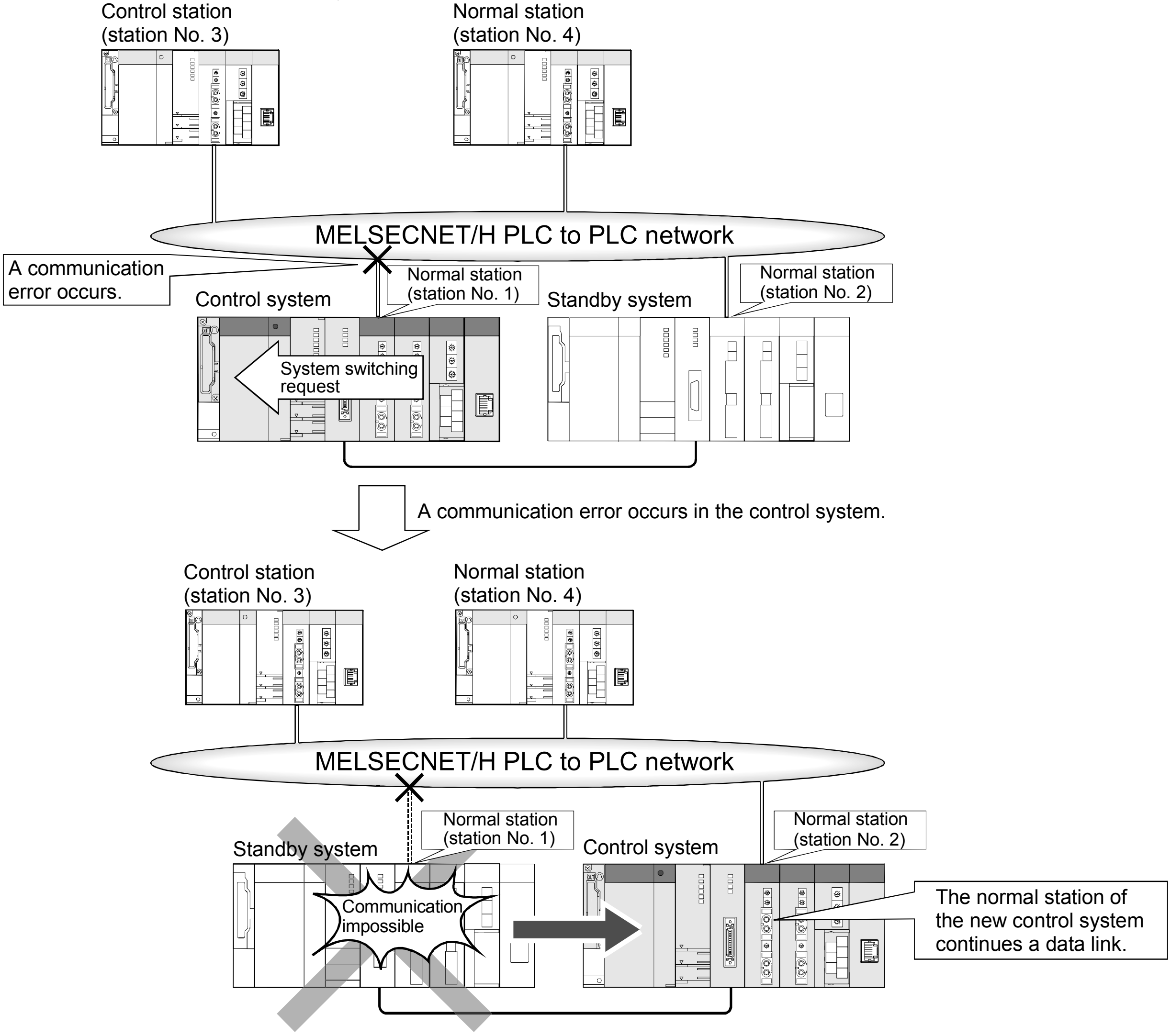
Described below is an outline of the redundant system operation.

(1) Operation of a redundant system

(a) Continuing a data link

If an error has occurred in the control system CPU or a network module, the system will be switched to the standby system on which system control and a data link can be continued.

[Example: When the redundant system is used for a normal station]



(b) Sending and receiving cyclic data

Cyclic data are sent and received by the following processing:

1) Processing by the network module connected to the control system

   The redundant system consists of a control system and a standby system, and only the control system executes programs. Thus, the network module connected to the control system sends and receives cyclic data.

2) Processing by the network module connected to the standby system

   The network module connected to the standby system only receives cyclic data from other stations to continue control when system switching results from either of the following events.

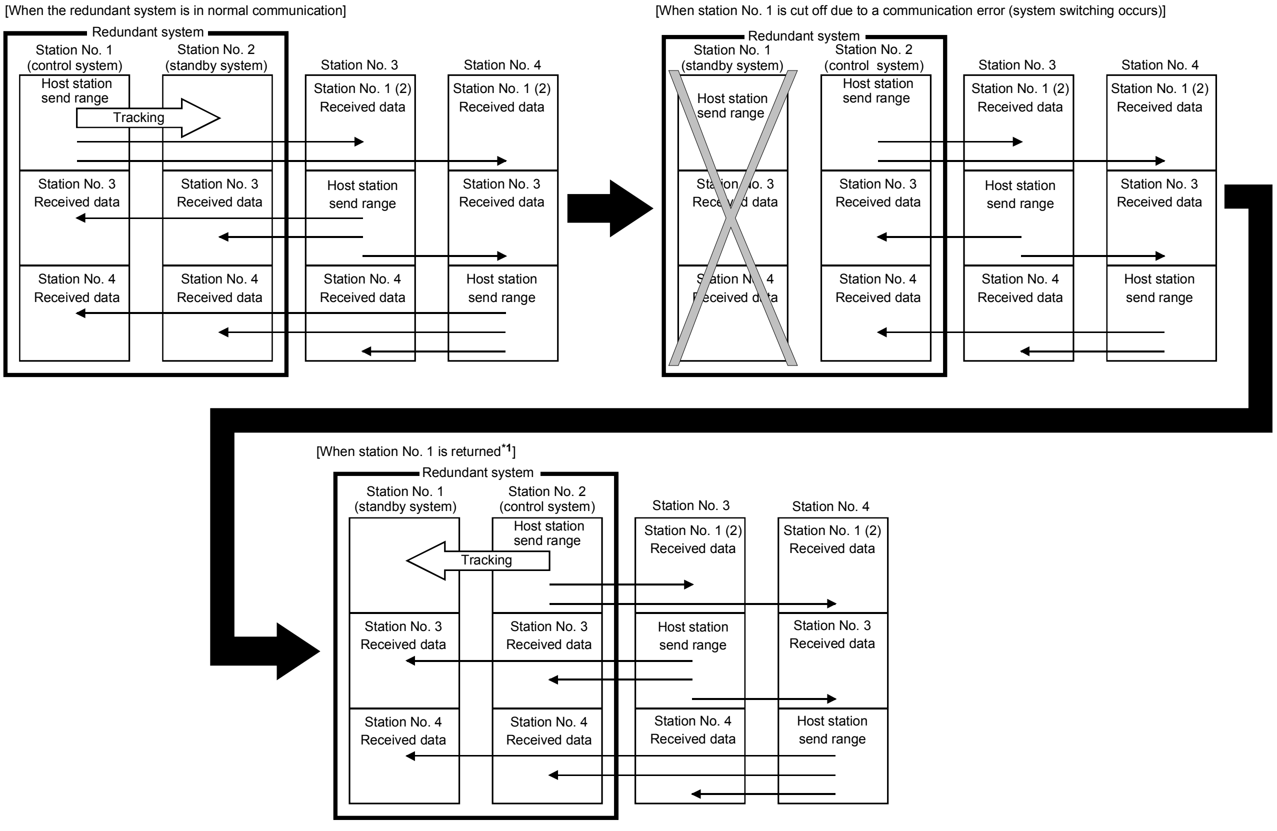
   For details of system switching, refer to the QnPRHCPU User's Manual (Redundant System).

   - System switching (control system's CPU module, network module, or power supply module malfunction or error, etc.)
   - Manual system switching (GX Developer, system switching dedicated instructions, etc.)

   Perform tracking from the control system CPU to the standby system CPU using the host station send range as a tracking device.

To perform cyclic transmission in the redundant system, pairing must be set in the network parameters.

For details of pairing setting, refer to Section 7.10.3.



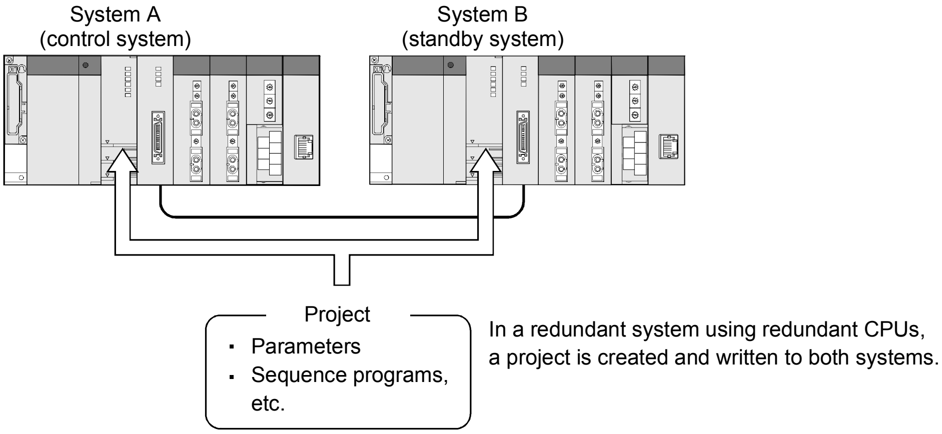
*1: Even if the station is recovered from a communication error, system switching does not occur in the redundant system.

(2) Redundant system project

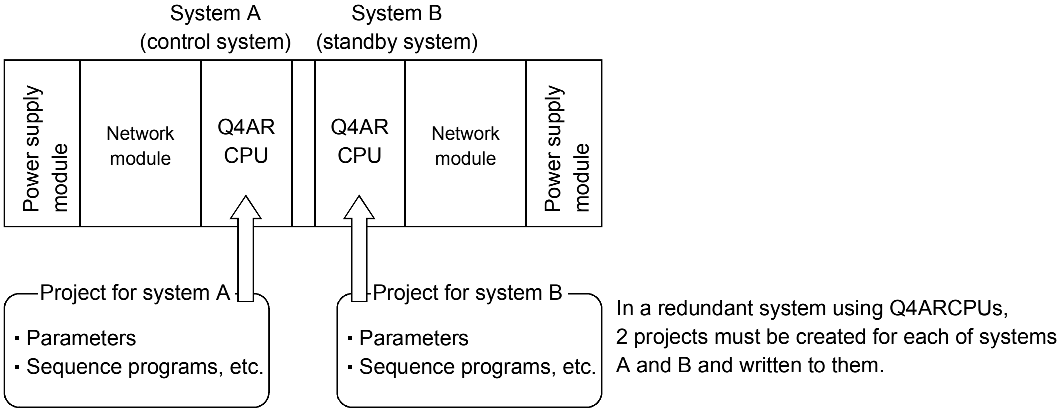
In a redundant system using redundant CPUs, one project is required to create parameters and sequence programs and there is no need to create 2 projects for each of the control and standby systems.

The network modules mounted to the control and standby systems can communicate with each other with a single network parameter.

<Redundant system using redundant CPUs>



<Redundant system using Q4ARCPUs>



(3) Station type at startup of the redundant system (when the redundant system is a control station)

At the time of startup of the redundant system, the network module installed with the control system CPU is identified as a "control station," and the network module installed with the standby system CPU is identified as a "normal station".

7.10.2 Precautions for network configuration including a redundant system

This section describes precautions when configuring a MELSECNET/H or MELSECNET/10 network including a redundant system.
When configuring such a network, pay careful attentions to the following points.
For details, refer to (1) and (2) of this section.

1) Use a network module of function version D or later for the following:
   - Network module to be mounted on the same base with the redundant CPU
   - Network module to be mounted on the same base with a QCPU other than the redundant CPU and used as a control station[*1]
2) Use GX Developer of version 8.18U or later for the following stations, and set network parameters:
   - Network module to be mounted on the same base with the redundant CPU
   - Network module to be mounted on the same base with a QCPU other than the redundant CPU and used as a control station[*2]
3) The network module mounted with an AnUCPU or QnACPU cannot be set as a control station if a redundant system using Q4ARCPUs or if redundant CPUs exist in the network[*3].
4) When the redundant system is in the debug mode, do not connect the network modules on both systems to the network at the same time. In the debug mode, system B CPU also operates with the same parameters as system A. Therefore, duplication of the control station is detected at the time of concurrent connection to the network
5) The following operations must be performed prior to system operation.
   - Power ON/OFF of other stations (including stations on the standby system)
   - Startup and shutdown of the personal computer where a MELSECNET/H interface board is installed

   If the above operation is performed during system operation, a MELSECNET/H module on the control system may detect a communication error and a system-switching request may be issued.
   When the system-switching request is issued before startup of the standby system, a continue error, "CAN'T SWITCH" may be detected in the control system CPU.
   Generally, normal system control is continued even if "CAN'T SWITCH" is detected. However, in the case of the system where error detection will stop the control, program the system to prevent such a control stop.
   For the method for automatically clearing the "CAN'T SWITCH" error, refer to the QnPRHCPU User's Manual (Redundant System).

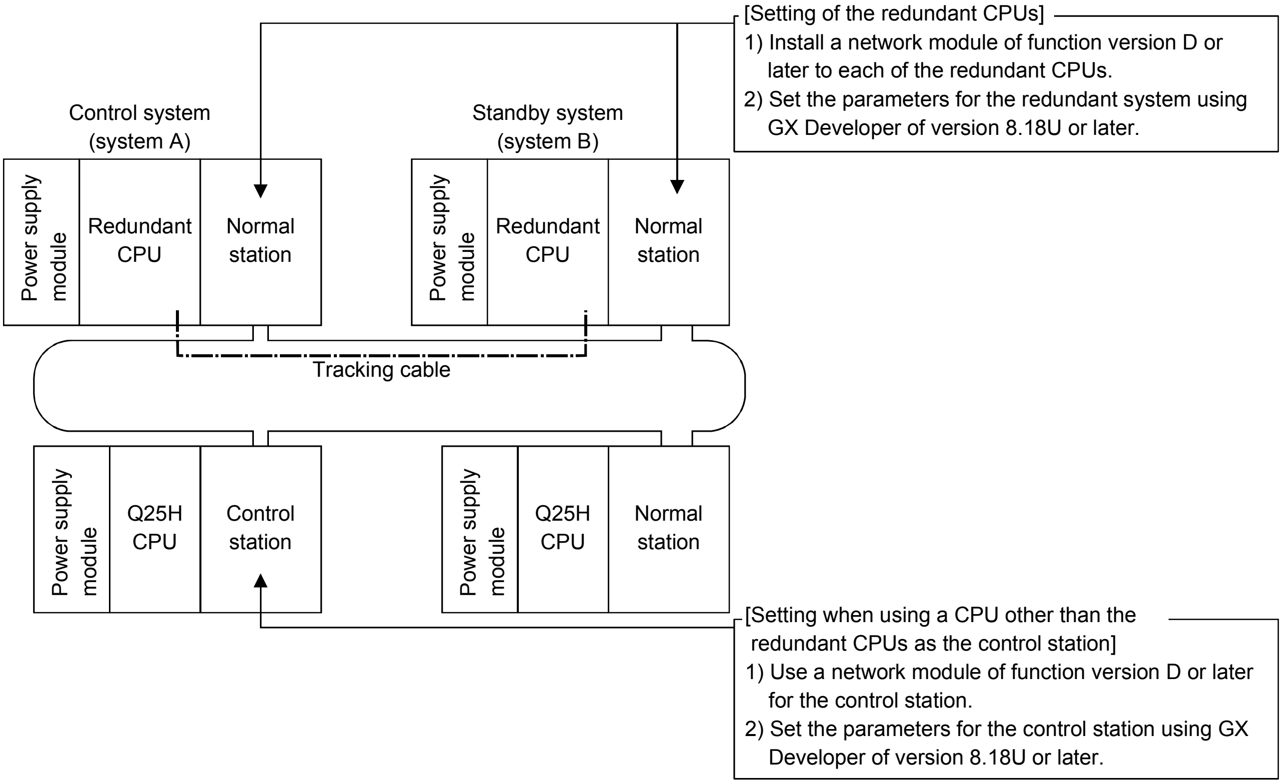
*1: When the redundant CPU is in debug mode, a network module of function version A or B can be used.
*2: When the redundant CPU is in debug mode, GX Developer compatible with each QCPU can be used.
*3: When the Q4ARCPU is used in a single CPU system or when the redundant CPU is in debug mode, the network module mounted with an AnUCPU or QnACPU can be set as a control station.

(1) Configuring a MELSECNET/H network including a redundant system

When configuring a MELSECNET/H network including a redundant system or when connecting a redundant system to an existing MELSECNET/H, follow the restrictions shown below.

(a) When configuring a new MELSECNET/H network including a redundant system

To configure a new MELSECNET/H network including a redundant system, use the following network modules and GX Developer.



[Setting of the redundant CPUs]
1) Install a network module of function version D or later to each of the redundant CPUs.
2) Set the parameters for the redundant system using GX Developer of version 8.18U or later.

[Setting when using a CPU other than the redundant CPUs as the control station]
1) Use a network module of function version D or later for the control station.
2) Set the parameters for the control station using GX Developer of version 8.18U or later.

1) Function versions of network modules

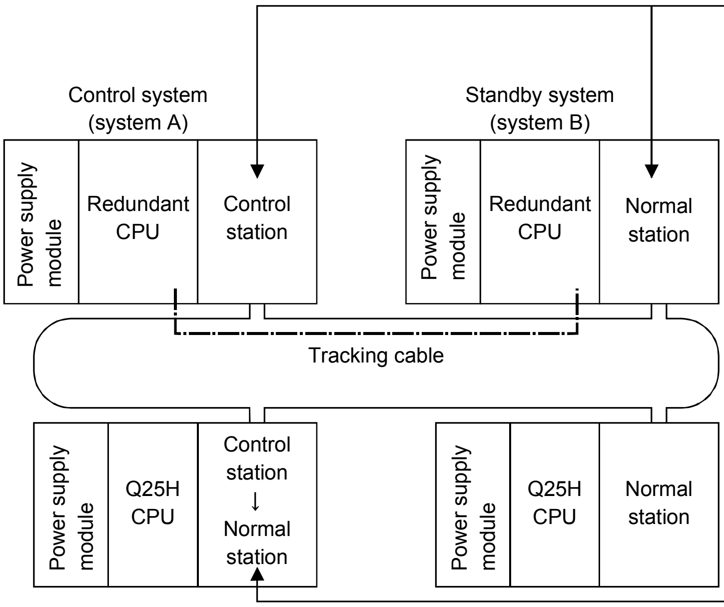
Station type	CPU type	Function version of network module
Control station	Redundant CPU	Function version D or later
	Basic model QCPU	
	High Performance model QCPU	
	Process CPU	
	Universal model QCPU	
	Safety CPU	Setting not available
Normal station	Redundant CPU	Function version D or later
	Basic model QCPU	No restrictions (However, use a model of function version B or later when configuring a multiple CPU system in a normal station.)
	High Performance model QCPU	
	Process CPU	
	Universal model QCPU	
	Safety CPU	

2) Versions of GX Developer or GX Works2 for setting parameters

Station type	CPU type		Version of GX Developer	Version of GX Works2
Control station	Q12PRH/Q25PRHCPU	Redundant system	Version 8.18U or later	Refer to the GX Works2 Version 1 Operating Manual (Common).
	Q00J/Q00/Q01CPU	Single CPU system		
		Multiple CPU system		
	Q02/Q02H/Q06H/Q12/Q25HCPU	Single CPU system		
		Multiple CPU system		
	Q02PH/Q06PHCPU	Single CPU system	Version 8.68W or later	
		Multiple CPU system		
	Q12PH/Q25PHCPU	Single CPU system	Version 8.18U or later	
		Multiple CPU system		
	Q02U/Q03UD/Q04UDH/ Q06UDHCPU	Single CPU system	Version 8.48A or later	
		Multiple CPU system		
	Q13UDH/Q26UDHCPU	Single CPU system	Version 8.62Q or later	
		Multiple CPU system		
	Q03UDE/Q04UDEH/Q06UDEH/ Q13UDEH/Q26UDEHCPU	Single CPU system	Version 8.68W or later	
		Multiple CPU system		
	Q00UJ/Q00U/Q01U/Q10UDH/ Q20UDH/Q10UDEH/ Q20UDEHCPU	Single CPU system	Version 8.78G or later	
		Multiple CPU system		
	CPU modules other than the above	Single CPU system	Setting not available	
		Multiple CPU system		
Normal station	Q12PRH/Q25PRHCPU	Redundant system	Version 8.18U or later	
	Q00J/Q00/Q01CPU	Single CPU system	Version 7 or later	
		Multiple CPU system	Version 8 or later	
	Q02/Q02H/Q06H/Q12H/Q25HCPU	Single CPU system	Version 4 or later	
		Multiple CPU system	Version 6 or later	
	Q02PH/Q06PHCPU	Single CPU system	Version 8.68W or later	
		Multiple CPU system		
	Q12PH/Q25PHCPU	Single CPU system	Version 7.10 or later	
		Multiple CPU system		
	Q02U/Q03UD/Q04UDH/ Q06UDHCPU	Single CPU system	Version 8.48A or later	
		Multiple CPU system		
	Q13UDH/Q26UDHCPU	Single CPU system	Version 8.62Q or later	
		Multiple CPU system		
	Q03UDE/Q04UDEH/Q06UDEH/ Q13UDEH/Q26UDEHCPU	Multiple CPU system	Version 8.68W or later	
		Single CPU system		
	Q00UJ/Q00U/Q01U/Q10UDH/ Q20UDH/Q10UDEH/ Q20UDEHCPU	Single CPU system	Version 8.78G or later	
		Multiple CPU system		
	QS001CPU	Single CPU system	Version 8.40S or later	
	CPU modules other than the above	Single CPU system	Setting not available	
		Multiple CPU system		

(b) When connecting a redundant system to an existing MELSECNET/H network
The method for configuring a network depends on conditions 1) and 2) shown below.

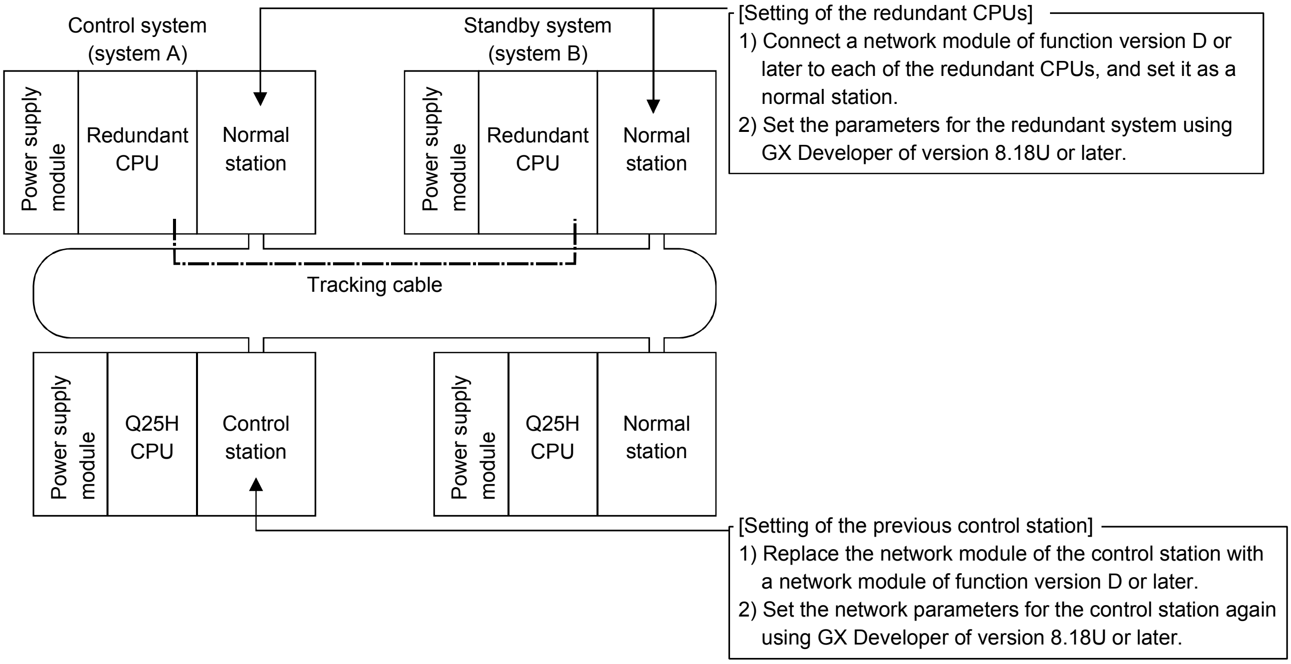
1) When connecting a redundant system as the control station
Change the previous control station to a normal station, and connect a redundant system.
Set new network parameters to the redundant system using GX Developer of version 8.18U or later.



[Setting of the redundant CPUs]
1) Install network modules of function version D or later to the redundant CPUs, and set one of them as the control station.
2) Set the parameters for the redundant system using GX Developer of version 8.18U or later.

[Setting of the previous control station]
1) Change the previous control station status to a normal station.

2) When connecting a redundant system as normal stations
Replace the network module of the control station with a network module of function version D or later (CPU module change is not required).
After changing the network module of the control station, use GX Developer of version 8.18U or later to make the network parameter setting again.



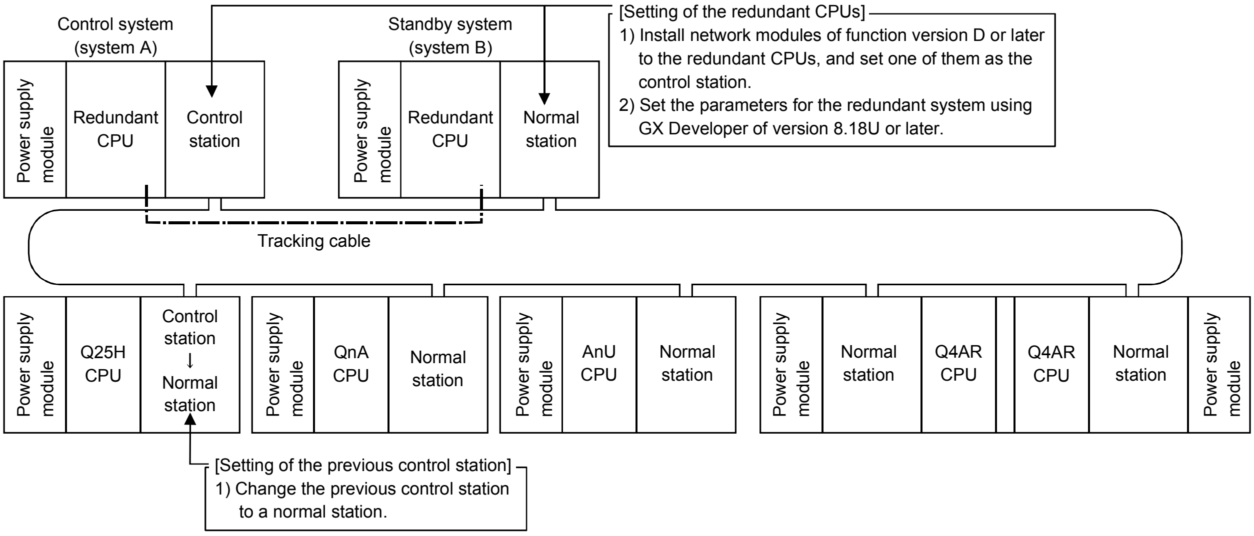
[Setting of the redundant CPUs]
1) Connect a network module of function version D or later to each of the redundant CPUs, and set it as a normal station.
2) Set the parameters for the redundant system using GX Developer of version 8.18U or later.

[Setting of the previous control station]
1) Replace the network module of the control station with a network module of function version D or later.
2) Set the network parameters for the control station again using GX Developer of version 8.18U or later.

(2) Connecting a redundant system to an existing MELSECNET/10

When connecting a redundant system to an existing MELSECNET/10, the method for configuring a network depends on conditions (a) to (d) shown below.

(a) When connecting a redundant system as the control station
Change the previous control station to a normal station, and connect the redundant system.
Set new network parameters to the redundant system using GX Developer of version 8.18U or later.



[Setting of the redundant CPUs]
1) Install network modules of function version D or later to the redundant CPUs, and set one of them as the control station.
2) Set the parameters for the redundant system using GX Developer of version 8.18U or later.

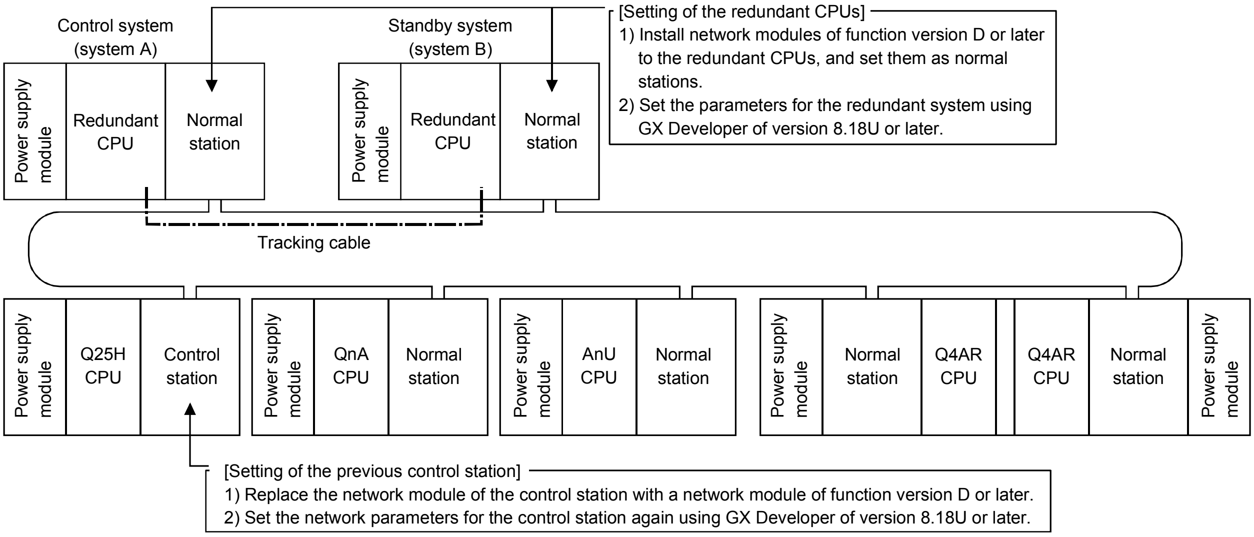
[Setting of the previous control station]
1) Change the previous control station to a normal station.

(b) When connecting a redundant system as normal stations

1) Connecting a redundant system as normal stations to a MELSECNET/10 including a QCPU (other than the redundant CPU) station acting as a control station

Replace the network module of the control station with a network module of function version D or later (it is not necessary to change the CPU module).

After changing the network module of the control station, use GX Developer of version 8.18U or later to reset network parameters.



[Setting of the redundant CPUs]
1) Install network modules of function version D or later to the redundant CPUs, and set them as normal stations.
2) Set the parameters for the redundant system using GX Developer of version 8.18U or later.

[Setting of the previous control station]
1) Replace the network module of the control station with a network module of function version D or later.
2) Set the network parameters for the control station again using GX Developer of version 8.18U or later.

2) When connecting a redundant system as normal stations to a MELSECNET/10 including a Q4ARCPU[*1] station acting as a control station

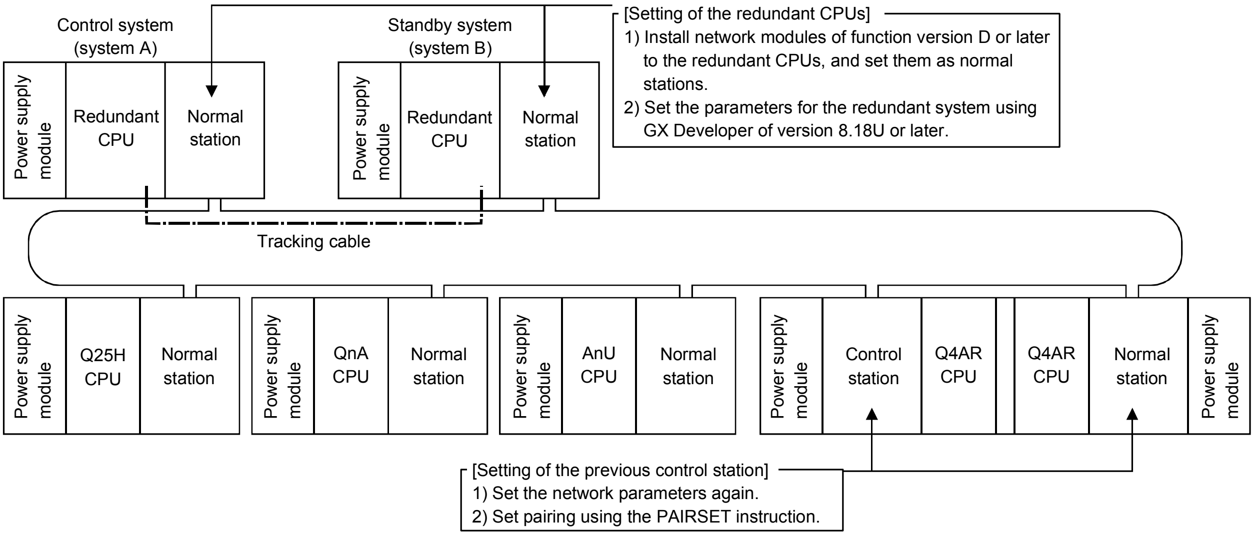
Set the network parameters for the control station (Q4ARCPU[*1]) again.

Make the pairing setting of the redundant system using the PAIRSET instruction at the control station (Q4ARCPU).

For details of the PAIRSET instruction, refer to the QnA/Q4AR MELSECNET/10 Network System Reference Manual.

*1: It represents both a single and a redundant system Q4ARCPU.

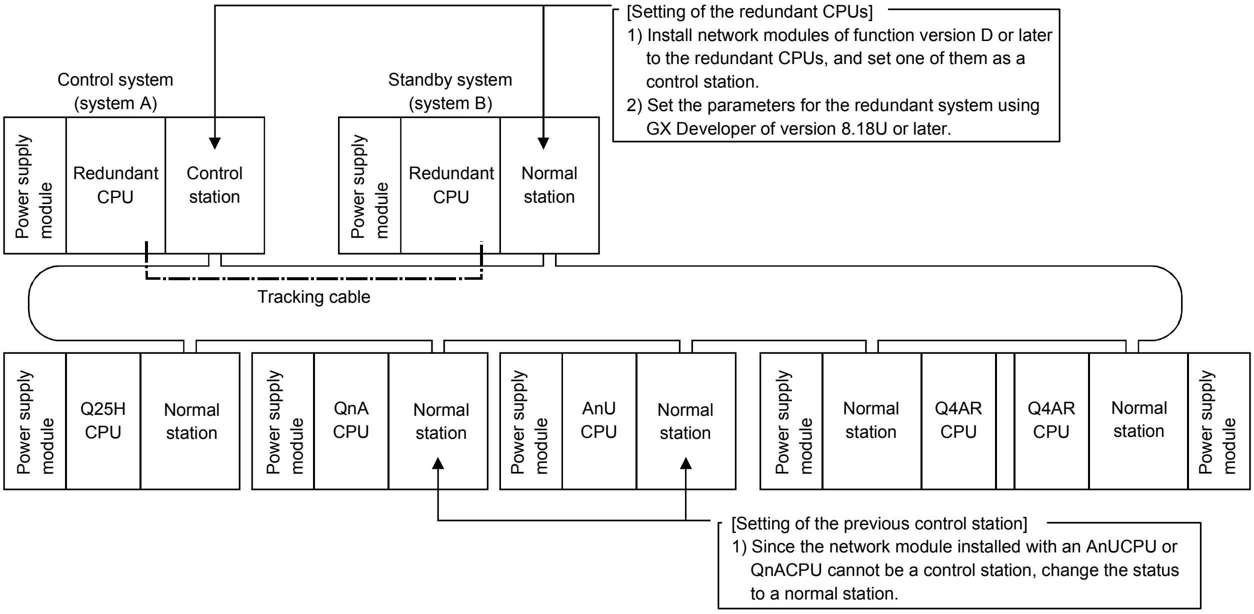
[When the redundant system using a Q4ARCP is the control station]



[Setting of the redundant CPUs]
1) Install network modules of function version D or later to the redundant CPUs, and set them as normal stations.
2) Set the parameters for the redundant system using GX Developer of version 8.18U or later.

[Setting of the previous control station]
1) Set the network parameters again.
2) Set pairing using the PAIRSET instruction.

3) When connecting a redundant system as normal stations to a MELSECNET/10 including an AnUCPU or QnACPU station acting as a control station
The network module installed with an AnUCPU or QnACPU cannot be set as a control station if a redundant system using Q4ARCPUs or redundant CPUs exists in the network.
Change the network module status of the AnCPU or QnACPU to a normal station, and connect the redundant system as the control station. (Refer to (2) (a) in this section.)



[Setting of the redundant CPUs]
1) Install network modules of function version D or later to the redundant CPUs, and set one of them as a control station.
2) Set the parameters for the redundant system using GX Developer of version 8.18U or later.

[Setting of the previous control station]
1) Since the network module installed with an AnUCPU or QnACPU cannot be a control station, change the status to a normal station.

7.10.3 Pairing setting in a redundant system

A redundant system consists of a control system and a standby system.
In pairing setting, set a combination of the station numbers of the network modules making up the redundant system.
When there is a redundant system in the network, the pairing setting must be done with the common parameters of the control station[*1]. [*2]

*1: For the control station, use a network module of function version D or later.
*2: Make the pairing setting using GX Developer of version 8.18U or later.

(1) Setting items

Make settings in "Pairing" on the "Network Range Assignment" screen with careful consideration for the following points:

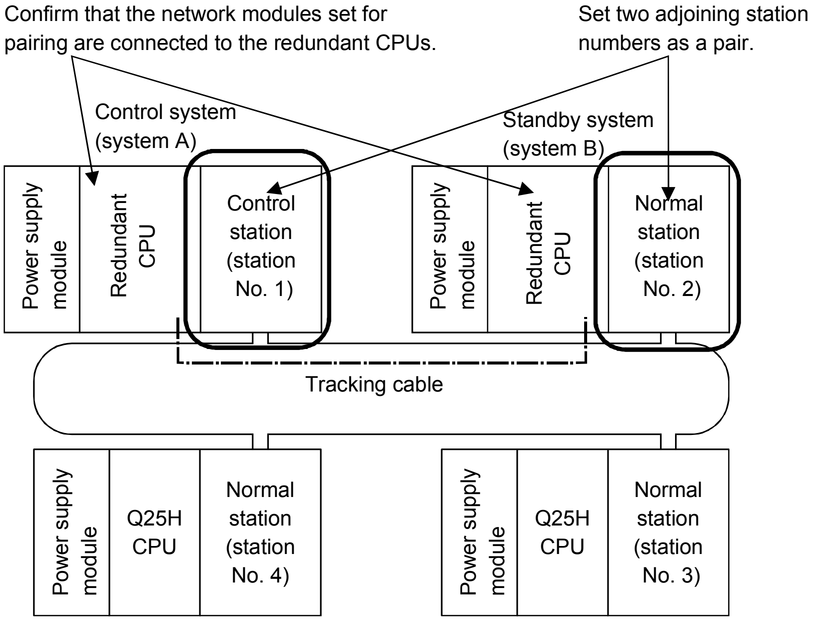
1) Set numbers of two adjoining stations as a pair. The station with the smaller station number can be set to either redundant CPU of system A or B.
2) The last station number and station No. 1 (example: station Nos. 64 and 1) cannot be paired.
3) Confirm that the stations to be paired are installed with redundant CPUs.
If either of the paired stations has a QCPU other than the redundant CPU, an error will occur in the CPU module.

POINT

Before pairing setting, confirm the station numbers of the network modules.
If the contents of pairing setting do not match the actual combination of the station numbers of the network modules, a receive data error will occur when the power is turned on or at the time of system switching.

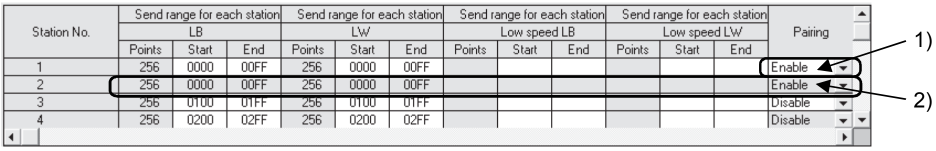
(2) Setting example and cyclic transmission

The following system configuration example is used to describe a setting example and cyclic transmission.



(a) Setting example

This example shows the send range for each station (LB/LW setting) when 256 points are assigned to each of station Nos. 1 to 4.



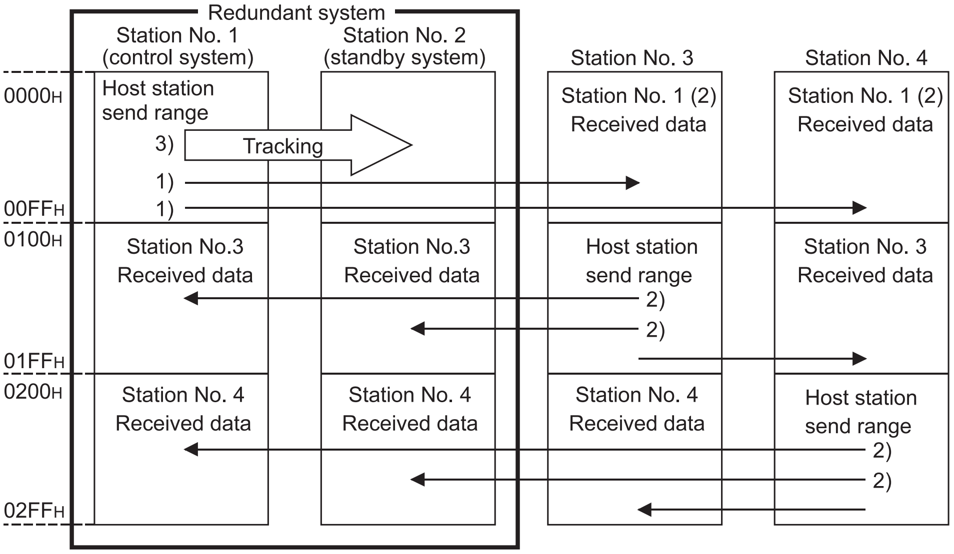
Station No.	Send range for each station LB			Send range for each station LW			Send range for each station Low speed LB			Send range for each station Low speed LW			Pairing
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1	256	0000	00FF	256	0000	00FF							Enable
2	256	0000	00FF	256	0000	00FF							Enable
3	256	0100	01FF	256	0100	01FF							Disable
4	256	0200	02FF	256	0200	02FF							Disable

1) To pair station Nos. 1 and 2, set the smaller station number to "Enable" (station No. 1 in this case).

2) By setting station No. 1 to "Enable", the send range for station No. 1 will be copied as that for station No. 2.

(b) Cyclic transmission

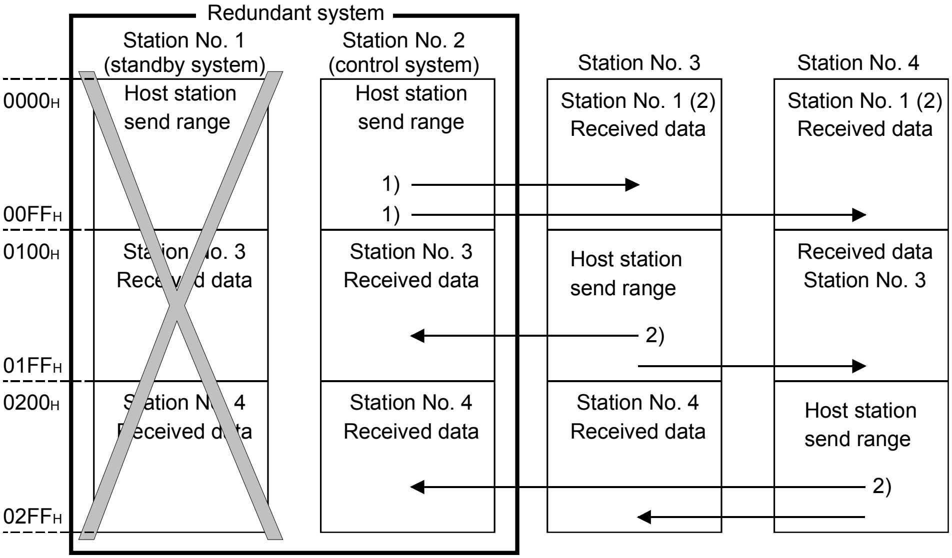
[When the redundant system is in normal communication]



1) The send range for the redundant system is sent from the control system CPU of station No. 1 or 2.
2) Station Nos. 1 and 2 receive data from another station.
3) The data sent from station No. 1 of the control system CPU to another station are transferred to the standby system CPU as tracking device data.

[When station No. 1 is cut off due to a communication error (system switching occurs)]

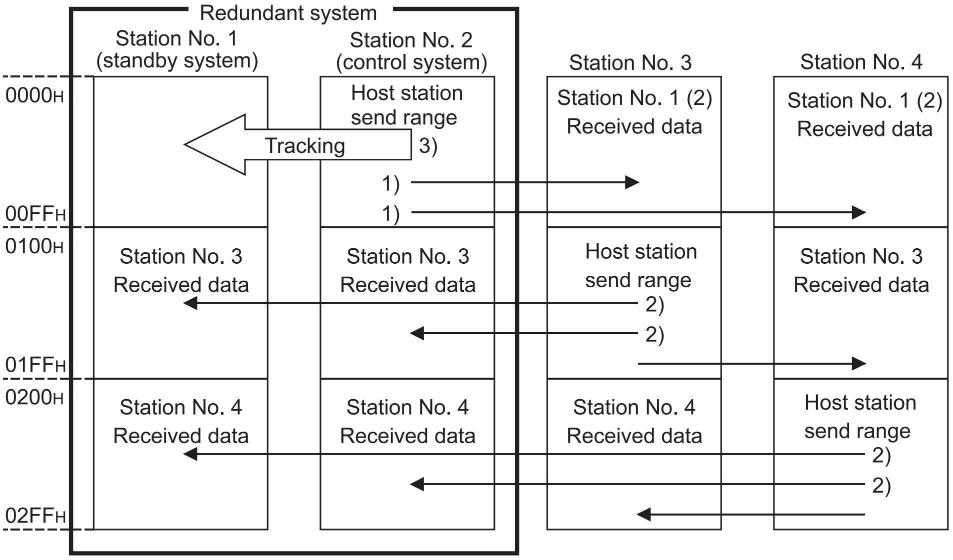
If a communication error occurs in station No. 1 and it is consequently cut off from the network, the network module automatically issues a system switching request to the control system CPU, and system switching occurs in the redundant system.
After system switching, station No. 2, a new control system, continues a data link.
Cyclic transmission after system switching in the redundant system is shown below.



1) Station No. 2 takes over the host station send range data handled by station No. 1 (data tracked) and sends them to other stations without discontinuing a data link.
2) Station No. 2 receives data from other stations.

[When station No. 1 is returned to the system]

When station No. 1 separated due to a communication error is returned to the system, the redundant CPU installed with the station No. 1 network module becomes the standby system CPU (system switching will not occur in the redundant system). Cyclic transmission after recovery from a communication error is shown below.



1) Station No. 2 of the control system CPU sends the send range data of the redundant system.
2) Station Nos. 1 and 2 receive data from other stations.
3) The data sent from station No. 2 of the control system CPU to other stations are transferred to the standby system CPU as tracking device data.

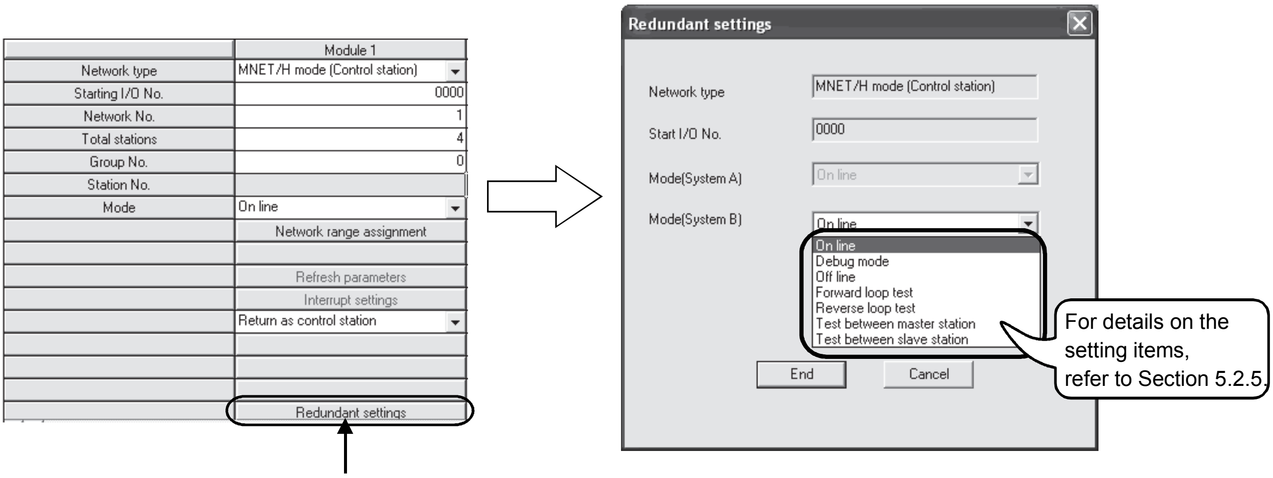
POINT

(1) Communication by LX/LY is not supported by the pairing setting.
(2) Set the refresh target devices of LB/LW set in the host station send range of the redundant system as tracking devices. For details, refer to the QnPRHCPU User's Manual (Redundant System).
(3) When tracking a link special relay and a link special register, exercise care not to transfer the link special relay (SB0020 to SB01FF) and the link special register (SW0020 to SW01FF) in use by the system.

7.10.4 Redundant settings in a redundant system

In the redundant settings, set the operation mode of the network module installed in the system B.
When the mode setting switch of the network module mounted to system B is set to online (0 or 4), the mode selection of this parameter is valid.

(Redundant settings screen)



	Module 1
Network type	MNET/H mode (Control station)
Starting I/O No.	0000
Network No.	1
Total stations	4
Group No.	0
Station No.	
Mode	On line
	Return as control station

Redundant settings

Network type: MNET/H mode (Control station)
Start I/O No.: 0000
Mode(System A): On line
Mode(System B): On line

For details on the setting items, refer to Section 5.2.5.

Click on the Redundant settings button.

(1) Using the redundant system in backup mode

To use the redundant system in backup mode, set the same operation mode as that of system A for system B.
If the mode of the network module is different between systems A and B, an error will occur in the redundant CPUs.

(2) Performing station-to-station or forward/reverse loop test

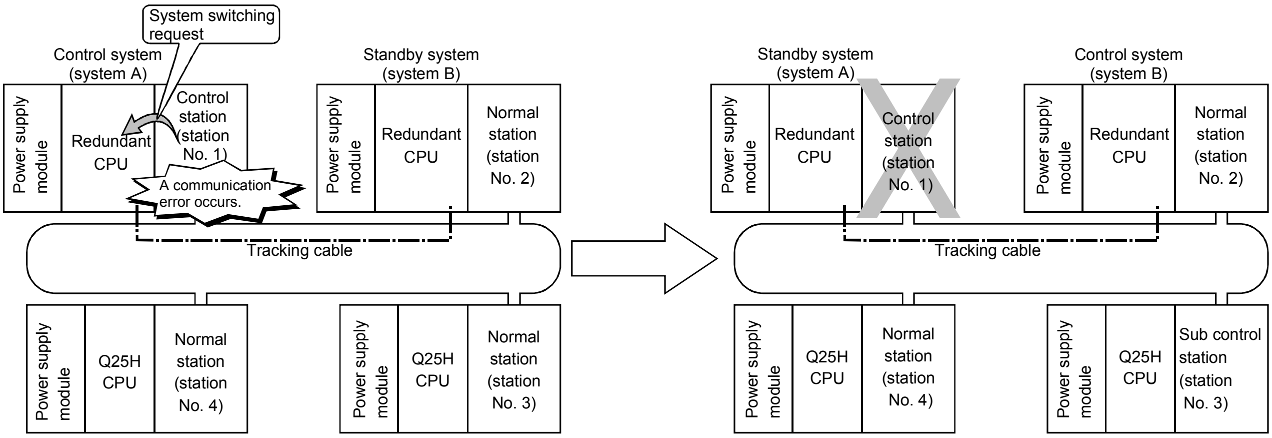
To perform station-to-station or forward/reverse loop test, set the mode of system B according to the relevant test setting.
For detail, refer to Sections 4.7.1 and 4.7.2.

POINT

(1) Except the operation mode, use the same network parameters between systems A and B.
(2) Set the mode of the network module mounted to system A in "Mode" on the Network Setting screen.

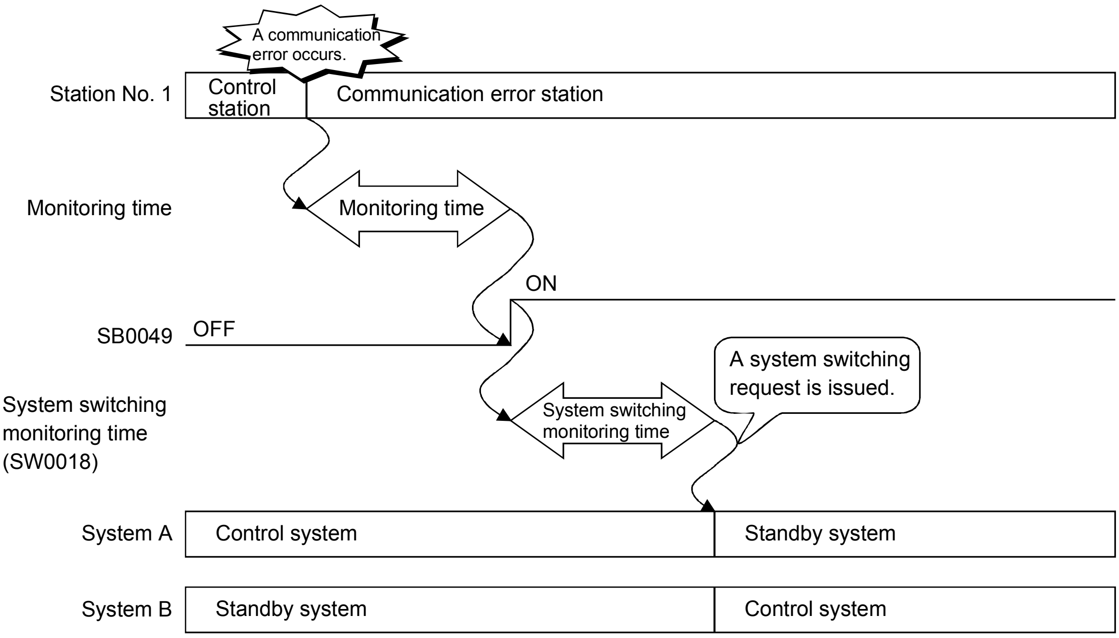
7.10.5 System switching request to the control system CPU

The network module in the control system of the redundant system automatically issues a system switching request to the control system CPU when the data link status of the network module remains faulty (the D. LINK LED goes off) over the system switching monitoring time (the time set at SW0018).



(1) Process for issuing a system switching request

1) An error occurs in the network module mounted to the control system CPU.
2) After the monitoring time has elapsed, the D. LINK LED goes off (the host station data link status (SB0049) is ON).
3) After the time set for the switching monitoring time setting (SW0018) has elapsed, a system switching request is issued to the control system CPU.
4) Upon receipt of the system switching request from the network module, the control system CPU switches the systems.
5) After system switching has been completed, the network module mounted to the new control system CPU continues a data link.



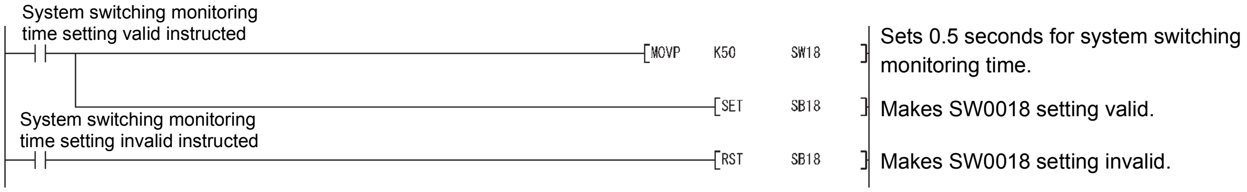
(2) System switching monitoring time

Set the time between an error occurring in the own station data link status (The D. LINK LED turns off.) and a system switching request issued using SW0018 (System switching monitoring time setting).
For details of SB and SW, refer to Appendices 3 and 4.

Set value	Monitoring time before issuing a system switching request
0 (default)	A system switching request is issued 2 seconds after SB0049 turns on.
1 to 500[*1]	A system switching request is issued (set value x 10 ms) after SB0049 turns on.

*1: This set value is valid when the system switching monitoring time setting valid flag (SB0018) is on.

To reduce the system switching monitoring time from 2 seconds (default) to 0.5 seconds, set SB0018 and SW0018 in the sequence program as shown below.



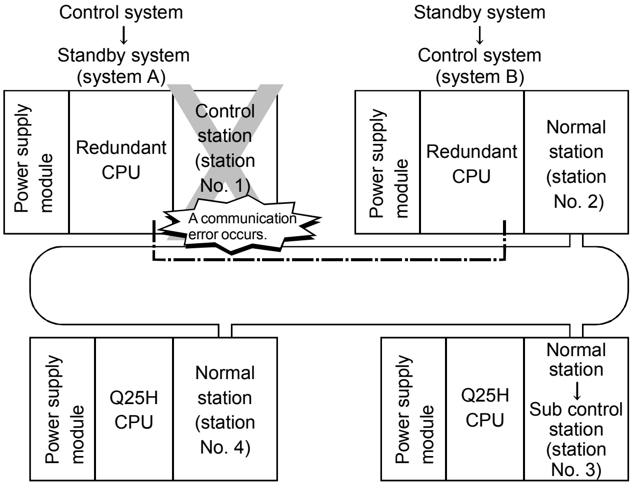
POINT

The network module issues a system switching request through the process described in (1) of this section and automatically switches the systems of the redundant system.
However, if the standby station has been already in an error status (power supply off, redundant CPU resetting, stop error, etc.), the system will not be switched even if the network module issues a system switching request to the control system CPU.
For details, refer to the QnPRHCPU User's Manual (Redundant System).

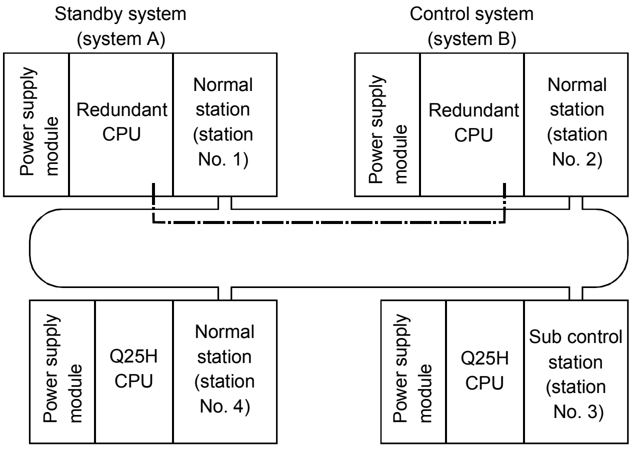
7.10.6 Function for returning to control station in a redundant system

This section describes unavailability of the function for returning to control station status when a redundant system has been acting as a control station.
In the redundant system, when the redundant CPU is in the standby system at the time of return to the system, the previous control station is returned as a normal station even if "Return as control station" is set for the return setting for the station.

1) When the control station falls into a communication error, another normal station will become a sub control station.



2) System switching does not occur even if station No. 1 returns to the system, and system A remains as the standby system and returns as a normal station (it does not return as a control station).



7.10.7 Data retention time for system switching

This section describes the cyclic data retention time at another station when system switching occurs in the redundant system.

Calculate the cyclic data retention time at another station based on:

- Monitoring time (Refer to Section 5.4);
- System switching monitoring time (Refer to Section 7.10.5);
- Control station shift time (Refer to Section 3.3.5);
- Redundant CPU system switching time (refer to the QnPRHCPU User's Manual (Redundant System); and
- Redundant CPU scan time (refer to the QnPRHCPU User's Manual (Redundant System).

The expression of the cyclic data retention time at another station depends on the reason(s) for system switching.

Reason	Expression
Control system power supply module malfunction, power supply off	Refer to (1) of this section.
Control system CPU malfunction, resetting	
Control system CPU stop error	Refer to (2) of this section.
Execution of system switching instruction	
System switching operation from GX Developer	
System switching request from other network module	
System switching request from network module (host station)	Refer to (3) of this section.

(1) Cyclic data retention time for control system power supply module malfunction, power supply off, control system CPU malfunction, or resetting

Use the following expression to calculate the cyclic data retention time in the case of control system power supply module malfunction, power supply off, control system CPU malfunction, or resetting.

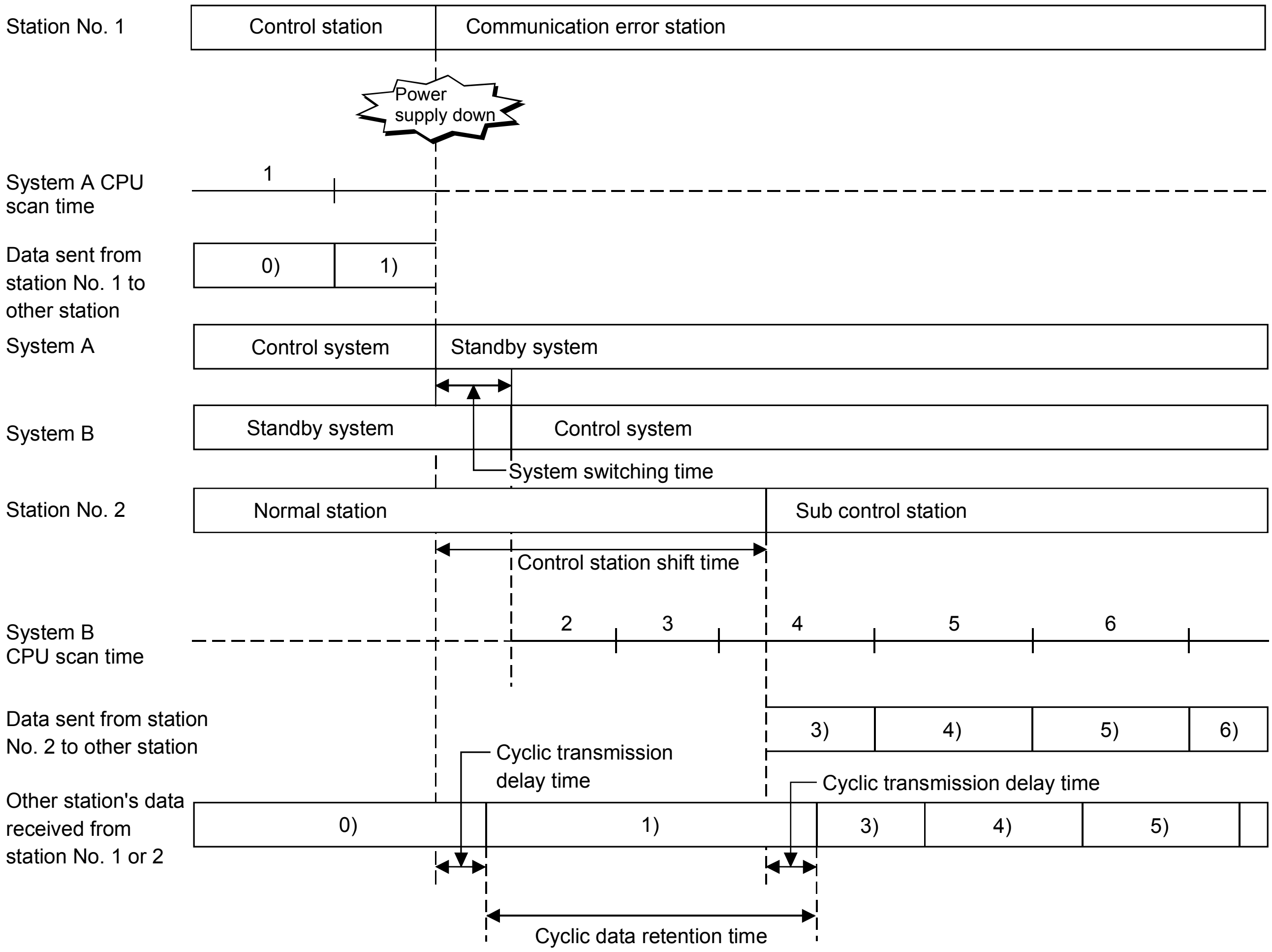
(a) When the redundant system has a control station

1) Redundant CPU system switching time (Tsw) < Control station shift time (Csw)

[Cyclic data retention time (T_H)]

T_H=Csw+SS [ms]

Csw : Control station shift time [ms]
SS : Redundant CPU scan time [ms]

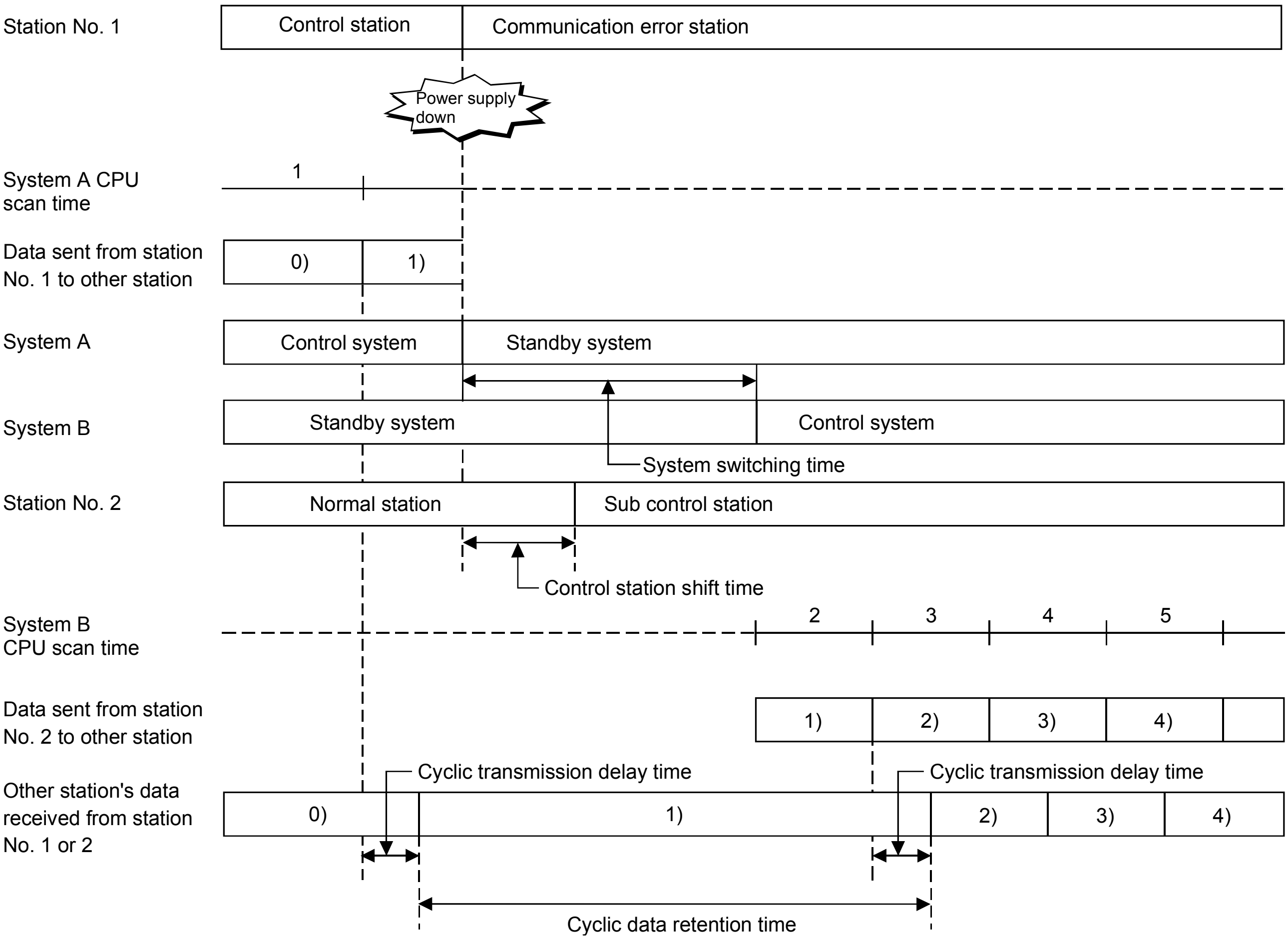


2) Redundant CPU system switching time (Tsw) > Control station shift time (Csw)

[Cyclic data retention time (T_H)]

T_H = Tsw + SS [ms]

Tsw : Redundant CPU system switching time [ms]
SS : Redundant CPU scan time [ms]

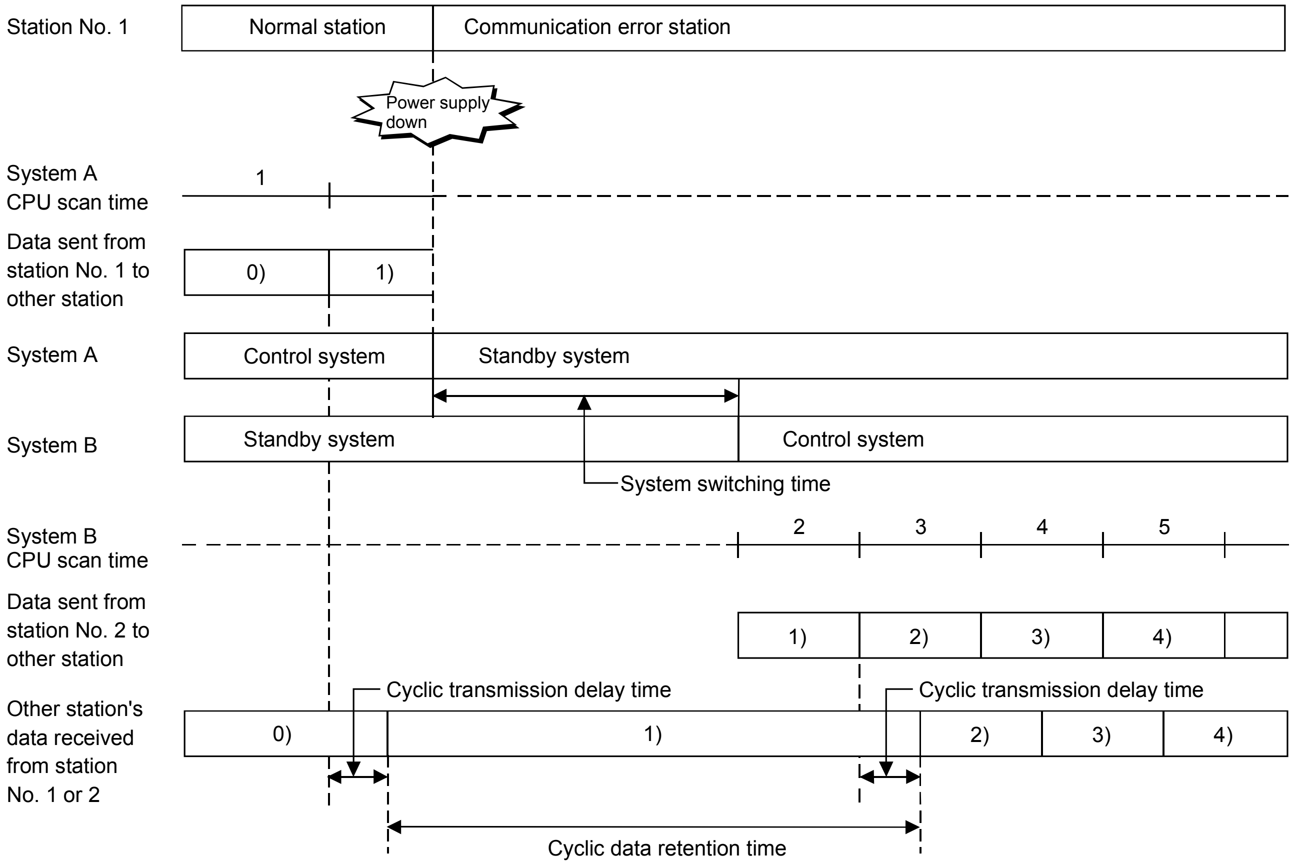


(b) When the redundant system has normal stations

[Cyclic data retention time (T_H)]

T_H = Tsw + SS [ms]

Tsw : Redundant CPU system switching time [ms]
SS : Redundant CPU scan time [ms]



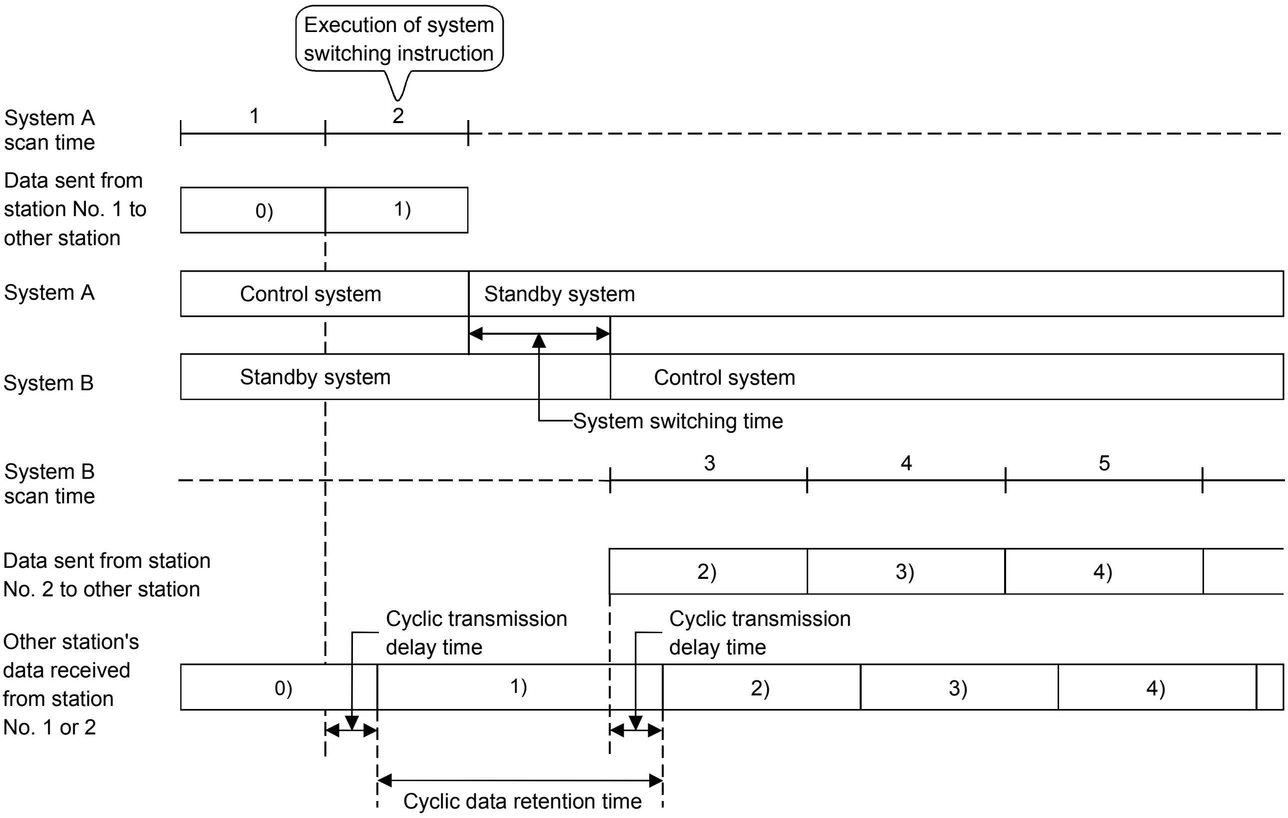
(2) Cyclic data retention time for a control system CPU stop error, execution of a system switching instruction, system switching operation from GX Developer, or system switching requesting from other network module

Use the following expression to calculate the cyclic data retention time in the case of a control system CPU stop error, execution of a system switching instruction, system switching operation from GX Developer, and system switching requesting from other network module.

[Cyclic data retention time (T_H)]

T_H = Tsw + SS [ms]

Tsw : Redundant CPU system switching time [ms]
SS : Redundant CPU scan time [ms]



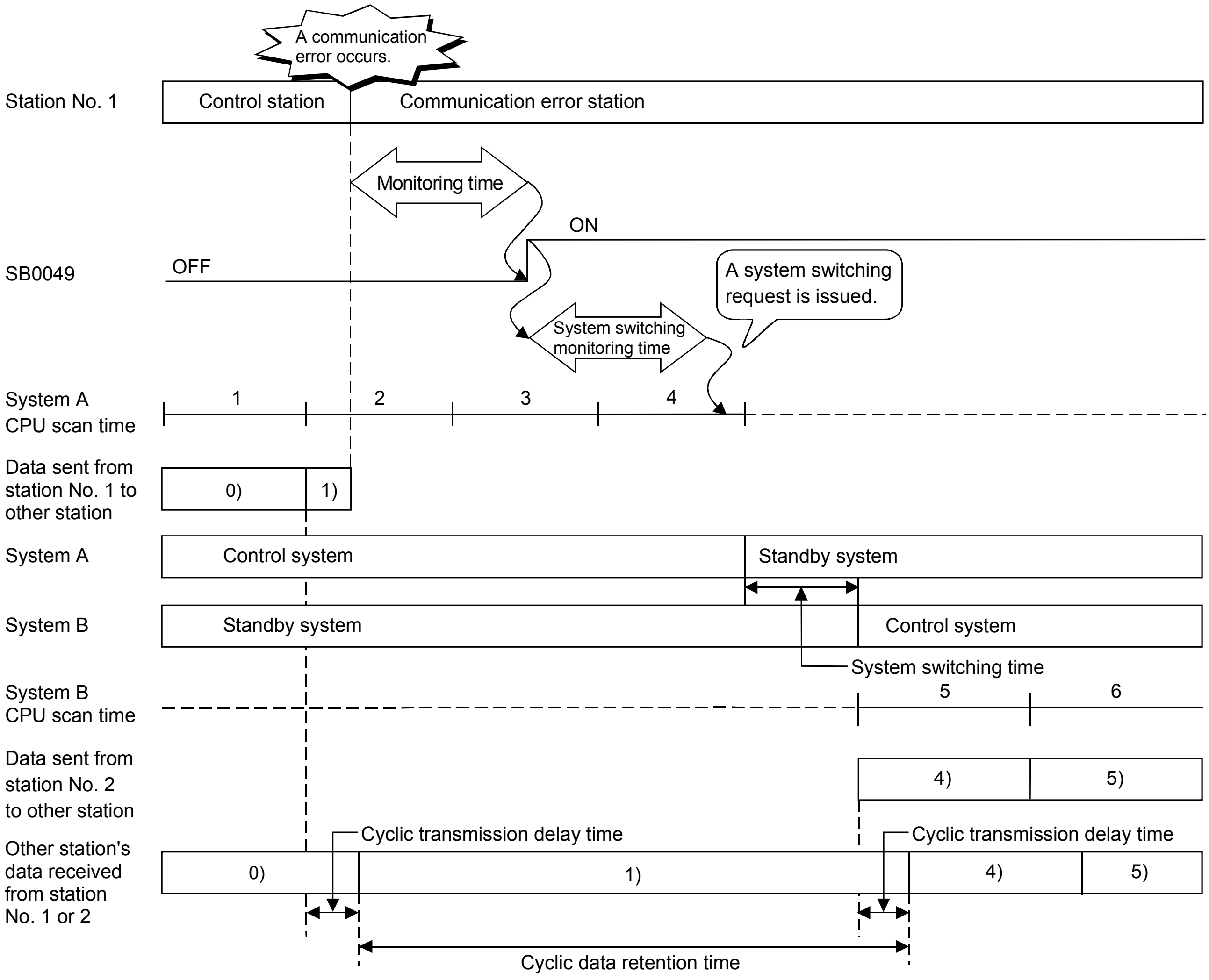
(3) Cyclic data retention time for system switching requesting from a network module (host station)

Use the following expression to calculate the cyclic data retention time in the case of system switching requesting from a network module (host station).

[Cyclic data retention time (T_H)]

T_H = 500 + K + Tc + Tsw + (SS × 2) [ms]

K : Monitoring time [ms]
Tc : System switching monitoring time [ms]
Tsw : Redundant CPU system switching time [ms]
SS : Redundant CPU scan time [ms]

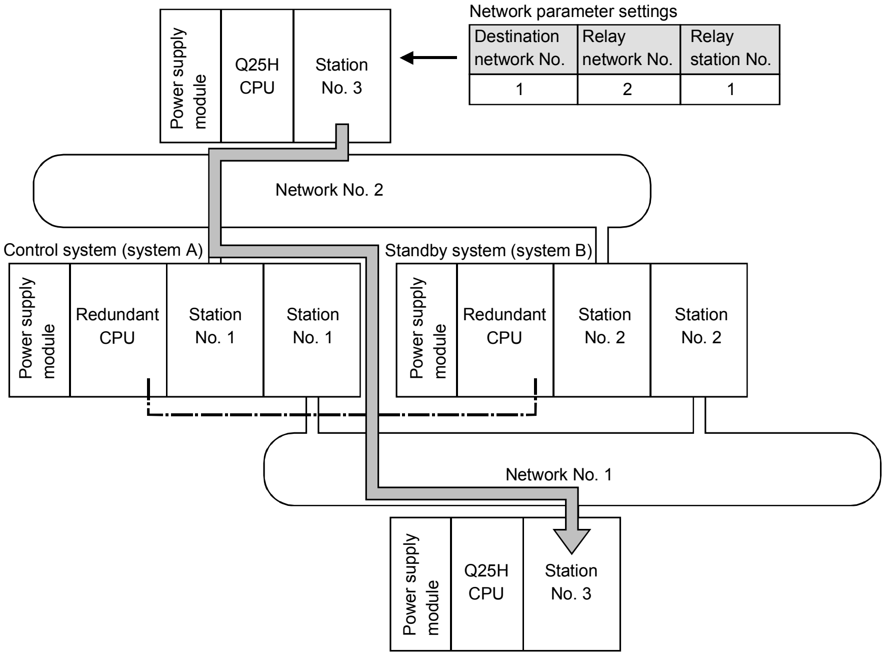


7.10.8 Routing via a redundant system

This section describes the function of routing via a redundant system.

(1) Routing via a redundant system

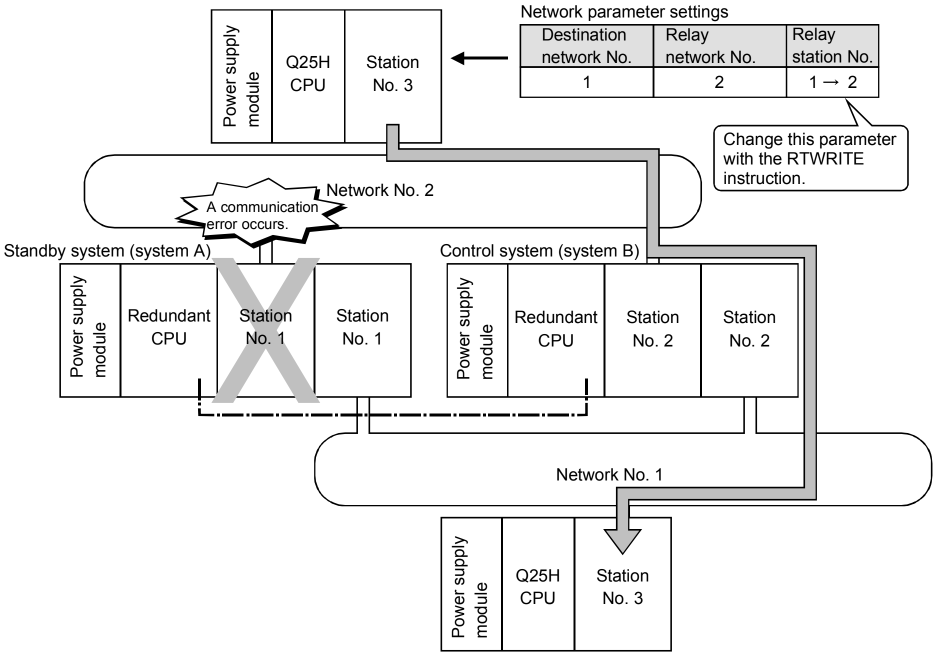
To use the routing via a redundant system, set the network module mounted to the control system CPU as a station to be routed.



Network parameter settings

Destination network No.	Relay network No.	Relay station No.
1	2	1

When the control system is switched, the routing parameter must be changed to go through the station of the new control system.
Change the routing parameter with the RTWRITE instruction.
For a sample program in the following system configuration example, refer to (2) of this section.



Network parameter settings

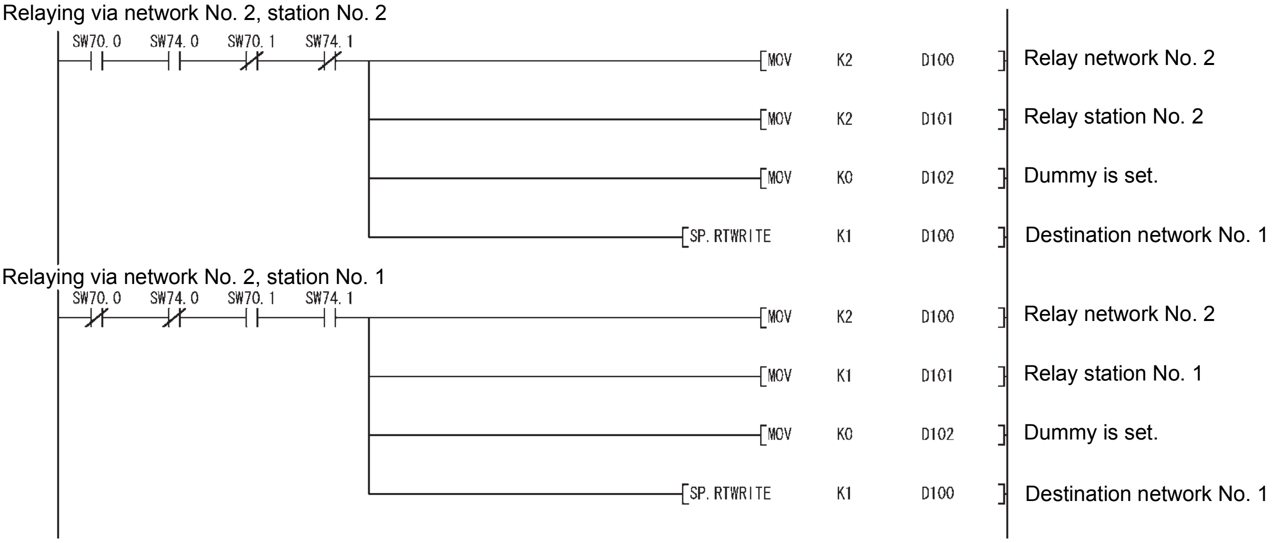
Destination network No.	Relay network No.	Relay station No.
1	2	1 → 2

Change this parameter with the RTWRITE instruction.

(2) RTWRITE instruction

The following is a sample program for changing the routing parameters for the requesting station (network No. 2, station No. 3) shown in (1) of this section using the RTWRITE instruction.

For details of the RTWRITE instruction, refer to the MELSEC-Q/L Programming Manual (Common Instruction).



Relaying via network No. 2, station No. 2

Relay network No. 2

Relay station No. 2

Dummy is set.

Destination network No. 1

Relaying via network No. 2, station No. 1

Relay network No. 2

Relay station No. 1

Dummy is set.

Destination network No. 1

8 TROUBLESHOOTING

In order to improve the reliability of the system, it is important to fix errors immediately and in the correct way.

For that purpose, it is necessary to grasp the contents of any errors quickly and accurately. Errors can be checked in three ways as explained below:

(1) Network diagnostics with GX Developer

(a) Network monitor (Refer to Section 8.1)

The status of the following four types of networks can be checked by monitoring the line:

1) Status of the entire network: Host information
2) Data link status and parameter status, etc. of each station: Other station information
3) Control station information, detailed data link information, etc.: Network monitor details
4) Loop switch count, line error, communication error, etc.: Error history monitor

(b) Diagnostic tests (Refer to Sections 4.8 and 7.8)

The following five items can be checked or executed through the diagnostic tests:

1) Wiring status (IN/OUT, etc.) of the data link cable: Loop test (required for optical loop)
2) Setting status of numbers: control station/remote master station duplication, network numbers and group numbers: Setup confirmation test
3) The order of stations connected in the direction of the forward loop and the reverse loop: Station order check test
4) Setting status of the routing parameters: Communication test
5) Link startup/stop for the host, specified stations and all stations: Network test

(2) Confirmation by error code: Refer to Section 8.3

When either cyclic transmission or transient transmission using dedicated link instructions or GX Developer (communication with other stations) was not normally performed, an error code is stored in the link special register and the system monitor. The contents of the error can be checked by this error code.

(3) Confirmation by the LED displays on the front of the network module (Refer to Section 4.2)

With the LED displays, the following errors can be checked: whether the host is operating or stopped, whether the station acts as a control station or a normal station, whether the baton pass is being executed, whether data linking is being executed, whether data is being transmitted/received, and whether any error has occurred.

(4) Confirmation of the error history of the entire system (Refer to Section 8.3)

By using GX Works 2, error history of the entire system can be checked even after errors were cleared by powering on and then off the programmable controller or by resetting the programmable controller CPU.

REMARKS

In order to fix the errors that may have occurred during data linking quickly and efficiently, it is important to perform offline tests of the network module and check the data link cable when starting up the system.

Make sure to perform the following checks, which are explained in Chapter 4, "Setup and Procedures Before Starting the Operation."

1) Standalone operation check and operational setting of the network module
2) Offline tests:
   Hardware test, Internal self-loopback test, self-loopback test, station-to-station test, and forward loop/reverse loop test (required for optical loop)
3) Check the connection of the data link cable.

8.1 Network Diagnostics (Network Monitor)

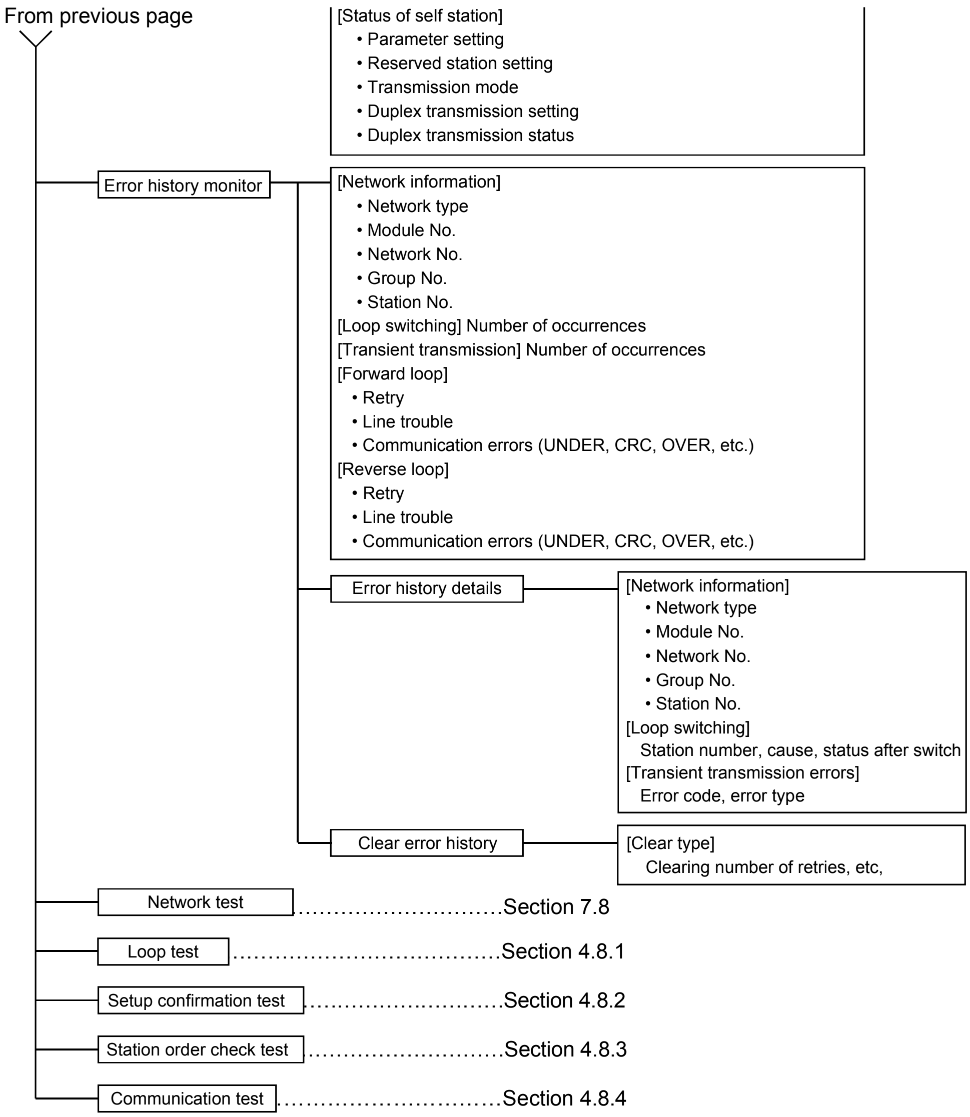
The status of the MELSECNET/H can be checked using the network diagnostic function of GX Developer.
When an error occurs, the faulty station can be identified using the host information, other station information, and error history monitor functions of the network.
The following lists the items that can be checked with the network diagnostic function.

Module 4
Module 3
Module 2
Module 1

Network diagnostics

- Host information
  - [Network information]
    - Network type
    - Network No.
    - Group No.
    - Station No.
  - [Link information]
    - Mode
    - Forward loop status (including loopback station)
    - Reverse loop status (including loopback station)
    - Link scan time (maximum, minimum, current)
  - [Communication information]
    - Communication status
- Other station information
  - [Network information]
    - Network type
    - Module No.
    - Network No.
    - Group No.
    - Station No.
  - [Other station information]
    - Communication status of each station
    - Data-link status of each station
    - Parameter status of each station
    - CPU operation status of each station
    - CPU RUN status of each station
    - Loop status of each station
    - Reserved station designation of each station
    - PSU operation status of each station extension
    - Search status of local station error
    - Each station PLC operation mode status
    - Each station pairing status
    - Each station PLC system status
    - Each station network type status
- Network monitor details
  - [Network information]
    - Network type
    - Module No.
    - Network No.
    - Group No.
    - Station No
  - [Control station information]
    - Assign control station
    - Present control station
    - Transmission information
    - Sub-control station transmission
    - Remote I/O master station No. (block 1, block 2)
    - LX/LY Allocations
  - [Data link information]
    - Total number of linked stations
    - Station of maximum normal transmission
    - Station of maximum data link
    - Transmission status
    - Reason for transmission interruption
    - Reason for transmission stop

To next page


From previous page
[Status of self station]
• Parameter setting
• Reserved station setting
• Transmission mode
• Duplex transmission setting
• Duplex transmission status
Error history monitor
[Network information]
• Network type
• Module No.
• Network No.
• Group No.
• Station No.
[Loop switching] Number of occurrences
[Transient transmission] Number of occurrences
[Forward loop]
• Retry
• Line trouble
• Communication errors (UNDER, CRC, OVER, etc.)
[Reverse loop]
• Retry
• Line trouble
• Communication errors (UNDER, CRC, OVER, etc.)
Error history details
[Network information]
• Network type
• Module No.
• Network No.
• Group No.
• Station No.
[Loop switching]
Station number, cause, status after switch
[Transient transmission errors]
Error code, error type
Clear error history
[Clear type]
Clearing number of retries, etc,
Network test ....Section 7.8
Loop test ....Section 4.8.1
Setup confirmation test ....Section 4.8.2
Station order check test ....Section 4.8.3
Communication test ....Section 4.8.4

POINT

(1) The target of the network diagnostics is the host's network specified as the connection destination.

(2) When another station is specified in the transfer setup, only the host information and other stations' information are available in the network diagnostics.

(3) The network diagnostics cannot be displayed correctly while the network module is executing the offline test.

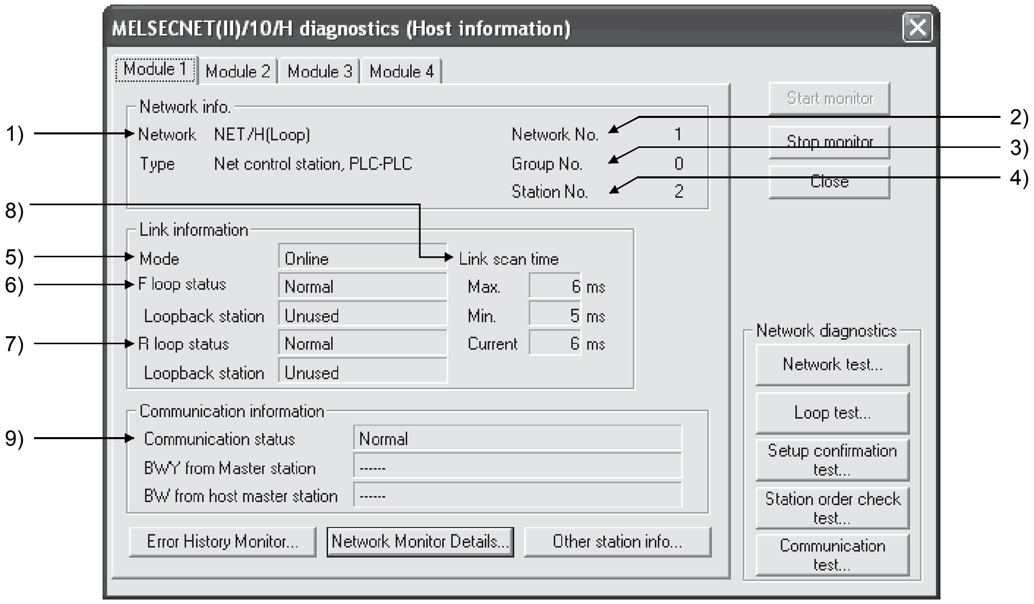
(4) When the link dedicated instruction is used to access the other station programmable controller during network diagnosis, the execution of the link dedicated instruction may be delayed.
After taking the following measures, perform network diagnosis processing and execute the link dedicated instruction.
- Execute the COM instruction.
- Secure the communication processing security time for 2 to 3ms.
For the High Performance model QCPU, Process CPU, and Redundant CPU, set it by the special register SD315.
For the Universal model QCPU, set it by the service processing setting of the PLC parameter (PLC system) of GX Developer.

REMARKS

SB□□□□ and SW□□□□ found in the explanations of each item indicate the link special relay (SB) or the link special register (SW) used for monitoring.

8.1.1 Host information

On the host information screen, the information of the entire network of the connection destination and the status of the host can be checked.



Network NET/H(Loop)
Type Net control station, PLC-PLC
Network No. 1
Group No. 0
Station No. 2
Mode Online
F loop status Normal
Loopback station Unused
R loop status Normal
Loopback station Unused
Link scan time
Max. 6 ms
Min. 5 ms
Current 6 ms
Communication status Normal
BWY from Master station ------
BW from host master station ------

[Network info.]

1) Network type (SB0040, SB0044, SB0057, SB005A, SW0044, SW0046)
   Displays the network type of the host
   - MELSECNET/H (loop) PLC to PLC network control station
   - MELSECNET/H (loop) PLC to PLC network normal station
   - MELSECNET/H Extended Mode (loop) PLC to PLC network control station
   - MELSECNET/H Extended Mode (loop) PLC to PLC network normal station
   - MELSECNET/H (bus) PLC to PLC network control station
   - MELSECNET/H (bus) PLC to PLC network normal station
   - MELSECNET/H Extended Mode (bus) PLC to PLC network control station
   - MELSECNET/H Extended Mode (bus) PLC to PLC network normal station
   - MELSECNET/10 (loop) PLC to PLC network control station
   - MELSECNET/10 (loop) PLC to PLC network normal station
   - MELSECNET/10 (bus) PLC to PLC network control station
   - MELSECNET/10 (bus) PLC to PLC network normal station

2) Network No. (SW0040)
   Displays the network No. of the host

3) Group No. (SW0041)
   Displays the group No. of the host

4) Station No. (SW0042)
   Displays the station No. of the host

[Link information]

5) Mode (SW0043)

Displays the operation mode of the host.

- Online
- Offline (debug mode)
- Offline
- Forward loop test
- Reverse loop test
- Station-to-station test (Station that executes tests)
- Station-to-station test (Station to be tested)

6) F loop status (SB0091), Loopback station (SB0099)

Displays the status of the forward loop side.

- Loop status : Normal/abnormal
- Loopback : Unused/"executed station number"

"---" is displayed in case of bus type.

7) R loop status (SB0095), Loopback station (SB009A)

Displays the status of the reverse loop side.

- Loop status : Normal/abnormal
- Loopback : Unused/"executed station number"

"---" is displayed in case of bus type.

8) Link scan time (SW006B/SW006C/SW006D)

Displays the maximum/minimum/current value of the link scan time of the host.

Station type Constant link scan	Control station	Normal station
No	Measured value (Displays the maximum/minimum/current value the link scan actually took.)	
Yes	Measured value (Displays the maximum, minimum, and current values of the times that were actually taken. If the set value is small, the formula in Appendix 4 (SW006B to 6D) is applied.)	Constant link scan ±2 ms

[Communication information]

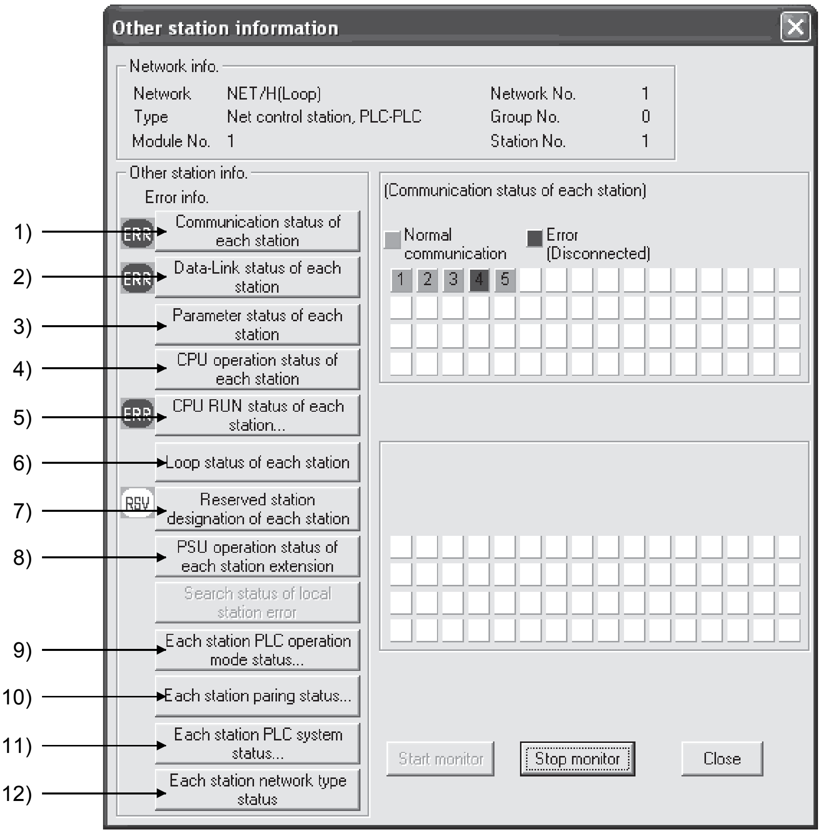
9) Communication status (SB0047)

Displays the communication status of the host.

- Data link being executed (SB0047: Off)
- Data link stopped (SB0047: On)

8.1.2 Other station information

On the other station information screen, information such as the communication, data link, parameter, CPU, loop and reserved station statuses of each station can be checked.



Network info.

Network NET/H(Loop)

Type Net control station, PLC-PLC

Module No. 1

Network No. 1

Group No. 0

Station No. 1

[Network info.]

This area displays the same information as the host information in Section 8.1.1.

[Other station info.]

When any STOP-status station, reserved station and/or externally-powered station is detected for 1) to 8) and 12), the following mark(s) is displayed in the error information area. (For 9) to 11), "ERR" is not displayed.)

Status	Display
When a faulty or STOP-status station is detected	ERR
When a reserved station exists	RSV
When power is supplied to a module with external power supply	PWR

By clicking each item button, the corresponding status of each station is displayed.

This information is displayed for the number of stations that equals to the "total number of link stations" set with the network parameters.

1) Communication status of each station (SW0070 to 73)

   Displays the status of the baton pass (whether or not the transient transmission is possible).

   - Normal display : Communication normal station or reserved station
   - Highlighted display : Communication error station (disconnected status)

2) Data-Link status of each station (SW0074 to 77)
Displays the status of the cyclic transmission.
- Normal display : Normal station or reserved station
- Highlighted display : Error station (data link not executed)

3) Parameter status of each station
Displays the parameter communication status of each station (SW0078 to 7B).
- Normal display : Other than during parameter communication, reserved station or unconnected station
- Highlighted display : During parameter communication

Displays the abnormal parameter status of each station (SW007C to 7F).
- Normal display : Normal parameter, reserved station or unconnected station
- Highlighted display : Abnormal parameter

4) CPU operation status of each station (SW0080 to 83, SW0088 to 8B)
Displays the operation status of the CPU.
When the communication status of each station is normal, the display is effective.
- Normal display : CPU normal, reserved station or unconnected station
- Highlighted display : CPU error, Minor: Minor error
  Serious: Medium
  (such as watchdog timer error)
  fatal (hardware error, etc.)

5) CPU RUN status of each station (SW0084 to 87)
Displays the RUN/STOP status of the CPU.
When the communication status of each station is normal, the display is effective.
- RUN : RUN or STEP RUN
- STOP : STOP, PAUSE, ERROR or unconnected station
  "---" is displayed for a reserved station.

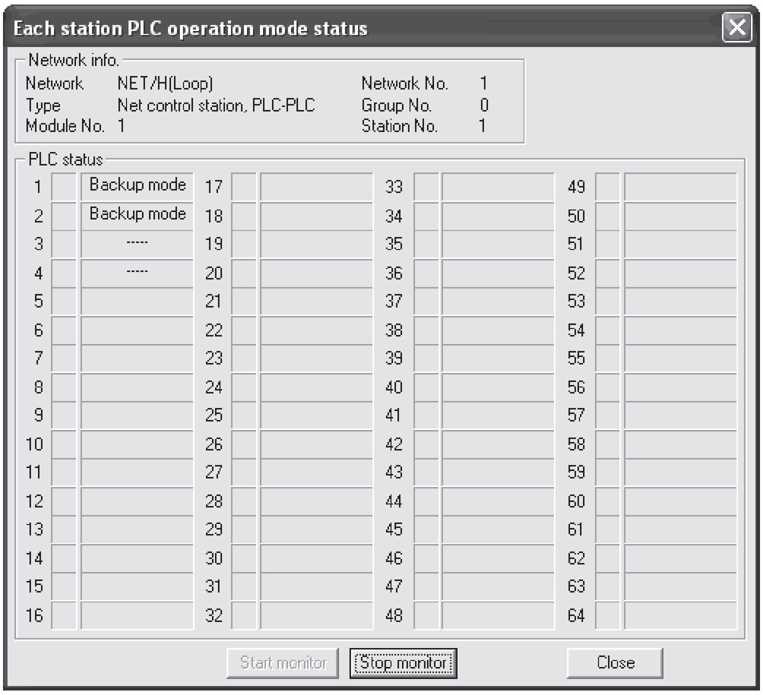
6) Loop status of each station (SW0091 to 94, SW0095 to 98)
Displays the status of the forward/reverse loops in case of the optical loop system.
- Normal display : Normal, reserved station or unconnected station
- Highlighted display : Error

7) Reserved station designation of each station (SW0064 to 67)
Displays the setting status of a reserved station.
- Normal display : Unreserved station
- Highlighted display : Reserved station

8) PSU operation status of each station extension (SW008C to 8F)
Displays the supply status of the external power 24 V DC of the network module.
When the communication status of each station is normal, the display is effective.
- Normal display : Not powered by 24 V DC or network module without supply terminal
- Highlighted display : 24 V DC powered

9) Each station PLC operation mode status (SW01F4 to 1F7)
Displays the operation mode of the Redundant CPU.
"---" indicates that the CPU is other than the Redundant CPU.

• Backup mode	: Operating in the backup mode
• Separate mode	: Operating in the separate mode



Each station PLC operation mode status

Network info.

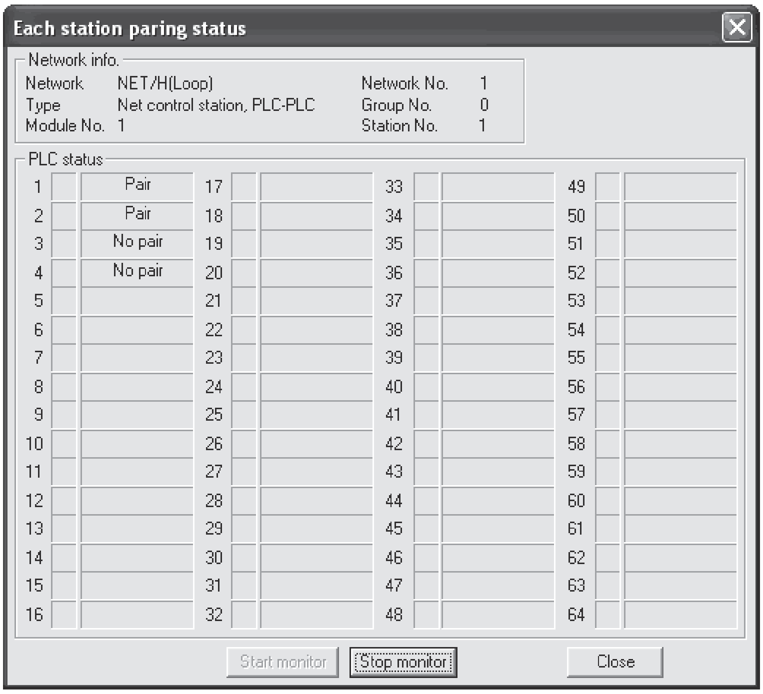
Network	NET/H(Loop)	Network No.	1
Type	Net control station, PLC-PLC	Group No.	0
Module No.	1	Station No.	1

PLC status

1	Backup mode	17		33		49	
2	Backup mode	18		34		50	
3	-----	19		35		51	
4	-----	20		36		52	
5		21		37		53	
6		22		38		54	
7		23		39		55	
8		24		40		56	
9		25		41		57	
10		26		42		58	
11		27		43		59	
12		28		44		60	
13		29		45		61	
14		30		46		62	
15		31		47		63	
16		32		48		64	

10) Each station pairing status (SW01F8 to 1FB)
Displays the status of the pairing setting.

• No pair	: Station not specified for pairing
• Pair	: Station specified for pairing



Each station paring status

Network info.

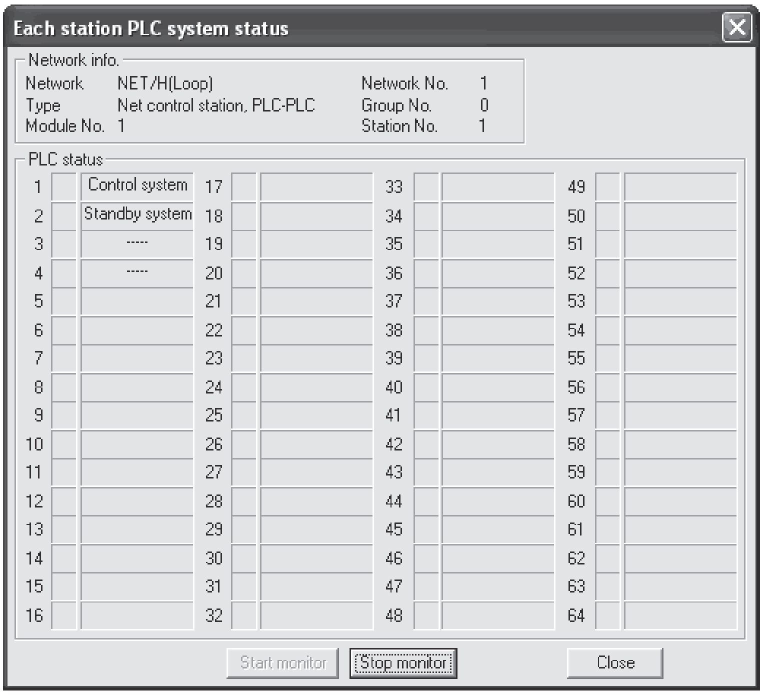
Network	NET/H(Loop)	Network No.	1
Type	Net control station, PLC-PLC	Group No.	0
Module No.	1	Station No.	1

PLC status

1	Pair	17		33		49	
2	Pair	18		34		50	
3	No pair	19		35		51	
4	No pair	20		36		52	
5		21		37		53	
6		22		38		54	
7		23		39		55	
8		24		40		56	
9		25		41		57	
10		26		42		58	
11		27		43		59	
12		28		44		60	
13		29		45		61	
14		30		46		62	
15		31		47		63	
16		32		48		64	

11) Each station PLC system status (SW01FC to 1FF)
Displays the system status of the Redundant CPU.
"---" indicates that the CPU is other than the Redundant CPU.

- Control system : Operating as the control system
- Standby system : Operating as the standby system



Network info.
Network NET/H(Loop)
Type Net control station, PLC-PLC
Module No. 1
Network No. 1
Group No. 0
Station No. 1

PLC status

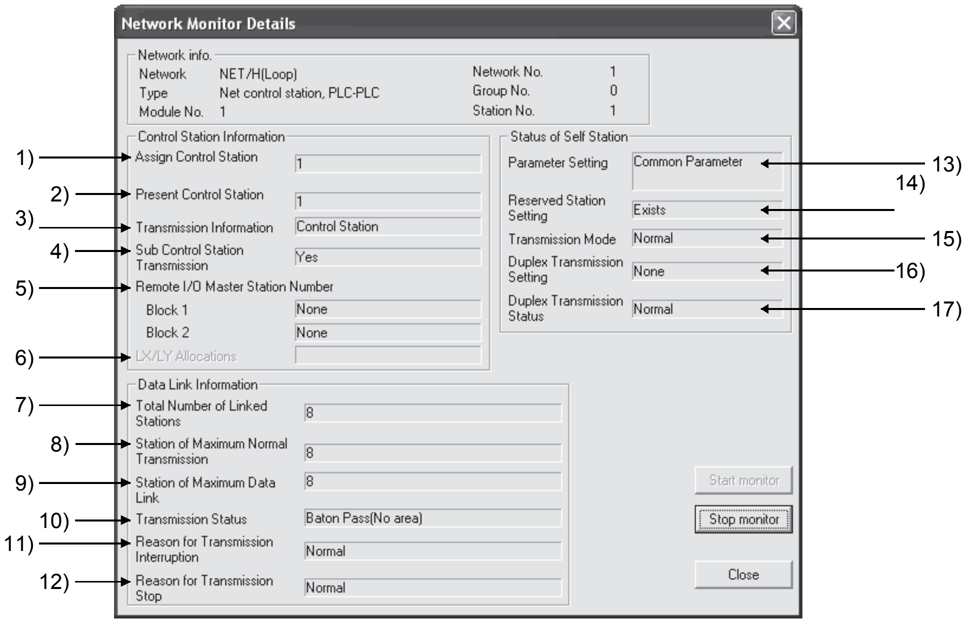
1	Control system	17		33		49	
2	Standby system	18		34		50	
3	-----	19		35		51	
4	-----	20		36		52	
5		21		37		53	
6		22		38		54	
7		23		39		55	
8		24		40		56	
9		25		41		57	
10		26		42		58	
11		27		43		59	
12		28		44		60	
13		29		45		61	
14		30		46		62	
15		31		47		63	
16		32		48		64	

12) Each station network type status (SW01E0 to 1E3F)
Displays whether the network type set to the control station is consistent with those set to the normal stations.
Reserved stations and faulty stations are displayed normally.

- When the control station is in MELSECNET/H Extended mode
  Normal stations in MELSECNET/H or MELSECNET/10 mode are displayed highlighted.
- When the control station is in MELSECNET/H or MELSECNET/10 mode
  Normal stations in MELSECNET/H Extended mode are displayed highlighted.

8.1.3 Network monitor details

On the Network Monitor Details screen, the control station information, data link information and the parameter status of the host can be checked.



Network Monitor Details

Network info.
Network NET/H(Loop)
Type Net control station, PLC-PLC
Module No. 1
Network No. 1
Group No. 0
Station No. 1

Control Station Information
Assign Control Station 1
Present Control Station 1
Transmission Information Control Station
Sub Control Station Transmission Yes
Remote I/O Master Station Number
Block 1 None
Block 2 None
LX/LY Allocations

Status of Self Station
Parameter Setting Common Parameter
Reserved Station Setting Exists
Transmission Mode Normal
Duplex Transmission Setting None
Duplex Transmission Status Normal

Data Link Information
Total Number of Linked Stations 8
Station of Maximum Normal Transmission 8
Station of Maximum Data Link 8
Transmission Status Baton Pass(No area)
Reason for Transmission Interruption Normal
Reason for Transmission Stop Normal

[Network info.]
This area displays the same information as the host information in Section 8.1.1.

[Control Station Information]

1) Assign Control Station (SW0057)
Displays the number of the control station specified with the parameter.

2) Present Control Station (SW0056)
Displays the number of the station that actually controls the network.

3) Transmission Information (SB0056)
Displays the type of the station that controls the network.
When the control station goes down, the display automatically changes to the sub-control station.
- Control station communication/sub-control station communication

4) Sub Control Station Transmission (SB0058)
Displays whether or not to execute data linking by the sub-control station when the control station is down.
- Yes/No

5) Remote I/O Master Station Number
Displays the number of the I/O master station of X/Y communication blocks 1 and 2.
Block 1
Block 2
"None" is displayed for blocks that are not set.

6) LX/LY Allocations
Nothing is displayed

[Data Link Information]

7) Total Number of Linked Stations (SW0059)
Displays the total number of link stations set with the parameter.

8) Station of Maximum Normal Transmission (SW005A)
Displays the highest station number that is executing the baton pass normally (the status where the transient transmission is possible).
The T.PASS LED of the network module turns on for stations executing the baton pass normally.

9) Station of Maximum Data Link (SW005B)
Displays the highest station number that is executing data linking normally (cyclic transmission and transient transmission).
The D.LINK LED of the network module turns on for stations executing data linking normally.

10) Transmission Status (SW0047)
Displays the communication status of the host.

Indication	Description
In Data Link	Data link is being executed.
Suspend Data link (Other)	Other station stopped the cyclic transmission.
Suspend Data link (Host)	The host station stopped the cyclic transmission.
Baton Pass (No area)	No area is assigned for the host's B/W transmission.
Baton Pass (Parameter Halt)	An error is identified in the host's parameters.
Baton Pass (No Receive)	The common parameters have not been received.
Disconnecting (No Baton)	Station numbers are duplicated or the cable is not connected.
Disconnecting (Link Error)	The cable is not connected.
In Test	The online/offline test is being executed.
Resetting	Hardware fault

11) Reason for Transmission Interruption (SW0048)
Displays the causes why the host cannot communicate (transient transmission).
For details of actions to take, refer to Section 8.3, "Error Codes."

Indication	Description/Action
Normal	Communications being executed normally
Offline	In offline status
Offline Test	The offline test being executed
Initial state	Error occurred (Error code: F101, F102, F105)
Shift Control Station	Error occurred (Error code: F104, F106)
Online testing	Error occurred (Error code: F103, F109, F10A)
Baton disappearance	Error occurred (Error code: F107)
Baton repetition	Error occurred (Error code: F108)
Same Station Present	Error occurred (Error code: F10B)
Control Station repetition	Error occurred (Error code: F10C)
Reception retry error	Error occurred (Error code: F10E)
Transmission retry error	Error occurred (Error code: F10F)
Timeout error	Error occurred (Error code: F110)
Network Disorder	Error occurred (Error code: F112)
Disconnecting...	Error occurred (Error code: F11B)
No baton to local station	Error occurred (Error code: F11F)
Error code: ****	Error occurred (Refer to the displayed error code.)

12) Reason for Transmission Stop (SW0049)
Displays the causes why the host's data linking (cyclic transmission) was disabled.

Indication	Description
Normal	Communications being executed normally
There is a stop instruction (All)	Cyclic transmission to all stations is stopped from the host or other station.
There is a stop instruction (Own)	Cyclic transmission of the host station is stopped.
Stop instruction present (☐)	Cyclic transmission of the host station is stopped from other station (station No. ☐).
No Parameter	No parameter can be received.
Illegal Parameter	Set parameters are not correct.
Host PLC Error	A moderate or major error occurred in the CPU module of the host station.
Suspend Communication	Data link error occurred on the host station.

[Status of Self Station]

13) Parameter Setting (SB0054, SW0054)
Displays the parameter setting status of the host.
- Common parameters
- Common + specific
- Default parameters
- Default + specific

14) Reserved Station Setting (SB0064)
Displays the designation status of reserved stations.
- Yes/No

15) Transmission Mode (SB0068)
Displays the link scan status.
- Normal mode
- Constant link scan

16) Duplex Transmission Setting (SB0069)
Displays the designation status of the multiplex transmission.
- Normal transmission
- Multiplex transmission

"----" is displayed for the bus type system.

17) Duplex Transmission Status (SB006A)
Displays the status of the multiplex transmission.
- Normal transmission
- Multiplex transmission

"----" is displayed for the bus type system.

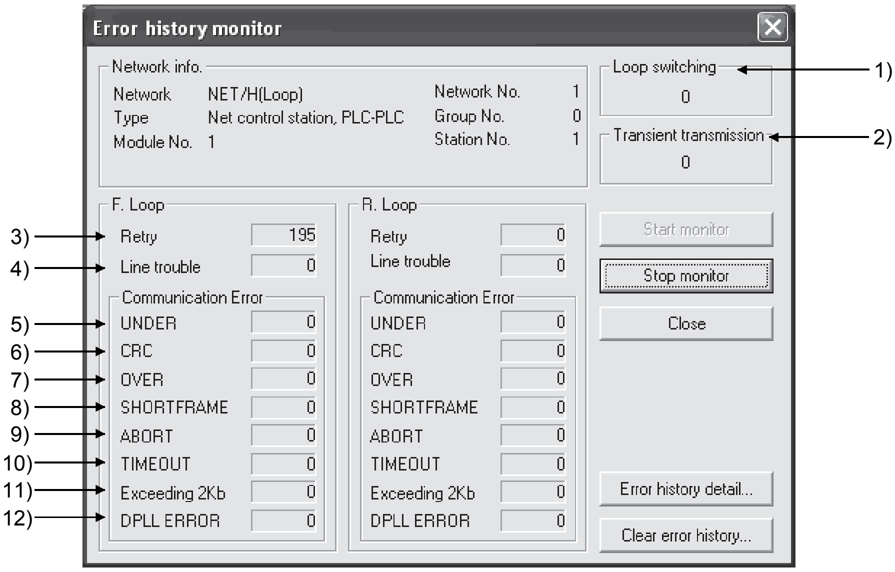
REMARKS

(1) A station that detected a forward loop error executes the reverse loopback.
(2) A station that detected a reverse loop error executes the forward loopback.

8.1.4 Error history monitor

With the error history monitor information, the status of the forward/reverse loop errors, communication errors, and transient transmission errors can be checked. In addition, the detailed error history display and the error history can be cleared on this screen.

(1) Error history monitor



Network info.

Network NET/H(Loop)
Type Net control station, PLC-PLC
Module No. 1
Network No. 1
Group No. 0
Station No. 1

Loop switching 0

Transient transmission 0

	F. Loop	R. Loop
Retry	195	0
Line trouble	0	0
Communication Error		
UNDER	0	0
CRC	0	0
OVER	0	0
SHORTFRAME	0	0
ABORT	0	0
TIMEOUT	0	0
Exceeding 2Kb	0	0
DPLL ERROR	0	0

[Network info.]

This area displays the same information as the host information in Section 8.1.1.

1) Loop switching (SW00CE)
   Displays how many times loops were switched.
   <Error Cause> Station's power-ON/OFF, faulty cable, noise, etc.
   <Corrective Action> Refer to POINT on the next page.

2) Transient transmission (SW00EE)
   Displays how many transient transmission errors have occurred.
   <Error Cause> Power-OFF of the destination station, failure of the destination station's CPU module, faulty cable, noise, etc.
   <Corrective Action > Check the error code of the transient transmission error from "Error history detail..." and correct the error referring to Section 8.3.

3) Retry (SW00C8, SW00C9)
   Displays the number of retries (communication retries when a communication error occurs.)
   <Error Cause> Station's power-ON/OFF, faulty cable, noise, etc.
   <Corrective Action> Refer to POINT on the next page.

4) Line trouble (SW00CC, SW00CD)
   Display how many line errors have occurred.
   <Error Cause> Power-OFF of the adjacent station, faulty cable, noise, etc.
   <Corrective Action> Refer to POINT on the next page.

5) UNDER (SW00B8, SW00C0)
   Displays how many UNDER errors have occurred.
   <Error Cause> Power-ON/OFF of the adjacent station, faulty cable, etc.
   <Corrective Action> Refer to the following POINT.

6) CRC (SW00B9, SW00C1)
   Displays how many CRC errors have occurred.
   <Error Cause> Isolation of the sending station, faulty cable, hardware failure, noise, etc.
   <Corrective Action> Refer to the following POINT.

7) OVER (SW00BA, SW00C2)
   Displays how many OVER errors have occurred.
   <Error Cause> Faulty cable, hardware failure, noise, etc.
   <Corrective Action> Refer to the following POINT.

8) SHORTFRAME (SW00BB, SW00C3)
   Displays how many short frame errors (messages too short) have occurred.
   <Error Cause> Faulty cable, hardware failure, noise, etc.
   <Corrective Action> Refer to the following POINT.

9) ABORT (SW00BC, SW00C4)
   Displays how many AB and IF errors have occurred.
   <Error Cause> Isolation of the sending station, faulty cable, hardware failure, noise, etc.
   <Corrective Action> Refer to the following POINT.

10) TIMEOUT (SW00BD, SW00C5)
   Displays how many timeout errors have occurred.
   <Error Cause> Data link monitoring time too short, faulty cable, noise, etc.
   <Corrective Action> Refer to the following POINT.

11) Exceeding 2Kb (SW00BE, SW00C6)
   Display how many times messages exceeding 2k bytes were received.
   <Error Cause> Faulty cable, hardware failure, noise, etc.
   <Corrective Action> Refer to the following POINT.

12) DPLL ERROR (SW00BF, SW00C7)
   Displays how many times the DPLL errors occurred.
   <Error Cause> Faulty cable, hardware failure, noise, etc.
   <Corrective Action> Refer to the following POINT.

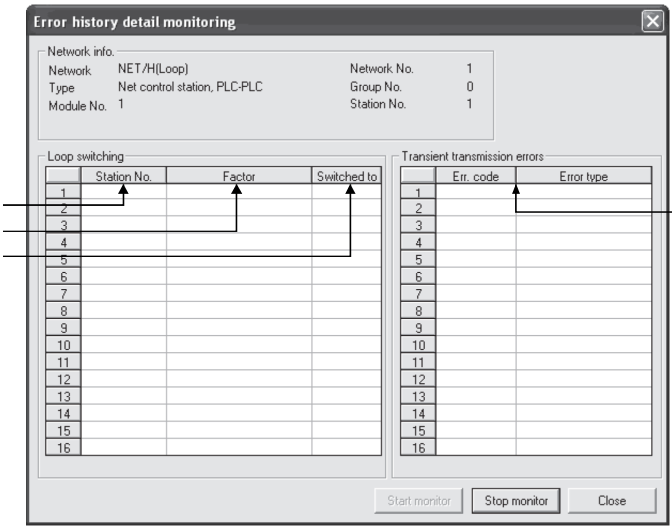
POINT

The number of each error occurrence does not necessarily mean a problem unless the count value rises frequently during operation. If it rises frequently, observe the following.

1) Check the power-ON/OFF status of the host and other stations.
2) Check the condition of the cables and connectors. (Disconnection or looseness of the connectors, cable breakage, cable length, etc.)
3) Perform the self-loopback test, internal self-loopback test and hardware test.
4) Perform the station-to-station test, forward/reverse loop test.
5) Referring to the user's manual (for hardware) of the network module, perform the wiring again. Also, set the system again referring to the user's manual of the CPU module.

(2) Error history detail monitoring

Displays the causes of loop switches and the history of the transient transmission errors.



Error history detail monitoring

Network info.

Network NET/H(Loop)
Type Net control station, PLC-PLC
Module No. 1
Network No. 1
Group No. 0
Station No. 1

Loop switching

	Station No.	Factor	Switched to
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

Transient transmission errors

	Err. code	Error type
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

[Loop switching]

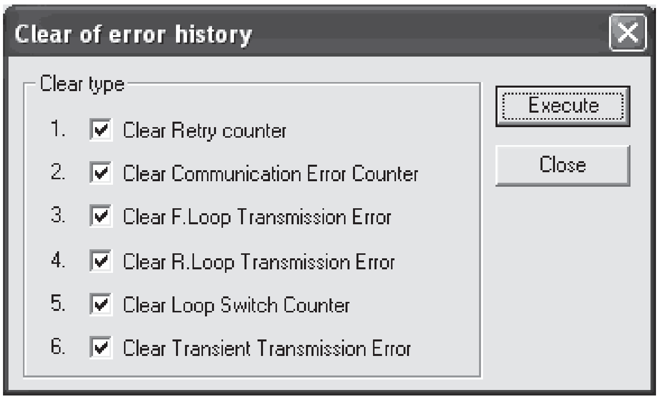
1) Station No. (SW00E0 to 00E7)
   Displays the number of the station (not necessarily an adjacent station) that requested the loop switch and loopback.
2) Factor (SW00D0 to 00DF)
   Displays the reason why the loop switch and loop back are executed.
   - Normal return
   - Forward loop hardware error : Cable or optical module error
   - Reverse loop hardware error : Cable or optical module error
3) Switched to (SW00D0 to 00DF)
   Displays the data link status after the loop switch.
   - Multiplex transmission: Forward loop/reverse loop normal
   - Forward loop transmission
   - Reverse loop transmission
   - Loopback transmission

[Transient transmission errors]

4) Error code, error type (SW00F0 to 00FF)
   Displays the error code.
   Refer to Section 8.3

(3) Clear of error history

Error history can be cleared for each item by selecting the item from the list.



Clear of error history

Clear type

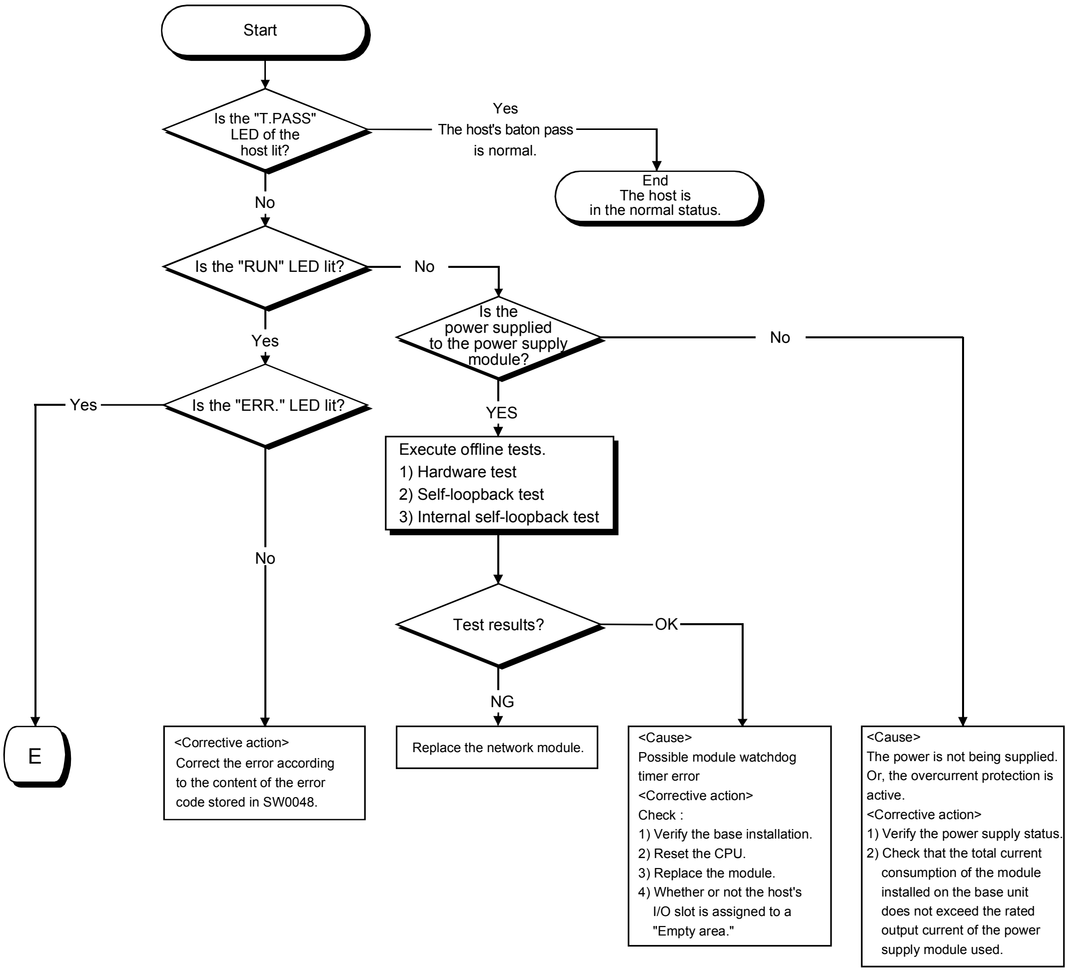
1. ☑ Clear Retry counter
2. ☑ Clear Communication Error Counter
3. ☑ Clear F.Loop Transmission Error
4. ☑ Clear R.Loop Transmission Error
5. ☑ Clear Loop Switch Counter
6. ☑ Clear Transient Transmission Error

8.2 Troubleshooting

Check the programmable controller CPU for an error before starting the troubleshooting of the network module and network.
If the RUN LED of the programmable controller CPU is off/flickering or the ERR. LED is on, identify the error that occurred in the programmable controller CPU, and take corrective action.

(1) Check that the host has joined the network.

Start the troubleshooting of the host by monitoring the status of the host. First, check whether or not the host has joined the network.
This is important because it is not possible to monitor the status of other stations and to perform troubleshooting on other stations unless the host has joined the network.
The troubleshooting flowchart shown below explains the sequence from checking an error to enabling a baton pass (in order to join the network).



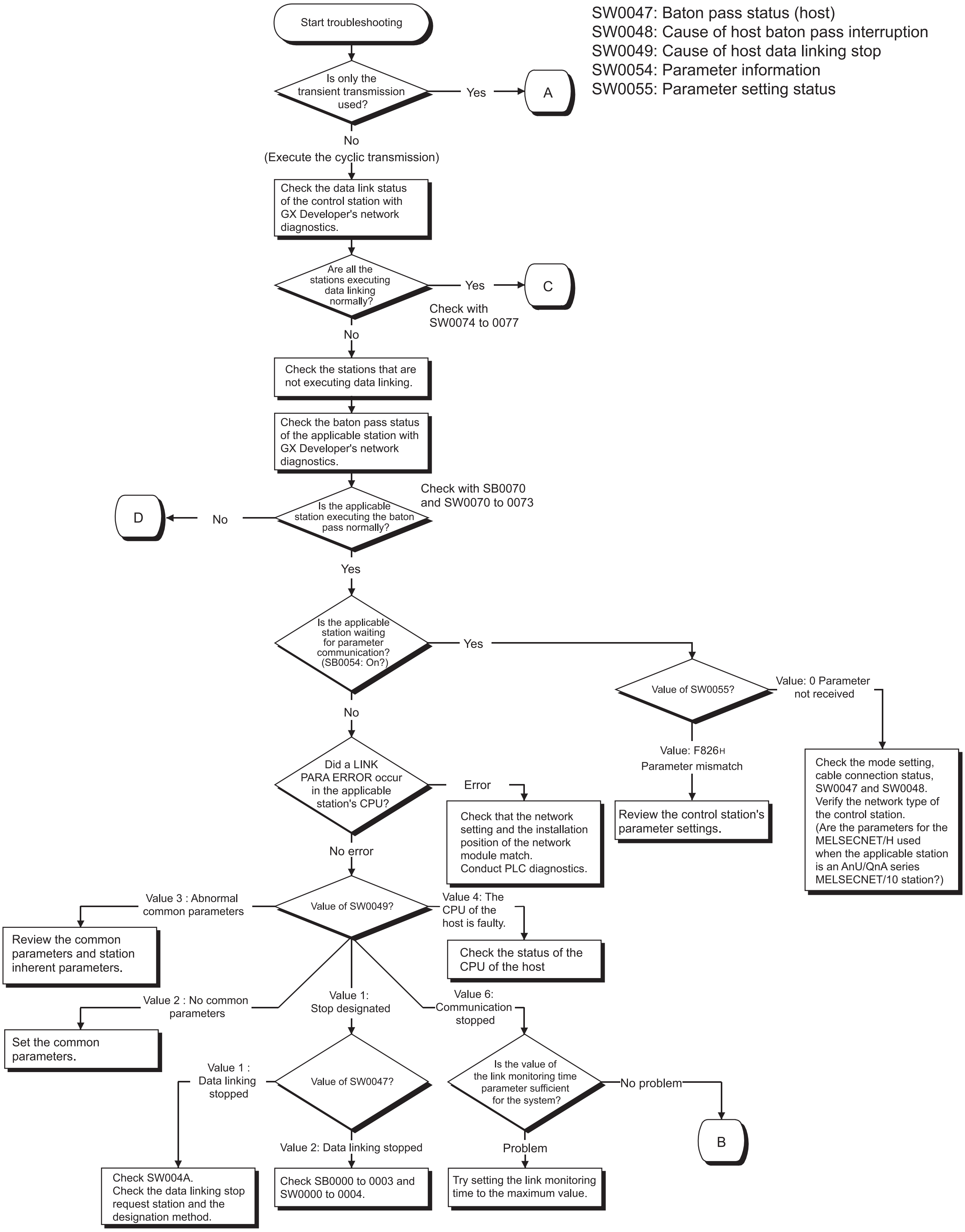
POINT

If the T. PASS LED turns on and off and looks unstable, refer to the following.
<Cause>
The line status is assumed to be unstable.
<Troubleshooting>
1) Check the connector for loose connection and the cable for a break.
2) Check that the cable used conforms to the specifications.
3) Check that the overall length and station-to-station distance are within specifications. (Refer to Section 4.6 Cable Connection.).

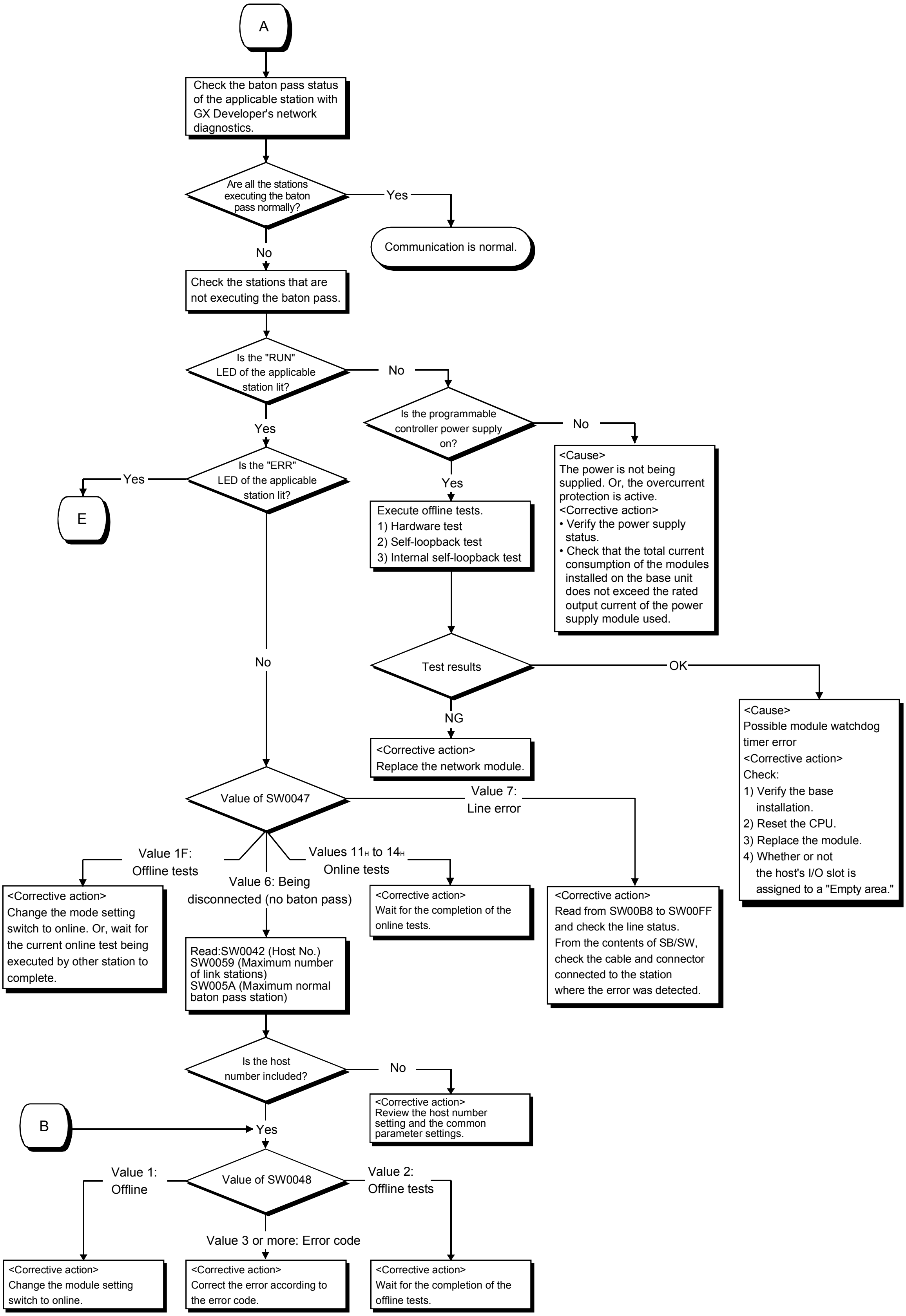
(2) From monitoring the network status to troubleshooting of a faulty station

The following flowchart illustrates the procedure for monitoring the status of the entire network, detecting a faulty station, and then performing troubleshooting for the applicable station.

The status of the entire network is monitored with GX Developer.



SW0047: Baton pass status (host)
SW0048: Cause of host baton pass interruption
SW0049: Cause of host data linking stop
SW0054: Parameter information
SW0055: Parameter setting status



Check the baton pass status of the applicable station with GX Developer's network diagnostics.

Communication is normal.

Check the stations that are not executing the baton pass.

<Cause>
The power is not being supplied. Or, the overcurrent protection is active.
<Corrective action>
- Verify the power supply status.
- Check that the total current consumption of the modules installed on the base unit does not exceed the rated output current of the power supply module used.

Execute offline tests.
1) Hardware test
2) Self-loopback test
3) Internal self-loopback test

<Corrective action>
Replace the network module.

<Cause>
Possible module watchdog timer error
<Corrective action>
Check:
1) Verify the base installation.
2) Reset the CPU.
3) Replace the module.
4) Whether or not the host's I/O slot is assigned to a "Empty area."

<Corrective action>
Change the mode setting switch to online. Or, wait for the current online test being executed by other station to complete.

<Corrective action>
Wait for the completion of the online tests.

<Corrective action>
Read from SW00B8 to SW00FF and check the line status.
From the contents of SB/SW, check the cable and connector connected to the station where the error was detected.

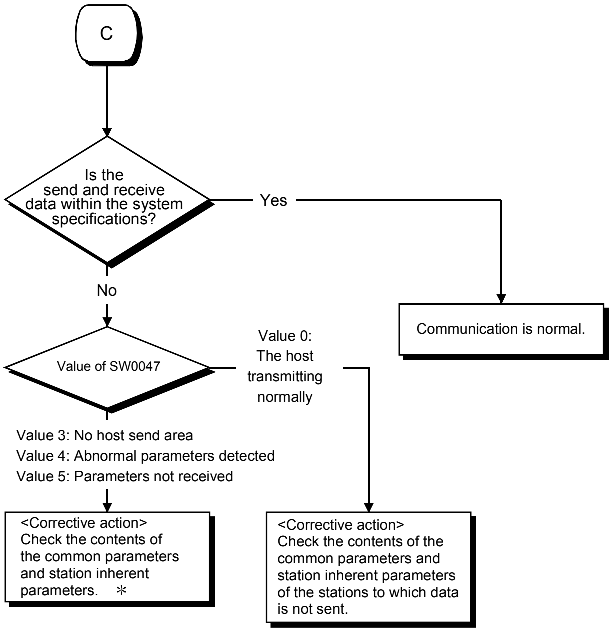
Read:SW0042 (Host No.)
SW0059 (Maximum number of link stations)
SW005A (Maximum normal baton pass station)

<Corrective action>
Review the host number setting and the common parameter settings.

<Corrective action>
Change the module setting switch to online.

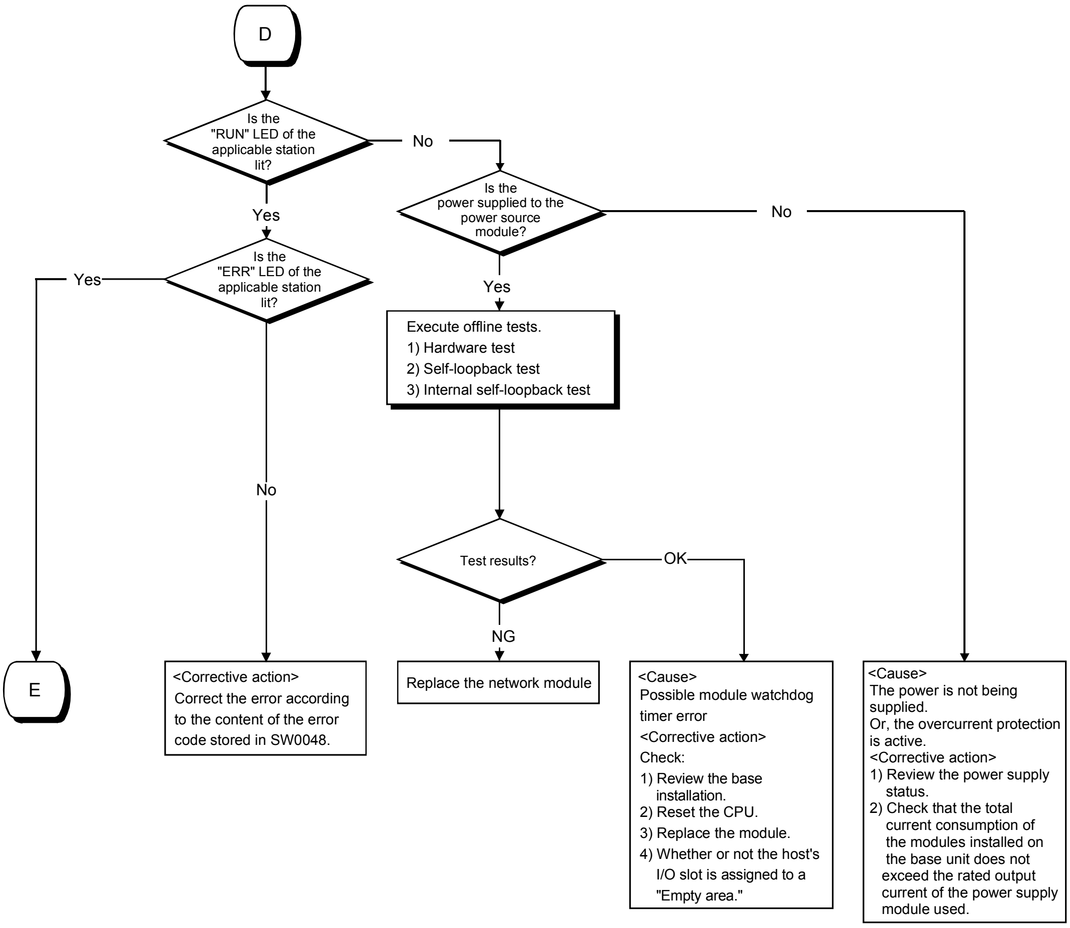
<Corrective action>
Correct the error according to the error code.

<Corrective action>
Wait for the completion of the offline tests.



✻ : In case of SW0047 = 3, the following two causes may be considered:

1) The link device has not been assigned; only the station number was set with the common parameters.
2) The link device was assigned, but "Send/receive link points = 0" was specified in the station inherent parameters setting.



E

<Cause 1>
M/S error or SW error is assumed.
<Corrective action 1>
1) Check for duplicate station number, duplicate control station designations or switch setting error.
2) Take corrective action according to the contents of SW0047 and the error code stored in SW0048.

<Cause 2>
Programmable controller error is assumed.
<Corrective action 2>
Check the programmable controller CPU error in the PLC diagnostics and restore the CPU to normal. (Refer to Section 8.2.1.)

8.2.1 Items to be checked first

Check item	Checking procedure
Monitor the communication status of each station with GX Developer's network diagnostics.	Check the CPU module status of the faulty station, the status of the network modules, the loop status of each station to search for the location where the error occurred.
Is the ERR. LED of the CPU module still lit or flickering?	Read the error code using GX Developer, and take proper measures against the error. (For details, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection). Check the following when LINK PARA. ERROR occurs. 1) Check whether the starting I/O in the network setting matches the slot where the network module is installed. (Refer to Section 5.2.1.) 2) Check for consistency in the network type and the station number of the network module. (Refer to Section 5.1.) 3) Check if the PLC side device ranges in Refresh parameters are within the ranges set in [PLC parameter] – [Device]. (Refer to Section 5.7.2 (2).) If refresh parameters have not been set, set them according to the changes made in [Device] under [PLC parameter]. (Refer to Section 5.7.2 (3).) 4) When the Redundant CPU is installed, check whether the host station is set to be paired. (Refer to Section 7.10.3.) 5) Check whether the network type of the control station matches that of the normal stations. (Refer to Section 5.1.) 6) When the MELSECNET/H Extended mode has been set, check whether a compatible network module is used. (Refer to Section 2.2.) 7) When the MELSECNET/H twisted bus system is configured, check that the MNET/10 mode is not selected as the network type and either of the forward loop and reverse loop test is not selected as the mode.
Is the on/off status of the LEDs on the network module normal?	Check the on/off status of the RUN, ERR, L ERR. and other LEDs and correct the error accordingly. (Refer to Section 4.2.) If the T. PASS LED turns on and off and looks unstable, the line status is assumed to be unstable. Therefore, check the following. 1) Check the connector for loose connection and the cable for a break. 2) Check that the cable used conforms to the specifications. 3) Check that the overall length and station-to-station distance the specifications. 4) Check that cables are correctly installed. (Refer to Section 4.6 Cable Connection.)

8.2.2 Data link failure on the entire system

Check item	Checking procedure
Monitor the communication status of each station with GX Developer's network diagnostics.	Check the line condition with GX Developer's network diagnostic loop test (only in case of optical loop test). Check the faulty station's CPU module and network module. Check the network module and data link cable with the self-loopback test and station-to-station test of the offline tests. Check whether data linking is stopped for all stations.
Are the network parameters set for the control station?	Check whether the network parameters from the control station's CPU module are set.
Are the switch settings of the control station's network module correct?	Check the station number setting switches and mode setting switch. ＊1
Are the switches of the network modules on all stations set in the correct position?	Make sure that the mode setting switches of the network modules on all stations are in the same position. ＊1
Is the link monitoring time set to a sufficient value?	Set the link monitoring time to the maximum value and check whether or not data linking can be performed.
Did the control station and remote master station go down?	Check the on/off status of the LEDs of the network modules of the control station and the remote master station.
Did the control switch to the sub-control station?	Check that the "continue data linking by a sub-station when the control station goes down" setting is set to "Yes" in the communication error settings of the control station's common parameters.

＊1: For the QJ71NT11B, check the station number/mode setting switch.

8.2.3 Data link failure caused by reset or power-off of each station

Check item	Checking procedure
Is the cable wired properly?	Check the wiring status with GX Developer's network diagnostic loop test. (Refer to Section 4.8.1.)
Is the network cable disconnected?	Check the status of each station to see whether the entire system is faulty or a specific-station is faulty, and locate the faulty area.
Are the switches of the network modules on all stations set in the correct position?	Make sure that the mode setting switches of the network modules on all stations are in the same position. ＊1
Is the setting of the link monitoring time sufficient?	Set the link monitoring time to the maximum value and check whether or not data linking is possible. If the L ERR. LED of a normal station is lit, check the TIME error with the GX Developer's network diagnostics.

＊1: For the QJ71NT11B, check the station number/mode setting switch.

POINT

In the optical loop system, do not reset the CPU modules of adjoining stations (adjoining stations on the wiring) at the same time.
Data link may be disabled.
In the case of initializing adjoining stations at the same time, turn off the power and turn it on again.

8.2.4 Data link failure of a specific station

Check item	Checking procedure
Monitor the communication status of each station.	Perform network monitoring of the network diagnostics of GX Developer, check for any abnormally communicating station and check the loop status. Also, check whether or not data linking is stopped. In case of an optical loop system, check the line condition and communication status of each station as well, using the loop test of GX Developer's network diagnostics.
Is the network module of the faulty station normal?	Check whether or not an error or problem occurred in the CPU module and network module of the faulty station.
Was the loop error caused by the network module or the data link cable?	Check whether or not the network module works normally with the self-loopback test of the offline tests. Check whether or not the data link cable is normal with the station-to-station test of the offline tests.
Are the control station's parameters correct?	Check that the total number of link stations is set to the largest number of the connected stations or more, and check that the stations that cannot communicate are specified as reserved stations.
Are the control station's parameters normal?	Read the network parameters from the faulty station's CPU module and check that the network settings such as the network type, start I/O number and network number are correct.
Are the switch settings of the network module correct?	Check the station number setting switches and mode setting switch. *1
Is any data link cable disconnected?	Perform the network monitoring and loop tests in the network diagnostics of GX Developer and check the wiring conditions.

*1: For the QJ71NT11B, check the station number/mode setting switch.

8.2.5 Data link failure in MELSECNET/H Extended mode

Checkpoint	Checking procedure
LINK PARA. ERROR occurs on the control station.	Replace the network module on the control station with a network module that supports the MELSECNET/H Extended mode. (Error code F813$_H$) For applicable network modules, refer to Section 2.2.
All stations do not start data link.	
LINK PARA. ERROR occurs on a normal station.	Make the network type of the normal station matched with the network type set to the control station. (Error code: F82A$_H$)
	Replace the network module on the normal station with a network module that supports the MELSECNET/H Extended mode. (Error code F820$_H$) For applicable network modules, refer to Section 2.2.
Specific normal station does not start data link.	Make the network type of the normal station matched with the network type set to the control station. (Error code: F82A$_H$)
	Replace the network module on the normal station with a network module that supports the MELSECNET/H Extended mode. (Error code F820$_H$) For applicable network modules, refer to Section 2.2.
Some station does not send the cyclic data of 2000 bytes or more.	Set the network type of the control station to the MELSECNET/H Extended mode.
	In the network parameter (network range assignment) of the control station, set more than 2000 bytes to send range for each station of the station.

8.2.6 Data link failure in MELSECNET/H twisted bus system

Checkpoint	Checking procedure
LINK PARA. ERROR occurs in the CPU module.	Check that the MNET/10 mode is not selected as the network type and either of the forward and reverse test is not selected as the mode.
Certain normal station does not start data link.	Check whether the wiring between connectors are correctly installed. (Refer to Section 4.6.3 and 4.6.4)
Link scan is slow.	Check whether the "Communication speed setting" of the control station is correctly set in the network parameter (Refer to Section 5.2.6).
Communication speed cannot be set in the control station.	Set network parameters using GX Developer Version 8.78G or later.

8.2.7 Data link in a redundant system

(1) An error occurs in the redundant CPU

Checkpoint	Checking procedure
Is the station set for pairing a programmable controller CPU other than the redundant CPU?	Check the CPU model name of the station set for pairing.
Is the station installed with the redundant CPU preset for pairing?	Using the device monitoring function of GX Developer, check SW01F8 to SW01FB for pairing setting.
Is the station set for pairing a network module of function version D or later?	Install a network module of function version D or later.
Is the station installed with the redundant CPU a network module of function version D or later?	
Is GX Developer used to set network parameters compatible with the redundant system?	Using GX Developer of version 8.18U or later, set network parameters.

(2) The redundant CPU does not switch the system although the network module cable is disconnected

Checkpoint	Checking procedure
Is the power supply module on the standby system faulty?	Check the external power supply for the standby system.
Is the rated voltage supplied to the power supply module on the standby system?	
Is there any stop error in the redundant CPU on the standby system?	Connect GX Developer to the redundant CPU on the standby system to check whether an error exists.
Is there any error in the network module mounted on the base unit of the standby system?	Confirm the status of the network module on the standby system.
Is the tracking cable disconnected?	Properly connect the tracking cable.

(3) Cyclic data are cleared permanently or temporarily in system switching

Checkpoint	Checking procedure
Has the host station No. +1 or -1 been set to the station to be paired by pairing setting?	Confirm the number of the station set for pairing.
Is the send range of the host station within the tracking range?	Confirm that the refresh target devices of the LB/LW within the host station's send range are set as tracking devices.
Is any parameter destroyed?	Rewrite each parameter using GX Developer. If the symptom remains unchanged after rewriting, create a new project, and rewrite parameters.

8.2.8 Send/received data failure

(1) The cyclic transmission data is not normal

Check item	Checking procedure
Is the sequence program correct?	Stop the CPU modules of both the sending and receiving stations and turn the link device of the sending station on and off by GX Developer's test operation to check whether or not data is sent to the receiving station. If it is normal, review the sequence program. If it is abnormal, review the control station's common parameters as well as the host's refresh parameters.
Are the parameter settings of the control station and remote master station correct?	Review the range of the link devices assigned to the sending station.
Are the parameter settings of the sending station correct?	Check the settings of the refresh parameters and the station specific parameters to see in what range of LB/LW/LX/LY of the network module the device range used by the sequence program is stored.
Are the parameter settings of the receiving station correct?	Check the settings of the refresh parameters and the station specific parameters to see in what device range used by the sequence program the range of LB/LW/LX/LY of the network module received from the transmitting station is stored.
Is the switch setting of the network module correct?	Confirm that the station numbers of the network modules on system A and B of the redundant system are n and n + 1 respectively.
Is any parameter destroyed?	Rewrite each parameter using DX Developer. If the symptom remains unchanged after rewriting, create a new project, and rewrite parameters.

(2) The transient transmission is not normal

Check item	Checking procedure
Did an error occur while the transient transmission was being executed?	Check the error code at the transient transmission execution and correct the error according to the error code table in Section 8.3.
	Confirm whether a dedicated link instruction is executed to a programmable controller CPU other than the redundant CPU with the control or standby system specified. (Error code: $4B00_H$)
	Check if a dedicated link instruction is executed for a CPU other than the QCPU in the multiple CPU No. specification. (Error code: 4100_H, $4B00_H$, $FE20_H$)
	Confirm whether a dedicated link instruction is executed to a single CPU system with a multiple CPU number specified. (Error code: $4B00_H$)
	Check if a non-existing multiple CPU No. is specified in the target station type. (Error code: $4B00_H$)
Are the routing parameter settings correct?	Check that the communication target is not set for a station on another network No. If it is set for a station on another network No., correct the set value of the routing parameter. (Refer to Section 7.4.2.) Check the routing parameters with the communication test of GX Developer's network diagnostics.
Is the network No. parameter correct?	Check the network No. parameter. If the parameter is not set, the network No. has been set to 1 (default); so check other station's network No..
A dedicated link instruction is not responded within specified time.	Confirm whether a value out of the set range is set for the target station CPU type.
Does the transmission go through the network module on the standby system in the redundant system?	Using the RTWRITE instruction, change the routing parameter so that transmission will go through the network module on the control system.
The dedicated link instruction executed in the multiple CPU No. specification does not access the target CPU.	<When the dedicated link instruction is started from the QnACPU> Not executable for the QnACPU. <When the dedicated link instruction is started from the QCPU> Check whether the QCPUs and network modules of the host station and target station are the following versions. ・QCPU: Serial number (first five digits) "06092" or later ・Network module: Serial number (first five digits) "06092" or later
	Check if the group or all stations has been specified for the target station number. (Refer to Section 2.2.2 (5).)
Is the number of resends set every time the instruction is executed?	Confirm whether a program requires the setting of the number of resends when executing instructions.

8.2.9 Link dedicated instruction not complete

Check item	Checking procedure
Is the link dedicated instruction issuing station online?	Place the link dedicated instruction issuing station online and execute the link dedicated instruction. Use SB0043 as an interlock to confirm the online status in the sequence program.

8.2.10 Checking online for reverse optical fiber cable connection

This section explains the checking procedure for incorrect optical fiber cable connection (IN-IN, OUT-OUT) during online and the link special registers (SW009C to SW009F) used for the check.

Unlike the loop test, the checking procedure given in this section allows a check without stopping a data link.

If incorrect cable connection is found, correct the wiring after shutting off all phases of the system.

POINT

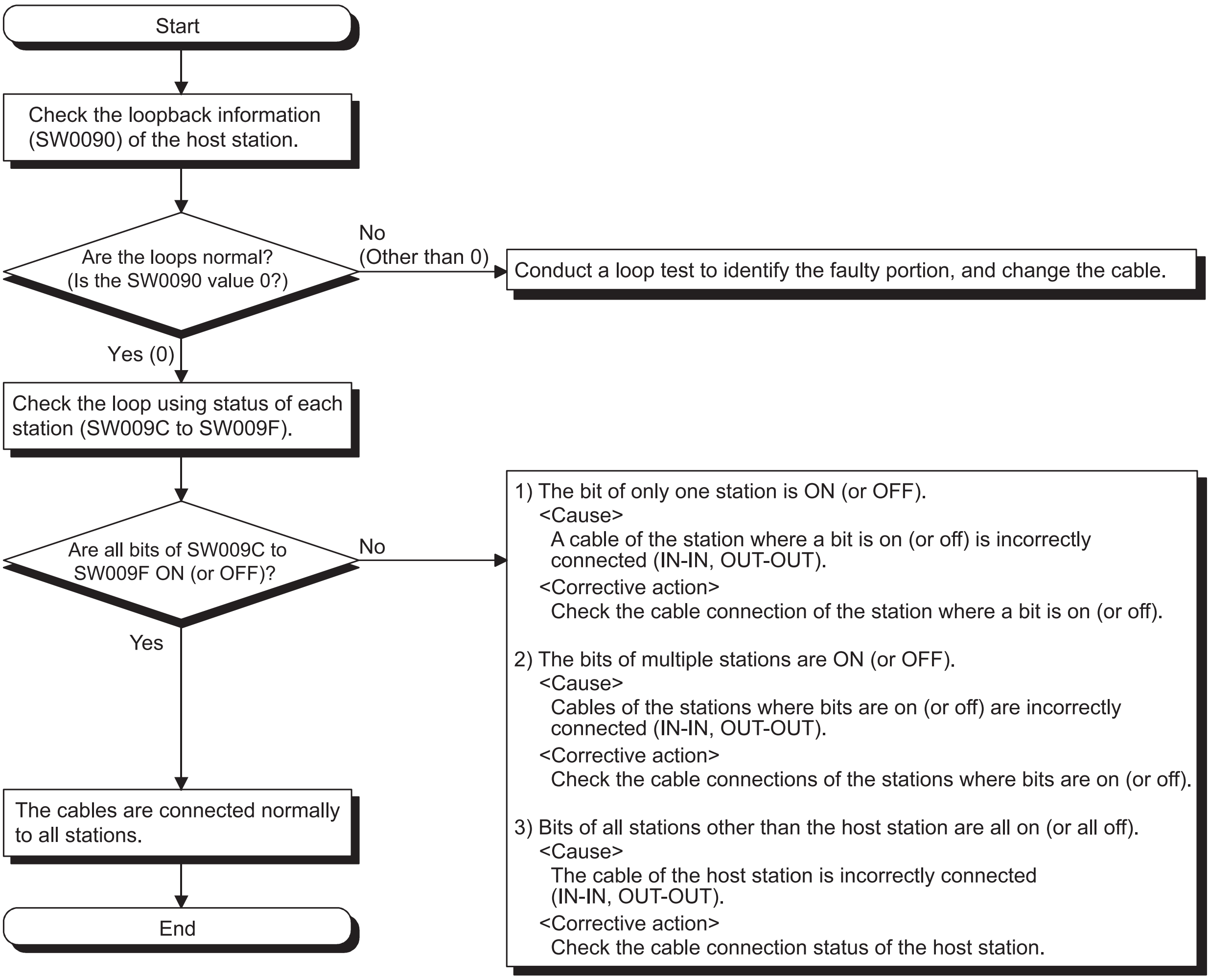
Before starting the check given in this section, make sure that the following conditions are satisfied.

If these are not satisfied, conduct a loop test to make a check.

- Multiplex transmission function is not used.
- The optical fiber cables have no breaks. (Both the forward and reverse loop cables are normal.)
- There are no stations having data link error (power off, MELSECNET/H module failure).

(1) Checking procedure

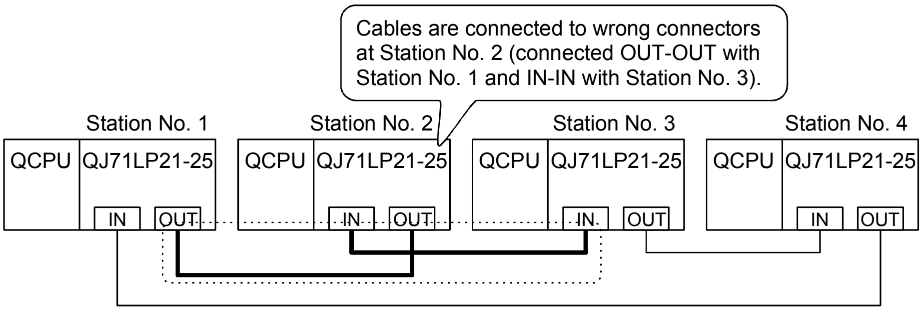
Follow the procedure given below to check for incorrect optical fiber cable connection (IN-IN, OUT-OUT) during online.



(2) Example of checking SW009C to SW009F

An example of incorrect cable connection at Station No. 2 is shown below.

(a) Wiring diagram



Cables are connected to wrong connectors at Station No. 2 (connected OUT-OUT with Station No. 1 and IN-IN with Station No. 3).

(b) SW009C to SW009F status

Station No.	SW009C to SW009F status
Station No. 1	Only Station No. 2 (bit 1) is ON or OFF. b15 to b4 b3 b2 b1 b0 SW009C: 0 | 0 0 1 0 SW009D: 0 SW009E: 0 SW009F: 0
Station No. 3	
Station No. 4	
Station No. 2	All stations (bit 0, bit 2, bit 3) other than Station No. 2 (bit 1) are ON or OFF. b15 to b4 b3 b2 b1 b0 SW009C: 0 | 1 1 0 1 SW009D: 0 SW009E: 0 SW009F: 0

8.2.11 When different network types exist in the same network

Set all the network modules within the same network to the same network type.
If there are different network types within the same network, any of the symptoms 1) to 6) given in the following table will occur.
If any different network type is accidentally set, take corrective action with reference to the following table.

Normal station / Control station			QCPU						QnA/ AnUCPU
			Serial number (first five digits) of the network module: "06092" or later			Serial number (first five digits) of the network module: "06091" or earlier			
			MELSECNET/ H Extended mode	MELSECNET/ H mode	MELSECNET/ 10 mode	MELSECNET/ H Extended mode	MELSECNET/ H mode	MELSECNET/ 10 mode	
QCPU	Serial number (first five digits) of the network module: "06092" or later	MELSECNET/H Extended mode	Normal operation	1)	1)	2)-1	2)-2	2)-2	6)
		MELSECNET/H mode	1)	Normal operation	5)	5)	Normal operation	5)	6)
		MELSECNET/10 mode	1)	5)	Normal operation	5)	5)	Normal operation	Normal operation
	Serial number (first five digits) of the network module: "06091" or earlier	MELSECNET/H Extended mode	4)-1	4)-2	4)-2	4)-3	4)-4	4)-4	4)-5
		MELSECNET/H mode	3)	Normal operation	5)	5)	Normal operation	5)	6)
		MELSECNET/10 mode	3)	5)	Normal operation	5)	5)	Normal operation	Normal operation
QnA/AnUCPU			3)	5)	Normal operation	5)	5)	Normal operation	Normal operation

Refer to the table below for 1) to 6).

No.		Control station status		Normal station status		Network status	Corrective action
		CPU	Network module (SW0055 status)	CPU	Network module (SW0055 status)		
1)		-	F82B$_H$*1	LINK PARA. ERROR	F82A$_H$	The normal station of a different network type is disconnected.	Change the network type of the normal station to that of the control station.
2)	1	-	F82B$_H$*1	LINK PARA. ERROR	F820$_H$	The normal station of a different network type is disconnected.	Replace the network module of the normal station with the one compatible with the MELSECNET/H Extended mode.
	2						Replace the network module of the normal station with the one compatible with the MELSECNET/H Extended mode, and change the network type to that of the control station.
3)		-	-	LINK PARA. ERROR	F82A$_H$	The normal station of a different network type is disconnected.	Change the network type of the normal station to that of the control station.
4)	1	LINK PARA. ERROR	F813$_H$	-	-	Data link stopped	Replace the network module of the control station with the one compatible with the MELSECNET/H Extended mode.
	2						・Replace the network module of the control station with the one compatible with the MELSECNET/H Extended mode. ・Change the network type of the normal station to that of the control station.
	3						・Replace the network module of the control station with the one compatible with the MELSECNET/H Extended mode. ・Replace the network module of the normal station with the one compatible with the MELSECNET/H Extended mode.
	4						・Replace the network module of the control station with the one compatible with the MELSECNET/H Extended mode. ・Replace the network module of the normal station with the one compatible with the MELSECNET/H Extended mode, and change the network type to that of the control station.
	5						・Replace the network module of the control station with the one compatible with the MELSECNET/H Extended mode. ・Replace the CPU of the normal station with a QCPU.
5)		-	-	-	-	There is a mismatch in network type, but the normal station operates according to the network type of the control station.	Change the network type of the normal station to that of the control station.
6)		-	-	-	-	The normal station of a different network type is disconnected.	Replace the CPU of the normal station with a QCPU.

-: No error

*1: Error code, F82B$_H$ is not stored in SW0055. Check it by System monitor of GX Developer.

8.3 Error Codes

When a trouble such as data link failure has occurred, the error cause can be identified by an error code.

8.3.1 How to check error codes

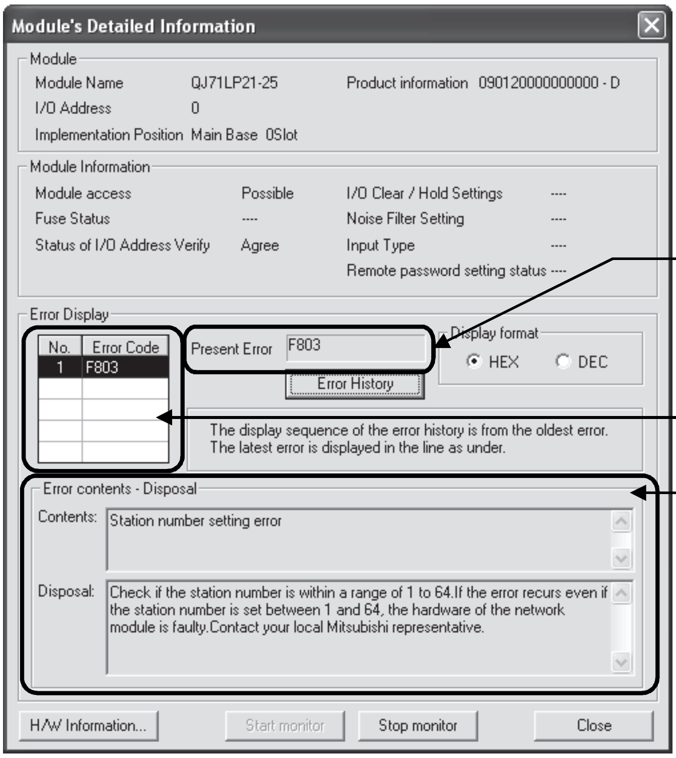
To check error codes for all network modules, follow either procedure (1) or (2) described in this section.
For cyclic transmission error and for dedicated instruction failure, the procedure described in (3) and (4) can also be used respectively.

REMARKS

By using GX Works 2, error history of the entire system can be checked even after errors were cleared by powering on and then off the programmable controller or by resetting the programmable controller CPU. (Refer to (2) (b) in this section)

(1) Checking with GX Developer

On GX Developer, select [Diagnostics] → [System monitor], and then click the Module's Detailed Information button.



Module's Detailed Information

Module
Module Name QJ71LP21-25
Product information 090120000000000 - D
I/O Address 0
Implementation Position Main Base 0Slot

Module Information
Module access Possible
Fuse Status ----
Status of I/O Address Verify Agree
I/O Clear / Hold Settings ----
Noise Filter Setting ----
Input Type ----
Remote password setting status ----

Error Display

No.	Error Code
1	F803

Present Error F803

Display format ● HEX ○ DEC

The display sequence of the error history is from the oldest error.
The latest error is displayed in the line as under.

Error contents - Disposal
Contents: Station number setting error
Disposal: Check if the station number is within a range of 1 to 64.If the error recurs even if the station number is set between 1 and 64, the hardware of the network module is faulty.Contact your local Mitsubishi representative.

Displays the latest error code.

Displays error history.

Displays the description of the error code selected in error history and action against

REMARKS

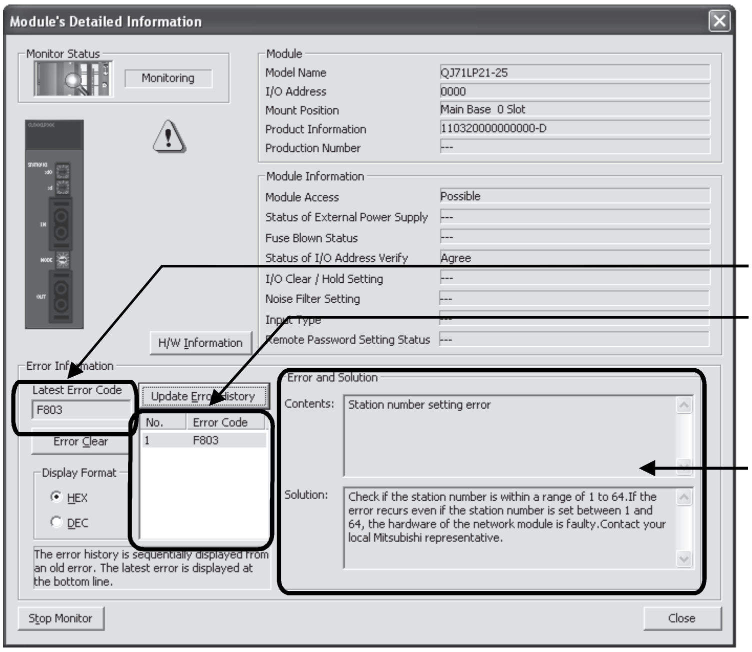
By changing parameters set in transfer setup of GX Developer, error codes of other programmable controller in the network can also be checked.

(2) Checking with GX Works2

Error codes that are corresponding to the errors occurred in network modules can be checked by following either procedure (a) or (b) described below.

(a) Checking on the "Module’s Detailed Information" screen

Error code, error contents, and corrective action are displayed.
On GX Works2, select [Diagnostics] → [System Monitor], and then click the Detailed Information button.



Model Name: QJ71LP21-25
I/O Address: 0000
Mount Position: Main Base 0 Slot
Product Information: 110320000000000-D
Production Number: ---
Module Access: Possible
Status of External Power Supply: ---
Fuse Blown Status: ---
Status of I/O Address Verify: Agree
I/O Clear / Hold Setting: ---
Noise Filter Setting: ---
Input Type: ---
Remote Password Setting Status: ---

Latest Error Code: F803

No.	Error Code
1	F803

Display Format: ● HEX ○ DEC

The error history is sequentially displayed from an old error. The latest error is displayed at the bottom line.

Contents: Station number setting error

Solution: Check if the station number is within a range of 1 to 64.If the error recurs even if the station number is set between 1 and 64, the hardware of the network module is faulty.Contact your local Mitsubishi representative.

Displays the latest error code.

Displays error history.

Displays description of the error code that is currently selected under Error history and corrective action for the error.

REMARKS

By changing parameters set in transfer setup of GX Works2, error codes of other programmable controller in the network can also be checked.

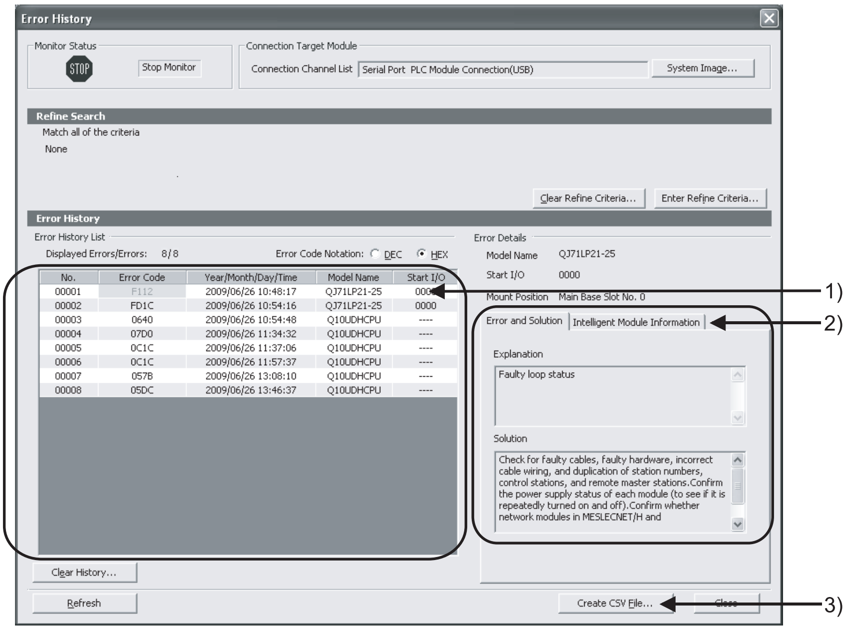
(b) Checking on the "Error History" screen ^{*1}

On this screen, errors including those occurred in other modules are displayed, and the data can be output in a CSV file.
Error code and date and time of error occurrence can be checked even after powering off and then on the programmable controller or after resetting the programmable controller CPU.

On GX Works2, select [Diagnostics] → [System Monitor], and then click the System Error History button.

∗1: Available on the programmable controller CPU, network module, and GX Works2 when their versions are respectively as follows.

Item	Version
Programmable controller CPU	Universal model QCPU whose serial number (first five digits) is "11043" or later
Network module	Network module whose serial number (first five digits) is "11042" or later
GX Works2	Version 1.12N or later



Connection Channel List: Serial Port PLC Module Connection(USB)

Match all of the criteria
None

Displayed Errors/Errors: 8/8
Error Code Notation: ○ DEC ● HEX

No.	Error Code	Year/Month/Day/Time	Model Name	Start I/O
00001	F112	2009/06/26 10:48:17	QJ71LP21-25	000
00002	FD1C	2009/06/26 10:54:16	QJ71LP21-25	0000
00003	0640	2009/06/26 10:54:48	Q10UDHCPU	----
00004	07D0	2009/06/26 11:34:32	Q10UDHCPU	----
00005	0C1C	2009/06/26 11:37:06	Q10UDHCPU	----
00006	0C1C	2009/06/26 11:57:37	Q10UDHCPU	----
00007	057B	2009/06/26 13:08:10	Q10UDHCPU	----
00008	05DC	2009/06/26 13:46:37	Q10UDHCPU	----

Model Name: QJ71LP21-25
Start I/O: 0000
Mount Position: Main Base Slot No. 0

Explanation: Faulty loop status

Solution: Check for faulty cables, faulty hardware, incorrect cable wiring, and duplication of station numbers, control stations, and remote master stations.Confirm the power supply status of each module (to see if it is repeatedly turned on and off).Confirm whether network modules in MESLECNET/H and

1) Error History List
Error log of the module is displayed.
For errors occurred during initial processing of the programmable controller CPU, the date and time will be 0000/00/00 00:00:00, therefore the displayed order under Error history list is not in the order in which the error occurred.
(Example: Station number setting error)

2) Error and Solution, Intelligent Module Information

- Error and Solution
  The error description and corrective action for the error, which is currently selected under "Error History List", are displayed.

- Intelligent Module Information
  The status of a network module when the error, which is currently selected under "Error History List", had occurred is displayed.＊1

  ＊1: When the error that simultaneously occurs with a network error is selected, the status right before the error occurrence may be displayed under Intelligent Module Information.

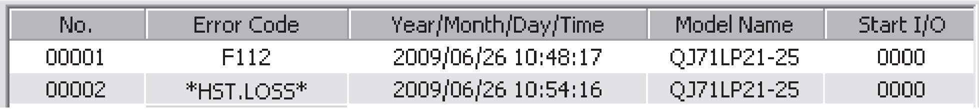
  For the network module, the following will be displayed.

Item	Description
Baton pass status (host) (SW0047)	Baton pass status of the host station
Cause of data link stop (SW0049)	Cause of data link stop of the host station
Baton pass status of each station (SW0070 to SW0073)	Baton pass status of each station 0: Normal 1: Abnormal
Loopback station (forward loop side) (SW0099)	Station number of which station is performing a loopback in the forward loop. For the remote master station, [7D$_H$] is displayed.
Loopback station (reverse loop side) (SW009A)	Station number of which station is performing a loopback in the reverse loop. For the remote master station, [7D$_H$] is displayed.
Cyclic transmission status of each station (SW0074 to SW0077)	Cyclic transmission status of each station 0: Executing cyclic transmission 1: Cyclic transmission not executed
Dedicated instruction	Dedicated instruction on which an error has occurred
Target network number	Network number of a station to which a dedicated instruction was executed, resulted in an error
Target station number	Station number of a station to which a dedicated instruction was executed, resulting in an error

3) Create CSV File button
   Click this button to output the module error history in a CSV file.

POINT

(1) If errors frequently occur in the network module, "*HST.LOSS*" may be displayed instead of error codes in the Error Code column.
(Example)



No.	Error Code	Year/Month/Day/Time	Model Name	Start I/O
00001	F112	2009/06/26 10:48:17	QJ71LP21-25	0000
00002	*HST.LOSS*	2009/06/26 10:54:16	QJ71LP21-25	0000

If too many "*HST.LOSS*" are displayed, increase the number of errors to be collected per scan in the "PLC RAS" tab of the "Q Parameter Setting" dialog box. For setting, refer to the user's manual (Function Explanation, Program Example) for the CPU module used.

(2) When the same errors consecutively occurred, only the error code for the first occurred is displayed on the "Error History" screen.

(3) Checking for data link error

When a data link is not available, check the following link special registers.

1) SW0048: Cause of the baton pass interruption
2) SW0049: Cause of the data link stop
3) SW0055: Parameter setting status

(4) Checking for dedicated instruction error

Error codes for the errors occurred during execution of a dedicated instruction can be checked by the following device data.

Error codes for transient transmission errors are stored in the link special registers SW00EE to SW00FF as well.

For details of each instruction, refer to programming examples for dedicated instructions described in Section 7.4.5

1) SEND, RECV, RECVS, READ, WRITE, REQ:
   Completion station (S1) + 1 of the control data
2) ZNRD : SW31
3) ZNWR : SW33
4) RRUN, RSTOP, RTMRD, RTMWR : SW0031 (When channel 1 is used.)
   SW0033 (When channel 2 is used.)
   SW0035 (When channel 3 is used.)
   SW0037 (When channel 4 is used.)
   SW0039 (When channel 5 is used.)
   SW003B (When channel 6 is used.)
   SW003D (When channel 7 is used.)
   SW003F (When channel 8 is used.)

8.3.2 Error code list

Table 8.1 Error code list

Error No.	Description of error	Corrective measure
4000 to 4FFF	(Error detected by the programmable controller CPU)	Take measures with referring to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).
7000 to 7FFF	(Error detected by the serial communication module, etc.)	Take measures referring to the troubleshooting section of the Serial Communication Module User's Manual.
B000 to BFFF	(Error detected by the CC-Link module)	Take measures referring to the troubleshooting section of the CC-Link System Master/Local Module User's Manual.
C000 to CFFF	(Error detected by the Ethernet module)	Take measures referring to the troubleshooting section of the Ethernet Interface Module User's Manual.
D000 to DFFF	(Error detected by the CC-Link IE Field Network)	Take measures referring to the troubleshooting section of the CC-Link IE Field Network User's Manual.
E000 to EFFF	(Error detected by the CC-Link IE Controller Network)	Take measures referring to the troubleshooting section of the CC-Link IE Controller Network Reference Manual.
F101	Initial status (Network activated)	Wait until SB0047 (baton pass status) and SB0049 (data link status) turn off (normal).
F102	Initial status (Network activated)	
F103	Initial status (during online test)	
F104	Initial status (Control/sub-control station shift)	
F105	Initial status (Parameters being processed)	
F106	Shift from failed control station to sub-control station	Check the condition of the control station's power supply and of the cables and the status of the control station CPU module.
F107	Baton pass error (baton lost)	Check the line status for a faulty cable or a missing terminating resistor, as well as the stations that are not powered on. In the case of the PLC to PLC network, when transient transmission is executed frequently and the link scan time may exceed 200 ms, adjust the transient setting values to reduce the link scan time.
F108	Baton pass error (duplicate baton)	Check for duplicate station numbers and control stations with the setup confirmation test. If the setup confirmation test cannot be executed, identify the station where a data link error has occurred in [Data-link status of each station] on the Other station information screen of network diagnostics and then check the station No. setting and parameters of the error station. Check for faulty cables, wire breakage, poor connector connections, connection errors, uninstalled or loose terminating resistors, etc.
F109	Initial status (during online test)	Wait until SB0047 (baton pass status) and SB0049 (data link status) are recovered.

Table 8.1 Error code list (continued)

Error No.	Description of error	Corrective measure
F10A	Initial status (online test/offline loop test)	<During execution of an online test> Wait until SB0047 (baton pass status) and SB0049 (data link status) are recovered. <During execution of an offline test> Change the switch setting to online after the test has been completed.
F10B	Duplicate station number error	Review the station number setting. The setup confirmation test of network diagnosis is effective. If the setup confirmation test cannot be executed, identify the station where a data link error has occurred in [Data-link status of each station] on the Other station information screen of network diagnostics and then check the station No. setting.
F10C	Duplicate control station error	Review the station number setting. The setup confirmation test of network diagnosis is effective. If the setup confirmation test cannot be executed, identify the station where a data link error has occurred in [Data-link status of each station] on the Other station information screen of network diagnostics and then check the parameters of the error station. When the operation mode for redundant system is debug, connect one of the systems to the network. When connecting to both systems to the network, set the operation mode to back-up mode or to separate mode.
F10D	Offline status	Review the mode setting, and change it to online.
F10E	Number of receive error retries exceeded	Check for faulty cables, faulty hardware, incorrect cable wiring, absence of terminating resistor (in the case of the bus), and duplication of station numbers, control stations, and remote master stations. The setup confirmation test and loop test of network diagnosis are effective.
F10F	Number of send error retries exceeded	
F110	Timeout error	
F111	Corresponding station error (Baton pass to the corresponding station not executed)	Review the status of the corresponding station and the parameter and switch settings (to see if there is a parameter error and the corresponding station is the control station and properly set). Confirm the power supply status of the corresponding station (to see if it is repeatedly turned on and off). Check for faulty cables, faulty hardware, incorrect cable wiring, absence of terminating resistor (in the case of the bus), and duplication of station numbers, control stations, and remote master stations. The setup confirmation test and loop test of network diagnosis are effective.
F112	Faulty loop status	Check for faulty cables, faulty hardware, incorrect wiring, and duplication of station numbers, control stations, and remote master stations. Confirm the power supply status of each module (to see if it is repeatedly turned on and off). Confirm whether network modules in MESLECNET/H and MELSECNET/10 modes exist together (confirm the control station type).
F113	Send failure (Baton pass to the host station not executed)	Retry after a little while. If the error reoccurs as a result of a retry, check for faulty cables, faulty hardware, incorrect cable wiring, absence of terminating resistor (in the case of the bus), and duplication of station numbers, control stations, and remote master stations. Wait until SB0047 (baton pass status) and SB0049 (data link status) are recovered.
F114	Send failure	Retry after a little while. If the error reoccurs as a result of a retry, check for faulty cables, faulty hardware, incorrect cable wiring, absence of terminating resistor (in the case of the bus), and duplication of station numbers, control stations, and remote master stations. Wait until SB0047 (baton pass status) and SB0049 (data link status) are recovered.

Table 8.1 Error code list (continued)

Error No.	Description of error	Corrective measure
F115	Improper function code	Check for faulty cables, faulty hardware, incorrect wiring, duplication of station numbers, and duplication of control stations.
F116	Delayed online test processing	
F117	Send failure	Check for faulty cables, hardware failure, noise, incorrect wiring, and absence of terminating resistors (when a bus is used).
F118	Send failure (baton regeneration)	Wait until SB0047 (baton pass status)/SB0049 (data link status) is turned off (normal).
F11A	Send failure (multiplex transmission stopped)	Wait for a while and execute again.
F11B	Being disconnected	Review the parameter and switch settings (to see if there is a parameter error and the corresponding station is the control station or remote master station and properly set). Check for faulty cables, faulty hardware, noise, incorrect wiring, and duplication of station numbers, control stations, and remote master stations.
F11C	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F11F	Initial status (no baton addressed to host)	Check for the operation status of the control/sub-control station, faulty cables, incorrect cable wiring, absence of terminating resistor (in the case of the bus), and duplication of station numbers, control stations, and remote master stations. Confirm whether network modules in MESLECNET/H and MELSECNET/10 modes exist together (confirm the control station type).
F120	Destination station specification error	Check for faulty cables, faulty hardware, incorrect wiring, absence of terminating resistor (in the case of the bus), and duplication of station numbers, control stations, and remote master stations.
F122	Send failure (coaxial/twisted bus system)	Check for cable connection, proper connector connection, connection of terminating resistor, or faulty cables.
F221	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F222	No free area in the receive buffer (buffer-full error)	Retry after a little while. If the error reoccurs as a result of a retry, review the number of transient communication times and communication interval of the entire system. Turn off the power supply to the entire system, and turn it on again.
F224	Receive data size error	The hardware of the module on the transient transmission source station is faulty. Please consult your local Mitsubishi representative.
F225	Logical channel number error	The hardware of the module on the transient transmission source station is faulty. Please consult your local Mitsubishi representative.
F226	Channel number error	Check if the logical channel number specified in the execution source of the SEND instruction is set in the target network module. Alternatively, specify the logical channel number set in the target network module.
F228	SEND instruction target station error	Review the target network number and target station No. in the control data at the execution source of the SEND instruction.
F301	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F701	Send-target station number error (station No. 0 specified)	The hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F702	Send-target station number error (station No. 65 or higher number specified)	
F703	Destination group number error	Review the destination group number.

Table 8.1 Error code list (continued)

Error No.	Description of error	Corrective measure
F706	Received data size error	The cable is faulty, or The hardware of the network module is faulty. If a communication error has occurred, review the cable. If not, the hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F707	Number of relay stations invalid	Set stations to which data can be sent. Review the system. Review the routing parameters.
F708	Receiving group number error	Review the group number of the target station.
F709	Receiving network number error	Review the network No. of network parameter for a host station and a target station. If the parameter is not set, the network No. is preset to 1 (default); so check the network No. of other stations.
F70A	System error	The cable is faulty, or the hardware of the network module is faulty. If a communication error has occurred, review the cable. If not, the hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F70B	Response wait timeout	Wait until SB0047 (baton pass status) and SB0049 (data link status) are recovered.
F70C	System error	The cable is faulty, or the hardware of the network module is faulty. If a communication error has occurred, review the cable. If not, the hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F70E	System error	
F710	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F711	System error	
F712	System error	
F781	Connection target specification error	Check if C24 connection or CC-Link connection is specified for access to other stations. If the setting is correct, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F782	System error	The hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F783	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F7C1	Host station channel in use	The same channel cannot be used at the same time. Change the channel number. Alternatively, do not use the same channel at the same time.
F7C2	Target station channel in use	Retry the SEND instruction after a little while. Check if the target station uses the channel concerned to execute the instruction, or if RECV processing is executed. Check if another station executes the SEND instruction to the target station's channel.

Table 8.1 Error code list (continued)

Error No.	Description of error	Corrective measure
F7C3	Arrival monitoring timeout	<When this error occurs by the ZNRD/ZNWR instruction> When a CPU module on another station to be accessed is an A2UCPU(S1), A3UCPU, A4UCPU, A2ASCPU(S1), or A2USCPU(S1), use the CPU module with the following version or later. • A2UCPU(S1), A3UCPU, A4UCPU: Version AY (manufactured since July, 1995) or later • A2ASCPU(S1), A2USCPU(S1): Version CP (manufactured since July, 1995) or later <When this error occurs by the RECV instruction> When another station is executing the SEND instruction, increase the value of the arrival monitoring time. Alternatively, start the RECV instruction by turning the RECV instruction execution request flag to ON. <When this error occurs in other cases> Increase the value of the arrival monitoring time. Confirm the operation status of the target station, the network status, and the relay station status (in the case of sending to other network).
F7C4	Resend count-out	Increase the arrival monitoring time. Re-execute the REMFR/REMTO instruction. Confirm the operation status of the target station, the network status, and the relay station status (in the case of sending to other network).
F7C5	SEND instruction target station error	Review the target network number and target station No. in the request control data of send/receive instructions.
F7C6	Channel number setting out of range	Set the channel numbers of the host station and of the target station in the request control data of send/receive instructions within a range between 1 and 64.
F7C7	Target station specification error (host station specification)	Specify the target station number in the request control data of send/receive instructions to other than the number of host station.
F7C8	Execution type specification error	When the execution/abnormal completion type in the request control data of send/receive instructions is specified for all stations or groups, set "No arrival confirmation" for the execution type.
F7C9	Resend count setting out of range	Set the resent count of the request control data of send/receive instructions within a range between 0 and 15 (times).
F7CA	Arrival monitoring time setting out of range	Set the arrival monitoring time of the request control data of send/receive instructions within a range between 0 and 32767 (seconds).
F7CB	Sent data length setting out of range (SEND instruction)	Set the sent data length of the request control data of the SEND instruction within a range between 1 and 960 (words).
F7CD	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F7E1	Control data error	Confirm the set values (mode, etc.) in the control data of a dedicated instruction.
F7E2	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F7E3	System error	
F7E4	Target CPU module type error	Check if the CPU module model of the target station specified in the WRITE, READ, REQ, RRUN, RSTOP, RTMRD, and RTMWR instructions is out of applicable range.
F7E5	Post-transmission event wait timer time-out	Re-execute the REMFR or REMTO instruction after a little while. Confirm the operation status of the target station, the network status, and the relay station status (in the case of sending to other network).
F7E7	Buffer memory address error	Check if the buffer memory address specified in the REMFR and REMTO instructions exceeds 8000_H.
F7E8	Network type error	Check if the network number specified in the REMFR and REMTO instructions represents a PLC to PLC network.
F7E9	Instruction not executable error	Check if the host station is data-linked when the REMFR or REMTO instruction is executed.

Table 8.1 Error code list (continued)

Error No.	Description of error	Corrective measure
F800	Mode switch setting error	Confirm the setting of the mode switch. *1 If the error reoccurs after resetting, the hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F801	Network number setting error	Create new network parameters and perform Write to PLC. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F802	Group number error	
F803	Station number setting error	Check if the station number is within a range of 1 to 64. If the error reoccurs even if the station number is set between 1 and 64, the hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F804	DIP switch setting error	Create new network parameters and perform Write to PLC. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F805	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F806	System error	The hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F808	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F80A	System error	
F80B	System error	
F80C	System error	
F80D	System error	
F80E	System error	
F80F	System error	
F811	System error	
F812	System error	
F813	Parameter data error (parameter)	Replace the network module of the control or normal station with the one compatible with the MELSECNET/H Extended mode. Change the network type of the normal station to that of the control station. Create new network parameters and perform Write to PLC. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F814	Parameter data error (code)	Create new network parameters and perform Write to PLC. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F820	Link parameter error	Replace the network module of the normal station with the one compatible with the MELSECNET/H Extended mode. Change the network type of the normal station to that of the control station. Create new network parameters and perform Write to PLC. When the MELSECNET/H twisted bus system is configured, check that the MNET/10 mode is not selected as the network type and either of the forward loop and reverse loop test is not selected as the mode. If any of above mentioned parameter is set, create new network parameters and perform Write to PLC. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F821	Station-specific parameter error	Review station-specific parameters. Set common parameters ≧ station-specific parameters for the sending range of the host station. If no station-specific parameters are set, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.

*1: For the QJ71NT11B, check the station number/mode setting switch.

Table 8.1 Error code list (continued)

Error No.	Description of error	Corrective measure
F822	System error	The hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F823	Parameter consistency error	Set common parameters ≧ station-specific parameters for the sending range of the host station. If no station-specific parameters are set, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F825	CPU parameter check error	Perform Write to PLC on the network parameters for the control station again. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F826	Parameter mismatch error	Set parameters suitable for the sub control station, or activate it as a control station. Review and reset the parameters for the master and sub master stations. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F828	No control station shift setting	Set "with data link by the sub control station when the control station is down."
F829	Pairing setting error	On the network parameter at control station, set the pairing setting on the Redundant CPU or unset the pairing setting on all the CPUs other than the Redundant CPU.
F82A	Network type mismatch (normal station detected)	Match the network type set for the normal station with the one set for the control station.
F82B	Network type mismatch (control station detected)	
F830	System error	The hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F831	System error	
F832	Data link startup condition error	If the data link is stopped under all station specification, start it by all station specification. If the data link is stopped under specific station specification, start it from the station, or forcibly start it.
F833	Keyword error	Start the data link from the station where it was discontinued, or forcibly start it.
F834	System error	The cable is faulty, or the hardware of the network module is faulty. If a communication error has occurred, review the cable. If not, the hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F835	System error	
F836	System error	
F837	Exceeded number of retries	Check the status of the control station and of the remote master station (to see if resetting or an error occurs in the middle of the operation).
F838	Relevant timer timeout	Check the status of the control station and of the remote master station (to see if resetting or an error occurs in the middle of the operation).
F839	No link parameter (communication impossible)	Register link parameters
F83A	SW0000 out of range error	Correct the contents of SW0000.
F83B	Forced switching impossible error	Check if the following conditions are met: • The system is a multiplexed remote I/O network system. • Check if "Return as a standby station" is set as the parameter for the master station. • The host station is operating as a master station. • The operating sub master station is in data-linking.
F840	Low speed cyclic parameter error	Create new network parameters and perform Write to PLC. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F841	System error	
F842	System error	Create new network parameters and perform Write to PLC. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F843	System error	Create new network parameters and perform Write to PLC. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.

Table 8.1 Error code list (continued)

Error No.	Description of error	Corrective measure
F901	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
F902	System error	Check the system configuration to see if there are eight or more relay networks in the MELSECNET/H.
F903	System error	The hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
F904	System error	
F905	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
FD01	CRC error (offline test)	There is no need to take corrective measures because the system retries the operation. If the error frequently occurs, check for faulty cables, faulty hardware, noise, absence of terminating resistor (in the case of the bus), and incorrect wiring.
FD02	Overrun error (offline test)	
FD03	AB. IF error (offline test)	
FD04	TIME error (offline test)	
FD05	Data error (offline test)	
FD06	Under error (offline test)	
FD07	Send failure	
FD08	Send failure (coaxial/twisted bus system)	Check if the cable is not connected or is loose or faulty and if the terminating resistor is not connected.
FD09	Loop status changed (offline loop test)	There is no need to take corrective measures because the system retries the operation (do not switch the loop in the middle of the operation). If the error frequently occurs, check the line and the wiring status.
FD0A	Unstable communication (offline loop test)	
FD0B	Wiring error (offline loop test)	Check the wiring.
FD0C	System error	There is a problem with the hardware of the network module. Please consult your local Mitsubishi representative.
FD11	Error occurred during test execution	Execute after the completion of the test from other station.
FD12	Disconnecting error	Review the cause for why the station is being disconnected.
FD13	System error	Set the total number of link stations with a common parameter. Set a station number that is equal to the host station number or larger.
FD14	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
FD15	System error	
FD16	System error	
FD17	System error	
FD18	System error	
FD19	System error	
FD1A	Station with duplicated station number	Check the duplicate station number, and correct it.
FD1B	Test abort error	The ongoing test was interrupted due to the resetting of the test executing station. There is a faulty station on the networks.
FD1C	Interruption error due to loop switching during test	There is no need to take corrective measures because the system retries the operation (do not switch the loop in the middle of the operation). If the error frequently occurs, check the line and the wiring status.
FD1D	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
FD1E	Bus topology, test disabled error	Conduct a test that can be executed in the bus topology.
FD20	Mode error	Create new network parameters and perform Write to PLC. If the error reoccurs, the hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
FD21	Hardware error (send interrupt error)	The cable was disconnected during the online test. Reconnect the cable, and continue the online test.
FD22	Hardware error (receive interrupt error)	
FD23	Data comparison error	Check for faulty cables, faulty hardware, incorrect wiring, absence of terminating resistor (in the case of the bus), and duplication of station numbers, and control stations.
FD24	Retry over	
FD25	Input port initial value check error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.

Table 8.1 Error code list (continued)

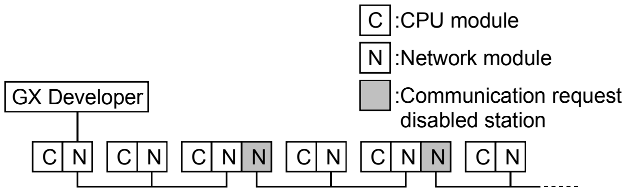
Error No.	Description of error	Corrective measure
FD26	Light check forward side error	There is a problem with the cable. Connect a proper cable, and perform an online test.
FD27	Light check reverse side error	
FD28	RAM check error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
FD29	ROM check error	
FD2A	Timer function check error	
FD2B	WDT function check error	
FD31	Duplicate online diagnostics request error	Execute online diagnostics after another is completed.
FD32	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
FD33	System error	
FD35	Response wait time-out occurred	Retry after a little while. Check the status of the relevant station and of the line.
FD36	Action wait time-out occurred	
FD37	Another online diagnosis executed	
FD38	Duplicate message error	
FD39	Communication test request destination error (host station)	Change the test request destination.
FD3A	Communication test request destination error (station to which the test cannot be requested)	A station to which a test request is not available was specified. 
FE20	Received data error	Review the routing parameters, or replace the relay CPU module with the AnU or QnA CPU module compatible with the MELECNET/10.
FE21	ZNRD/ZNWR device range error	Review the range of the device to be accessed with the ZNRD/ZNWR instructions to the ACPU.
FE22	AnU request error	Check if access to other station is made from GX Developer with a project of a different CPU type.
FE23	System error	The hardware of the source module starting dedicated instructions and MC protocol is faulty. Please consult your local Mitsubishi representative.
FE24	System error	Confirm the status of the target station and relay station CPU modules. Alternatively, change the CPU module concerned.
FE25	System error	Confirm the power supply status (insufficient voltage, instantaneous interruption, overvoltage, etc.) of the target station for transient transmission and the relay station. Alternatively, change the CPU module concerned.
FE26	System error	Confirm the operation status (WDT error, etc.) of the target station and relay station CPU modules. Alternatively, change the CPU module concerned.
FE27	System error	The hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
FE28	System error	Either the target station for transient transmission or the network module in the host station is faulty. Please consult your local Mitsubishi representative.

Table 8.1 Error code list (continued)

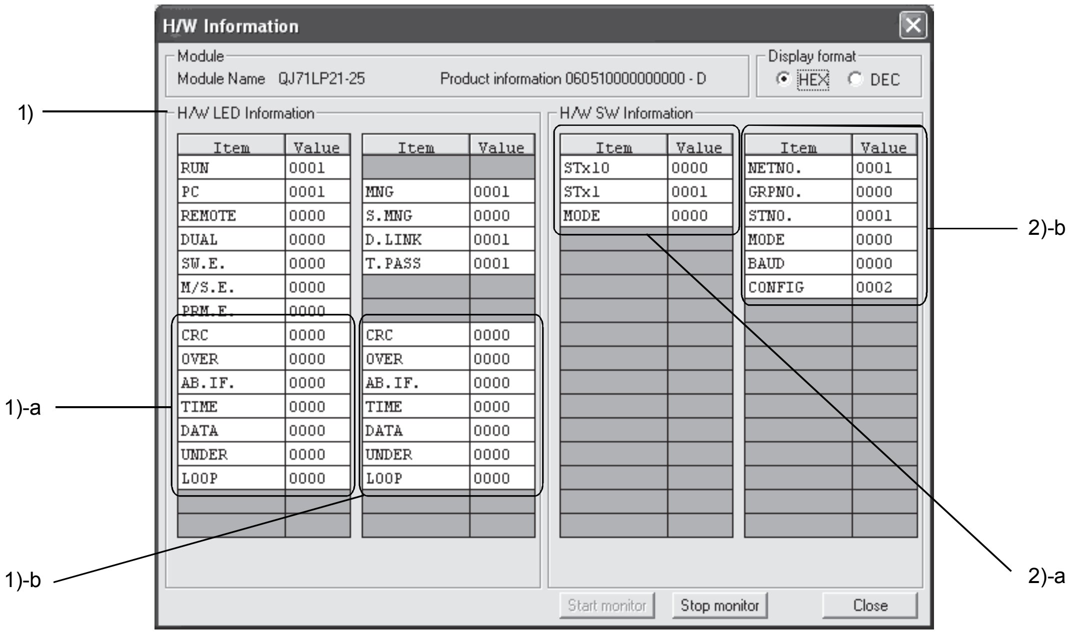
Error No.	Description of error	Corrective measure
FE30	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
FE31	System error	
FE32	System error	
FE34	System error	
FE36	System error	
FE37	System error	
FE38	System error	
FE39	System error	The hardware of the CPU or network module is faulty. Please consult your local Mitsubishi representative.
FE3B	System error	The hardware of the network module is faulty. Please consult your local Mitsubishi representative.
FE3C	System error	
FE3D	System error	
FE3E	System error	
FE3F	System error	

8.4 H/W Information

With the H/W information, details of the LED and switch information of the network modules can be monitored using GX Developer. To display the H/W information, click the H/W information button on the system monitor screen of GX Developer.

The H/W information is displayed on the screen shown below with a combination of the network module's function version and the GX Developer's function version.

(1) When the network module: function version B and the GX Developer: SW7D5C-GPPW are combined



Module
Module Name QJ71LP21-25 Product information 060510000000000 - D

Display format ● HEX ○ DEC

H/W LED Information

Item	Value
RUN	0001
PC	0001
REMOTE	0000
DUAL	0000
SW.E.	0000
M/S.E.	0000
PRM.E.	0000
CRC	0000
OVER	0000
AB.IF.	0000
TIME	0000
DATA	0000
UNDER	0000
LOOP	0000

Item	Value
MNG	0001
S.MNG	0000
D.LINK	0001
T.PASS	0001
CRC	0000
OVER	0000
AB.IF.	0000
TIME	0000
DATA	0000
UNDER	0000
LOOP	0000

H/W SW Information

Item	Value
STx10	0000
STx1	0001
MODE	0000

Item	Value
NETNO.	0001
GRPNO.	0000
STNO.	0001
MODE	0000
BAUD	0000
CONFIG	0002

The following details will be displayed for each item.

1) H/W LED information
   Displays the LED information for the network module.
   The values for each item is displayed as: 0001 on, 0000 off.

Item	Description
RUN	Module operating normally: on
PC	With PLC to PLC networks: on
REMOTE	With remote I/O networks: on
DUAL	During multiplex transmission execution: on
SW.E	During switch setting errors: on
M/S.E.	When station numbers or controlled stations are duplicated on the same network: on
PRM.E.	When an integrity error is triggered with a common parameter and a station's unique parameter, and when the parameter received from a sub-controlled station is different to the host parameter received from the controlled station: on
MNG	During controlled station setup: on During normal station setup: off
S.MNG	When it does not exist in a sub-controlled station: on
D.LINK	During data links (cyclic transmission is being executed): on
T.PASS	Executing baton pass (being joined in a network): on

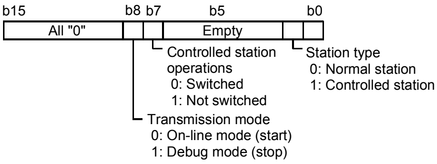
Item	Description
CRC	During received data code check errors: Illuminated 1)-a: Forward loop side, 1)-b: Reverse loop side
OVER	During delayed received data processing errors: Illuminated 1)-a: Forward loop side, 1)-b: Reverse loop side
AB.IF.	When errors are triggered owing to values other than the stipulated "1" are received consecutively, and when errors are triggered owing to the length of the received data being too short: Illuminated 1)-a: Forward loop side, 1)-b: Reverse loop side
TIME	When errors are triggered owing to the data link monitoring timer being activated: Illuminated 1)-a: Forward loop side, 1)-b: Reverse loop side
DATA	When errors are triggered owing to abnormal data exceeding 2kbytes has been received: Illuminated 1)-a: Forward loop side, 1)-b: Reverse loop side
UNDER	When errors are triggered owing to the internal processing of transmission data not being completed within the specified period of time: Illuminated 1)-a: Forward loop side, 1)-b: Reverse loop side
LOOP	When errors are triggered owing abnormalities on the loop: Illuminated 1)-a: Forward loop side, 1)-b: Reverse loop side

2) H/W switch information
Displays the switch information for the network module.

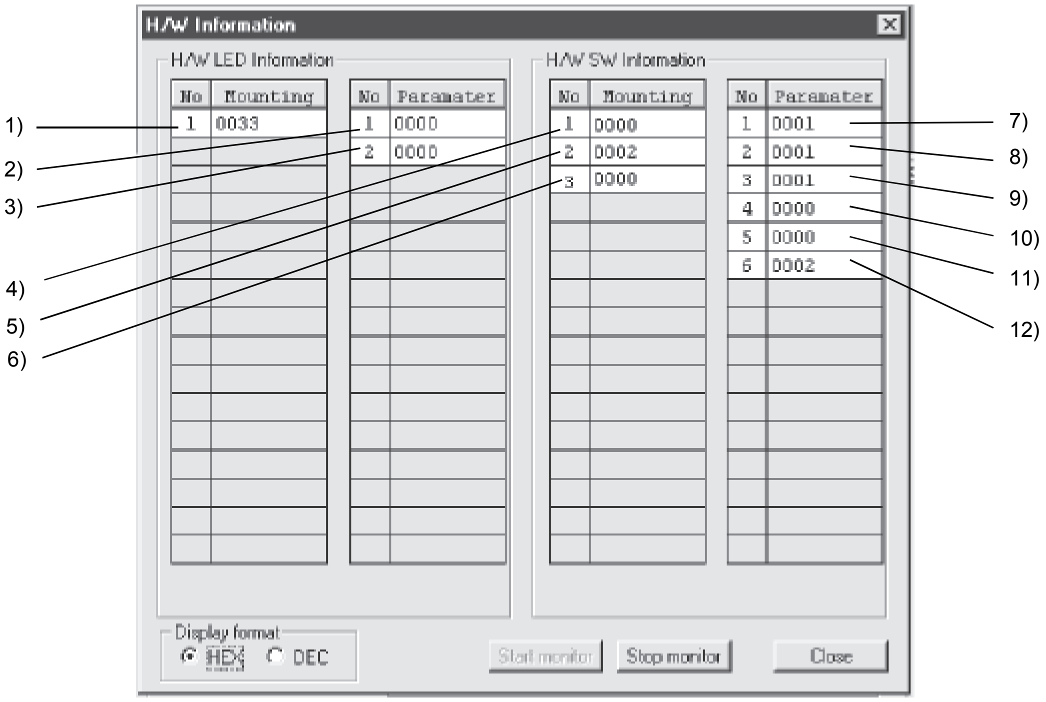
2)-a: Displays the switch settings for the H/W mounted on the network module.

Item	Description
STx10	Position 10 of the station number setting switch
STx1	Position 1 of the station number setting switch
MODE	Mode setting switch

2)-b: Displays the switch information actually set up on the network module.

Item	Description	Display range		
NETNO.	Network number setting	0 to 239		
GRPNO.	Group number setting	0 to 9		
STNO.	Station number setting	1 to 64		
MODE	Operation mode setting	0: On-line 7: Self loop-back test 8: Internal self loop-back test 9: Hardware test		
BAUD	Communication speed	Optical loop	Coaxial bus	Twisted bus
		0: 10 Mbps 1: 25 Mbps	0: 10 Mbps	0: 156Kbps 1: 312Kbps 2: 625Kbps 3: 1.25Mbps 4: 2.5Mbps 5: 5Mbps 6: 10Mbps
CONFIG	Station type, controlled station operations during recovery, transmission mode settings			

(2) When the network module: function version B and the GX Developer: prior to SW5D5C-GPPW are combined



H/W LED Information

No	Mounting
1	0033

No	Parameter
1	0000
2	0000

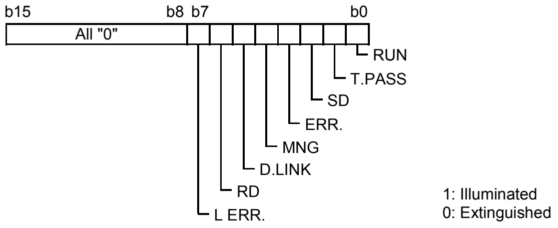
H/W SW Information

No	Mounting
1	0000
2	0002
3	0000

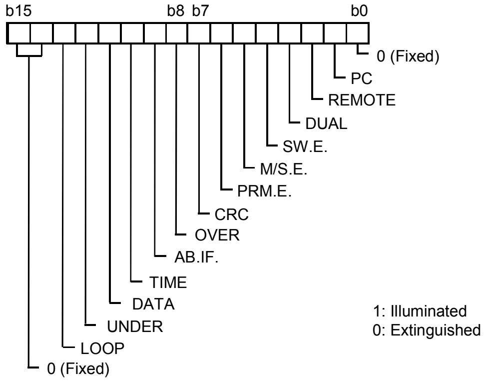
No	Parameter
1	0001
2	0001
3	0001
4	0000
5	0000
6	0002

The following details will be displayed for each item.

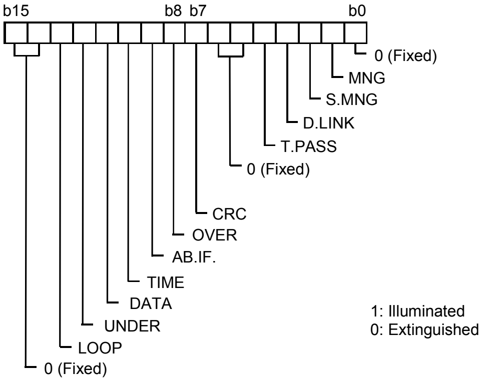
1) Actual LED1 information
Displays the illumination status of LEDs actually mounted onto the network module.



2) LED1 information
Displays information for illuminated LEDs on the network module. The following details are displayed.
(Refer to section 8.4 (1) for details of the information for all LEDs.)



3) LED2 information
Displays information for illuminated LEDs on the network module. The following details are displayed.
(Refer to section 8.4 (1) for details of the information for all LEDs.)



4) Actual switch 1 information
Displays the station number (position 10) set with the station number setting switch (position 10) mounted onto the network module.

5) Actual switch 2 information
Displays the station number (position 1) set with the station number setting switch (position 1) mounted onto the network module.

6) Actual switch 3 information
Displays the mode number set with the mode setting switch mounted onto the network module.

7) Network number switch information
Displays the number of the network actually set on the network module.
Display range: 0 to 239

8) Group number switch information
Displays the number of the group actually set on the network module.
Display range: 0 to 32

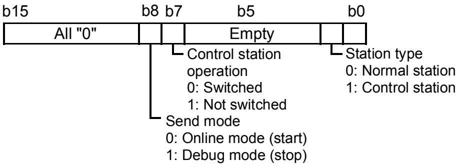
9) Station number switch information
Displays the number of the station actually set on the network module.
Display range: 0 to 64

10) Mode number switch information
Displays the number of the mode actually set on the network module.
Display range: 0 to F

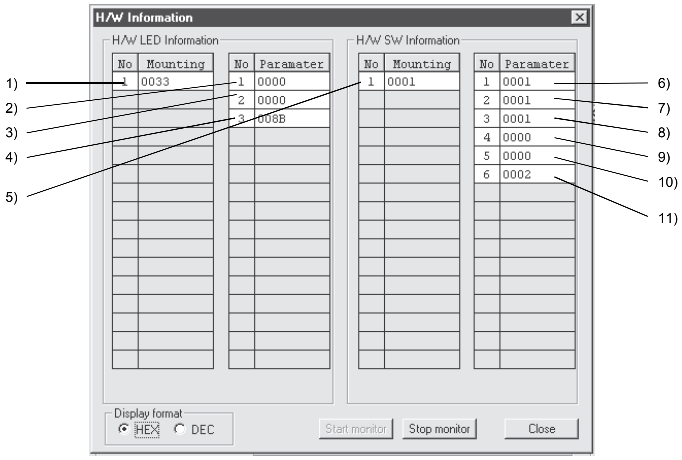
11) For future expansion purposes

12) Dip number switch information

Displays the station type, the controlled station operations during recovery, and the Send mode set up in the network module.



(3) When the network module: function version A and the GX Developer: prior to SW5D5C-GPPW are combined



No	Mounting
1	0033

No	Paramater
1	0000
2	0000
3	008B

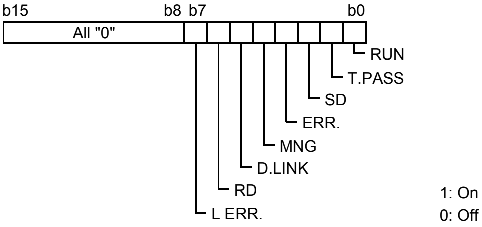
No	Mounting
1	0001

No	Paramater
1	0001
2	0001
3	0001
4	0000
5	0000
6	0002

Each item displays the following information.

1) Actual LED1 information

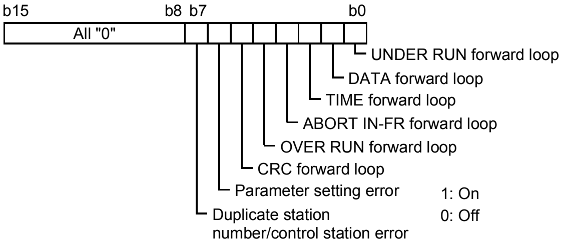
Displays the on/off status of the LEDs that are used in the network module.



2) LED1 information

Displays the information of the LEDs that are turned on by the network module. The contents are displayed in the following manner:

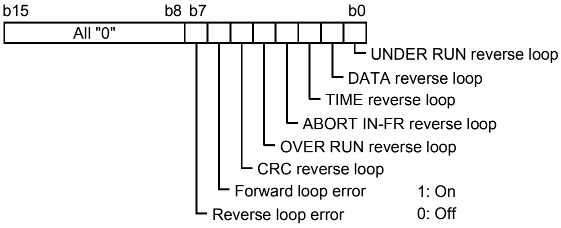
- "UNDER RUN forward loop" to "CRC forward loop" display the information of errors that have occurred on the forward loop side. The "L ERR." of 1) Actual LED1 information turns on if either one of these errors have occurred (corresponding LED information turns on) or the "UNDER RUN reverse loop" to "CRC reverse loop" LED information of 3) LED2 information is lit.
- The "ERR." signal of 1) Actual LED1 information turns on if either "Parameter setting error," "Duplicate station number/control station error" or "Switch setting error" of 4) LED3 information is lit.



3) LED2 information

Displays the information of the LEDs that are turned on by the network module. The contents are displayed in the following manner:

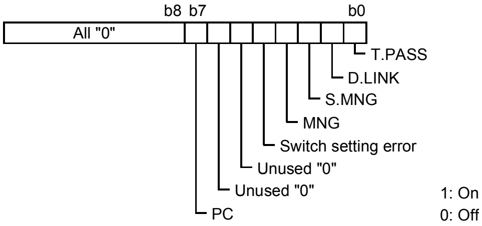
- "UNDER RUN reverse loop" to "CRC reverse loop" display information of errors that have occurred on the reverse loop side. The "L ERR." of 1) Actual LED1 information turns on if either one of these errors have occurred (corresponding LED information turns on) or the "UNDER RUN forward loop" to "CRC forward loop" LED information of 2) LED1 information is lit. Furthermore the "Forward loop error" turns on if either of "UNDER RUN forward loop" to "CRC forward loop" is on. The "Reverse loop error" turns on if either of "UNDER RUN reverse loop" to "CRC reverse loop" is on.



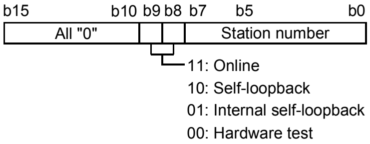
4) LED3 information

Displays the information of the LEDs that are turned on by the network module. The contents are displayed in the following manner:

- "T.PASS" turns on during baton pass. When this LED information turns on, the "T.PASS" of 1) Actual LED1 information is turned on.
- "D.LINK" turns on during data linking. When this LED information turns on, the "D.LINK" of 1) Actual LED1 information is turned on.
- "S.MNG" and "MNG" turn on when the network module is being controlled by the sub-control station and the control station, respectively. When either of this LED information turns on, the "MNG" of 1) Actual LED1 information is turned on.
- "ERR" of 1) Actual LED1 information turns on if either "Parameter setting error" or "Duplicate station number/control station error" of 2) LED1 information, or the "Switch setting error" is on.
- "PC" turns on when the network module is operating on PLC to PLC network. (1: fixed)



5) Actual switch information
Displays the station number and mode number that are set by the hardware switch mounted on the network module.



6) Network No. switch information
Displays the network No. set for the network module.
Display range: 0 to 239

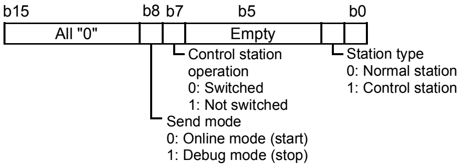
7) Group number switch information
Displays the group number set for the network module.
Display range: 0 to 32

8) Station number switch information
Displays the station number set for the network module.
Display range: 0 to 64

9) Mode number switch information
Displays the mode number set for the network module.
Display range: 0 to F

10) For future expansion

11) DIP number switch information
Displays the station type, control station operation when returning to the network, and send mode. The contents are displayed in the following manner.



APPENDICES

Appendix 1 Comparison of Network Module Specifications, and Compatibility

Appendix 1.1 List of comparison between MELSECNET/H and MELSECNET/H Extended mode and MELSECNET/10 mode specifications

The MELSECNET/H system supports the MELSECNET/H and MELSECNET/H Extended modes (high functionality/high-speed mode) and the MELSECNET/10 mode (functional and performance compatibility mode), which are explained in this manual.
When the MELSECNET/10 mode is used, it is easy to make connection with the AnU/QnA corresponding MELSECNET/10. However, its specifications are different from those of the MELSECNET/10 mode, as shown in Table 1 below.
Since this manual is written assuming that MELSECNET/H is used in the MELSECNET/H and MELSECNET/H Extended mode, refer to the "QnA/Q4AR Corresponding MELSECNET/10 Network System Reference Manual" to use it in the MELSECNET/10 mode.

Table 1 Comparison of specifications among MELSECNET/H mode, MELSECNET/H Extended mode and MELSECNET/10 mode

Selected mode Specification item		MELSECNET/H network system	
		MELSECNET/H mode, MELSECNET/H Extended mode	MELSECNET/10 mode
Transmission type		Coaxial bus type/optical (SI) loop type	
Maximum number of link points	I/O (LX, LY)	8192 points	
	Link relay (LB)	16384 points	8192 points
	Link register (LW)	16384 points	8192 points
Maximum number of link points per station *1		[MELSECNET/H mode] {(LY+LB)/8 + (2 × LW)} ≦ 2000 bytes [MELSECNET/H Extended mode] {(LY+LB)/8 + (2 × LW)} ≦ 35840 bytes	{(LY+LB)/8 + (2 × LW)} ≦ 2000 bytes
Transient transmission data size		Maximum 1920 bytes/frame	Maximum 960 bytes/frame
Communication speed		25 Mbps/10 Mbps (from switch setting)	10 Mbps
Link scan time		[MELSECNET/H mode, communication speed 10Mbps] KB + (0.45 × total stations) + (total number of bytes used by network × 0.001) (ms)	KB + (0.75 × total number of stations) + (total number of bytes used in the network × 0.001) (ms)
Transmission delay time		Sequence scan time of sending side + refresh time of sending side + LS × 1 + sequence scan time of receiving side × 2 + refresh time of receiving side	Sequence scan time of sending side + refresh time of sending side + LS × 2 + sequence scan time of receiving side × 2 + refresh time of receiving side
Communication method		Token bus method [coaxial bus type]/token ring method [optical loop type]	
Overall distance		500 m (1640.5 ft.) [coaxial bus type]/30 km (98430 ft.) [optical loop type] 2.5 km (8202.5 ft.) : When 4 repeaters are connected	
Distance between stations		[optical loop type (Communication speed 10 Mbps)] 1 km (3281 ft.) : When QSI/Broad-band H-PCF/H-PCF cable is used 500 m (1640.5 ft.) : When SI cable is used [coaxial bus type] 500 m (1640.5 ft.) : 5C-2V, 5C-FB 300 m (984.3 ft.) : 3C-2V	
Maximum number of networks		239	
Maximum number of groups		32	9
Maximum number of connected stations		32 stations (1: control station, 31: normal stations) [coaxial bus type]/ 64 stations (1: control station, 63: normal stations) [optical loop type]	
Maximum number of modules installed per CPU		Total of 4 modules (Basic model CPU, Q00UJCPU, Q00UCPU, Q01UCPU, and safety CPU: 1 module)	
32 bits data assurance		Supported	Not supported
Station-based block data assurance		Supported	Supported (Only for stations connected to the QCPU when the QCPU is the control station)
Transient transmission function			
	N:N communication (monitor, upload/download, etc.)	Supported	
	Number of data sending/receiving channels	Receive channels: 64 (up to 8 channels when used at the same time) Send channels: 8	8 (fixed channels)
	Compatible instructions (SEND, RECV, READ, SREAD, WRITE, SWRITE, REQ, ZNRD, ZNWR)	Available	
	RRUN, RSTOP, RTMRD, RTMWR instruction	Available	
	RECVS instruction	Available	Not available

*1: The number of LY points of the stations set in the I/O master station is the sum total of the LY points for output to all stations within the block.

<table>
<tr><th rowspan="2">Selected mode
Specification item</th><th colspan="2">MELSECNET/H network system</th></tr>
<tr><th>MELSECNET/H mode, MELSECNET/H Extended mode</th><th>MELSECNET/10 mode</th></tr>
<tr><td>Low-speed cyclic transmission function</td><td>Yes</td><td>No</td></tr>
<tr><td>Maximum number of refresh parameters that can be set (excluding SB, SW)</td><td colspan="2">
<table>
<tr><th rowspan="2">Item</th><th colspan="3">Number of settings</th></tr>
<tr><th>Basic model QCPU
Safety CPU</th><th>Q00UJCPU
Q00UCPU
Q01UCPU</th><th>High Performance model QCPU
Process CPU
Redundant CPU
Universal model QCPU other than indicated in the left column</th></tr>
<tr><td>Link device transfer</td><td>8</td><td>16</td><td>64</td></tr>
<tr><td>SB/SW transfer</td><td colspan="3">1 for each</td></tr>
</table>
</td></tr>
<tr><td>Network connection applicable CPU</td><td>QCPU (Q mode)</td><td>QCPU (Q mode)
QCPU-A (A mode)
QnACPU
ACPU</td></tr>
</table>

Appendix 1.2 Upgraded functions of the network module

The network module undergoes the addition of functions and specification changes by version upgrade.

For checking of the function version of the network module, refer to Section 2.3.

(1) Compatibility with old models

When replacing a previous network module (function version A or B) with the one of function version D, there is no need to change the parameters, programs, and switch settings.

However, to use any function not available for a previous version, the parameters and programs must be modified.

(2) Additional functions

The table below shows the functions added to function version B or later.

Additional function	Description	Function version		
		A	B	D
Multiple CPU system supported	Multiple CPU systems are supported.	×	○	○
Addition of link dedicated instructions	The following link dedicated instructions were added: • RRUN instruction (remote RUN instruction) • RSTOP instruction (remote STOP instruction) • RTMRD instruction (other station's clock data read instruction) • RTMWR instruction (other station's clock data write instruction)	×	○	○
Data length of link dedicated instructions increased to 960 words	The data length of the following link dedicated instructions was increased from 460 words to 960 words: • SEND instruction • RECV instruction • RECVS instruction • READ/SREAD instructions • WRITE/SWRITE instructions	×	○	○
Redundant system supported	• The network module can be mounted on the base unit of the redundant system and used (redundant network module). • A system switching request is automatically issued to the control system CPU in case of a data link error or malfunction.	×	×	○
Target station CPU type designation in link dedicated instruction (System specification in redundant system)	In the following link dedicated instructions, the target station CPU type can be designated (the redundant system's control system/standby system and system A/B can be designated): • READ/SREAD instructions • WRITE/SWRITE instructions • REQ instruction • RRUN instruction • RSTOP instruction • RTMRD instruction • RTMWR instruction	×	△ (Serial No. (first five digits) is "10101" or later.)	○
MELSECNET/H Extended mode compatibility	Compatibility with the MELSECNET/H Extended mode (The maximum number of link points per station has been increased from 2000 bytes to 35840 bytes)	×	△ (Serial No. (first five digits) is "10101" or later.)	△ (Serial No. (first five digits) is "06092" or later, or "07102" or later.)
Target station CPU type specification in link dedicated instruction (Multiple CPU No. specification)	In the following link dedicated instructions, the target station CPU type can be specified. (The CPU No. in the multiple CPU system can be specified.) • READ/SREAD instruction • WRITE/SWRITE instruction • REQ instruction	×	△ (Serial No. (first five digits) is "10101" or later.)	△ (Serial No. (first five digits) is "06092" or later.)
Module error history supported	Errors occurred in the network module are displayed in the Error history screen of GX Works2.	×	△ (Serial No. (first five digits) is "11042" or later)	△ (Serial No. (first five digits) is "11042" or later)

○: Available/compatible
△: Available/compatible (restricted by the serial No. of the product)
×: Unavailable/incompatible

Appendix 2 Differences Between the AJ71QLP21/AJ71QLP21G/AJ71QBR11, the A1SJ71QLP21/A1SJ71QBR11 and the QJ71LP21/QJ71LP21-25/QJ71LP21G/ QJ71BR11

Appendix 2.1 Differences in LED displays and switch settings

The MELSECNET/H network modules QJ71LP21, QJ71LP21-25, QJ71LP21G and QJ71BR11 have the same LED displays and switch settings as those of the MELSECNET/10 network modules AJ71QLP21, AJ71QLP21G, AJ71QBR11, A1SJ71QLP21, and A1SJ71QBR11. However, each network module has the following differences from others as shown in Appendix Table 2. Please consider these differences when operating the network modules.

Table 2 Difference of LED indications, switch setting and others

Model name Item	QJ71LP21, QJ71LP21-25 QJ71LP21G, QJ71BR21	AJ71QLP21 AJ71QLP21G	AJ71QBR11	A1SJ71QLP21	A1SJ71QBR11
LED display	RUN	RUN		RUN	
	–	POWER		(PW) *1	
	–	PC		(PC) *1	
	–	REMOTE		(REM.) *1	
	–	DUAL	–	DUAL	–
	MNG	MNG, S.MNG		MNG, S.MNG	
	T.PASS	T.PASS		T.PASS	
	D.LINK	D.LINK		D.LINK	
	SD	SD		SD	
	RD	RD		RD	
	ERR. *2	SW.E. M/S.E. PRM.E. CPU R/W		(SW.E.) *1 (M/S.E.) *1 (PRM.E.) *1 CPU R/W	
	L ERR. *2	CRC OVER AB.IF TIME DATA UNDER LOOP	CRC OVER AB.IF TIME DATA UNDER	CRC OVER AB.IF TIME DATA UNDER F.E. (R.E.) *1	CRC OVER AB.IF TIME DATA UNDER
Network No. setting switch	– *3	NETWORK NO. × 100, × 10, × 1		NETWORK NO. × 100, × 10, × 1	
Group No. setting switch	– *3	GROUP NO.		GR.NO.	
Station number setting switch	STATION NO. × 10, × 1	STATION NO. × 10, × 1		ST NO. × 10, × 1	
Mode setting switch	MODE 0: Online *3 (parameters are valid) 1: Self-loopback test 2: Internal self-loopback test 3: Hardware test 4: Online *4 5: Self-loopback test *4 6: Internal self-loopback test *4 7: Hardware test *4 8: and up: Use prohibited	MODE 0: Online 1: Use prohibited 2: Offline (disconnected) 3: Forward loop test 4: Reverse loop test 5: Station-to-station test (master station) 6: Station-to-station test (host) 7: Self-loopback test 8: Internal self-loopback test 9: Hardware test D: Network No. confirmation E: Group No. confirmation F: Station number confirmation		MODE 0: Online 1: Use prohibited 2: Offline (disconnected) 3: Forward loop test 4: Reverse loop test 5: Station-to-station test (master station) 6: Station-to-station test (host) 7: Self-loopback test 8: Internal self-loopback test 9: Hardware test	
Display select switch	–	–		DISPLAY L ↔ R	
Condition setting switch	– *3	SW1 : PC ↔ REMOTE SW2 : N.ST ↔ MNG SW3 : PRM ↔ D.PRM SW4, 5 : STATION SIZE SW6, 7 : LB/LW SIZE		SW1 : PC ↔ REM SW2 : N.ST ↔ MNG SW3 : PRM D. ↔ PRM SW4, 5 : STATION SIZE SW6, 7 : LB/LW SIZE	
Applicable CPU	QCPU	Q4ARCPU, QnACPU, Q2ASCPU		Q2ASCPU	
Applicable base	Q3 □ B, Q6 □ B	A3□B, A5□B, A6□B, A38HB, A37RHB, A3□RB, A68RB		A1S3□B, A1S5□B, A1S6□B, A1S38HB	
External dimensions	98 (3.86) (H) × 27.4 (1.08) (W) × 90 (3.54) (D) [mm (inch)]	AJ71QLP21, AJ71QLP21G: 250 (9.84) (H) × 37.5 (1.48) (W) × 111 (4.37) (D) [mm (inch)] AJ71QBR11: 250 (9.84) (H) × 37.5 (1.48) (W) × 113 (4.45) (D) [mm (inch)]		A1SJ71QLP21: 130 (5.12) (H) × 34.5 (1.36) (W) × 93.6 (3.69) (D) [mm (inch)] A1SJ71QBR11: 130 (5.12) (H) × 34.5 (1.36) (W) × 104.6 (4.12) (D) [mm (inch)]	
Weight	0.11kg	0.45kg		0.3kg	

*1: The LED display is activated with the display selection switch.

*2: The detailed contents of an error code can be checked by the network diagnostics.

*3: Set with a network parameter.

*4: Only possible with the QJ71LP21-25. Use with the QJ71LP21, QJ71LP21G and QJ71BR11 is prohibited.

Appendix 2.2 Precautions when replacing the AJ71QLP21/AJ71QLP21G/AJ71QBR11 and the A1SJ71QLP21/A1SJ71QBR11 with the QJ71LP21/QJ71LP21-25/ QJ71LP21G/QJ71BR11

The following are the precautions when replacing the QnACPU MELSECNET/10 network system with the QCPU MELSECNET/H network system:

(1) Switch settings of the network module

The MELSECNET/H network module does not have a network number setting switch, a group number setting switch and a condition setting switch (default parameter setting). Thus, these switches must be set with the network parameters.

(2) Correcting the network parameters

The corrections as described in item (1) above are required for the network parameters.

In particular, when the default parameter is set in SW3 of the network module, there will be no parameter information about the network after converting from a QnA to a Q with GX Developer.

When the default parameter is used, make sure to set the network parameters with GX Developer after the conversion.

(3) Correcting the sequence programs

It is not necessary to fix the sequence programs, such as an interlock program that uses a link special relay (SB) or a link special register (SW) and a program for accessing other stations using the data link instructions.

- The operations of the link special relays and link special registers used in the MELSECNET/10 network are the same as those in the MELSECNET/H.
- The interlock link special relay is required to use data link instruction in the MELSECNET/10 network, but it is not required for the MELSECNET/H network. However, the sequence program will operate normally even if the interlock link special relay remains in the sequence program after conversion.

(4) Distance between optical fiber cable stations

The distance between stations will become shorter when overwriting network systems at a communication speed of 25Mbps depending on the optical fiber cable in use.

In this event, set the communication speed to 10Mbps, or rewire the system with different optical fiber cables.

Appendix 3 Link Special Relay (SB) List

The link special relay (SB) turns on/off by various factors that occur during data linking. The error status of the data link can be checked by monitoring or using it in the sequence program.
The link special relay (SB) that stored the link status is used for the detailed information of the network diagnostics of GX Developer. For a list of the device numbers for each display item, refer to Section 8.1, "Network Diagnostics (Network Monitor)" and Section 8.3.1, "How to check error codes".

(1) Mounting multiple network modules

The link special relay (SB) of each network module is refreshed by the link special relay (SB) of the CPU module shown below when the refresh parameters of each network module remain default.

Module installing position	Module 1	Module 2	Module 3	Module 4
Device number	SB0000 to 01FF	SB0200 to 03FF	SB0400 to 05FF	SB0600 to 07FF

(2) Range turned ON/OFF by user and range turned ON/OFF by system

In the link special relay (SB), there are ranges the user can set on and off (SB0000 to SB001F) and ranges the system can set on and off (SB0020 to SB01FF). (When the module is installed in the position of Module 1.)

(3) Link special relay (SB) list

Assignments of SB0000 to SB01FF are shown in the special relay (SB) list.

POINT

(1) Do not turn ON the area of the No. which does not exist in the link special relay (SB) list.
Turning ON the area of the number which does not exist in the list may cause malfunction of the programmable controller system.

(2) For how to use link special relays (SB), refer to Section 6.4.

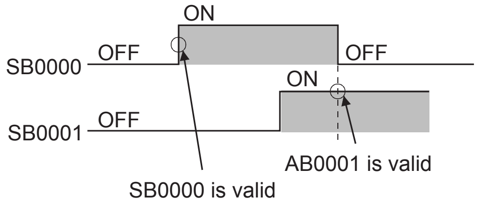
Table 3 Link special relay (SB) list

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
*1 *3 SB0000 (0)	Link startup (host)	Restarts the host's cyclic transmission. Off: Start not instructed On: Start instructed (valid at rise) *2	○	○	○	○	○	○	○	○
*1 *3 SB0001 (1)	Link stop (host)	Stops the host's cyclic transmission. Off: Stop not instructed On: Stop instructed (valid at rise) *2	○	○	○	○	○	○	○	○
*1 *3 SB0002 (2)	System link startup	Restarts the cyclic transmission according to the contents of SW0000 to SW0004. Off: Start not instructed On: Start instructed (valid at rise) *2	○	○	○	○	○	○	○	○
*1 *3 SB0003 (3)	System link stop	Stops the cyclic transmission according to the contents of SW0000 to SW0004. Off: Stop not instructed On: Stop instructed (valid at rise) *2	○	○	○	○	○	○	○	○
SB0005 (5)	Clear retry count	Clears the retry count (SW00C8 to SW00C9) to 0. Off: Clear not instructed On: Clear instructed (valid when on) *2	○	○	○	○	○	○	○	○
*1 SB0006 (6)	Clear communication error count	Clears the communication error (SW00B8 to SW00C7) to 0. Off: Clear not instructed On: Clear instructed (valid when on) *2	○	○	○	○	○	○	○	○

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

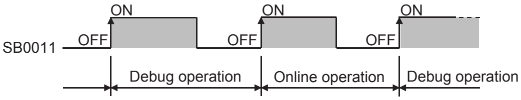
*1: Used in the network tests of GX Developer.

*2: The SB0000 to SB0003 become valid when only one point turns on.



*3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
SB0007 (7)	Clear forward loop transmission errors	Clears the line abnormal detection (SW00CC) of the forward loop side to 0. Off: Clear not instructed On: Clear instructed (valid when on)	○	×	○	×	○	×	○	×
SB0008 (8)	Clear reverse loop transmission errors	Clears the line abnormal detection (SW00CD) of the reverse loop side to 0. Off: Clear not instructed On: Clear instructed (valid when on)	○	×	○	×	○	×	○	×
＊6 SB0009 (9)	Clear loop switch count	Clears the loop switch count (SW00CE to SW00E7) to 0. Off: Clear not instructed On: Clear instructed (valid when on)	○	×	○	×	○	×	○	×
SB000A (10)	Clear transient transmission errors	Clears the transient transmission errors (SW00EE, SW00EF) to 0. Off: Clear not instructed On: Clear instructed (valid when on)	○	○	○	○	○	○	○	○
SB000B (11)	Transient transmission error area setting	Designates whether to overwrite or retain the transient transmission errors (SW00F0 to SW00FF). Off: Overwrite On: Retain	○	○	○	○	○	○	○	○
＊3＊4 SB000F (15)	Clear minor errors	Clears all of the minor errors detected by remote I/O stations. This is executed on all the remote I/O stations. While SB000F is ON, any minor error is not detected on all of the remote I/O stations. On multiplexed remote I/O networks or redundant multiplexed remote I/O networks, this can be operated only from the master station. Off: Clear not instructed On: Clear instructed (valid when on)	×	×	×	×	○	○	×	×
SB0011 (17)	Data link operation designation	Designates the data link operation. Off: No switch instruction On: Switch instruction (valid when on) When On is detected, data link switches from Online (normal data link) operation to Online (debug) operation, or from Online (debug) operation to Online (normal operation).  	○	○	○	○	○	○	○	○
SB0014 (20)	Remote sub-master station switching command	Forcibly directs the remote sub-master station that is performing master operation to shift to sub-master operation. (It is invalid for the redundant system.) Off: Without directive On: With directive	×	×	×	×	○	○	×	×
SB0018 (24)	System switching monitoring time setting valid flag	Indicates whether the system switching monitoring time setting (SW0018) is valid or invalid in case of a data link error. Off: Invalid On: Valid (valid at the time of startup)	○	○	○	○	○	○	×	×
SB0020 (32)	Module status	Indicates the communication status between the network module and CPU module. Off: Normal On: Abnormal	○	○	○	○	○	○	×	×
SB0040 (64)	Network type (host)	Indicates the network type set with the parameters of the host's network module. Off: PLC to PLC network On: Remote I/O network	○	○	○	○	○	○	○	○
SB0041 (65)	Host station's redundant function support information	Indicates the station supports the redundant function or not. Off: Redundant function not supported On: Redundant function supported	○	○	○	○	○	○	○	○
SB0042 (66)	Power supply status of host	Indicates the external power supply status to the host's QJ71LP21S-25. (When using QJ71LP21-25, 0 is ON.) Off: Not supplied (EXT.PW LED is OFF.) On: Supplied (EXT.PW LED is ON.)	○	×	○	×	○	×	○	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊6: The SB0009 must be kept on until the SW00CE becomes "0."

Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
SB0043 (67)	Online switch (host)	Indicates the mode set by the switch of the host's network module. Off: Online "Parameter setting mode becomes valid" On: Other than online	○	○	○	○	○	○	○	○
SB0044 (68)	Station setting (host)	When PLC to PLC network Indicates the station type set with the parameter of the host's network module. Off: Normal station On: Control station	○	○	○	○	×	×	×	×
		When remote I/O network Indicates the station type set with the parameter of the host's network module. Off: Remote I/O station or multiplexed remote sub-master station On: Remote master station or multiplexed remote master station	×	×	×	×	○	○	○	○
SB0045 (69)	Setting information (host)	Indicates the switch setting information (including parameter settings) of the host's network module. Off: Normal On: Abnormal setting	○	○	○	○	○	○	○	○
SB0046 (70)	Data link operation designation result (host)	Indicates the switch setting information (including parameter settings) of the host's network module. Off: Normal data linking On: Operating in debug mode	○	○	○	○	○	○	○	○
SB0047 (71)	Baton pass status (host)	Indicates the host's baton pass status (transient transmission enabled). Off: Normal On: Abnormal When an error is identified, the cause of the error can be checked in Baton pass status (host) (SW0047) and Cause of baton pass interruption (SW0048).	○	○	○	○	○	○	○	○
＊3 SB0048 (72)	Control station status (host)	When PLC to PLC network Indicates the host's status. Off: Normal station On: Control station (SB0044 is on) Sub-control station (SB0044 is off)	○	○	○	○	×	×	×	×
	Remote master station status (host)	When remote I/O network Indicate the host status Off: Remote I/O station On: SB0044=On Remote master station or multiplexed remote master station SB0044=Off Remote I/O station or multiplexed remote sub-master station	×	×	×	×	○	○	○	○
SB0049 (73)	Host data link status	Indicates the host's data link operation status. Off: Normal On: Abnormal When an error is identified, the cause of the error can be checked in Cause of data link stop (SW0049).	○	○	○	○	○	○	○	○
＊4 SB004A (74)	Host CPU status (1)	Indicates the host's CPU status. Off: Normal On: Minor error occurred	○	○	○	○	○	○	×	×
＊5 SB004B (75)	Host CPU status (2)	Indicates the host's CPU status. Off: Normal On: A serious or fatal error occurred	○	○	○	○	○	○	×	×
＊3 SB004C (76)	Cyclic transmission start acknowledgment status (host)	Indicates the startup acknowledgment status of the cyclic transmission. Off: Not acknowledged (SB0000 is off) On: Start acknowledged (SB0000 is on)	○	○	○	○	○	○	○	○
＊3 SB004D (77)	Cyclic transmission start completion status (host)	Indicates the completion status of the cyclic transmission. Off: Not completed (SB0000 is off) On: Start completed (SB0000 is on)	○	○	○	○	○	○	○	○

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.
＊4: Minor errors are the type of errors that do not affect the CPU operation.
＊5: Serious errors are the type of errors that stop the CPU operation.
Fatal errors are also the type of errors that stop the CPU operation.

Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
＊3 SB004E (78)	Cyclic transmission stop acknowledgment status (host)	Indicates the stop acknowledgment status of the cyclic transmission. Off: Not acknowledged (SB0001 is off) On: Stop acknowledged (SB0001 is on)	○	○	○	○	○	○	○	○
＊3 SB004F (79)	Cyclic transmission stop completion status (host)	Indicates the stop completion status of the cyclic transmission. Off: Not completed (SB0001 is off) On: Stop completed (SB0001 is on)	○	○	○	○	○	○	○	○
＊3 SB0050 (80)	Cyclic transmission start acknowledgment status (system)	Indicates the startup acknowledgment status of the cyclic transmission. Off: Not acknowledged (SB0002 is off) On: Start acknowledged (SB0002 is on)	○	○	○	○	○	○	○	○
＊3 SB0051 (81)	Cyclic transmission start completion status (system)	Indicates the completion status of the cyclic transmission. Off: Not completed (SB0002 is off) On: Start completed (SB0002 is on)	○	○	○	○	○	○	○	○
＊3 SB0052 (82)	Cyclic transmission stop acknowledgment status (system)	Indicates the stop acknowledgment status of the cyclic transmission. Off: Not acknowledged (SB0003 is off) On: Stop acknowledged (SB0003 is on)	○	○	○	○	○	○	○	○
＊3 SB0053 (83)	Cyclic transmission stop completion status (system)	Indicates the stop completion status of the cyclic transmission. Off: Not completed (SB0003 is off) On: Stop completed (SB0003 is on)	○	○	○	○	○	○	○	○
SB0054 (84)	Parameter receive status	Indicates the parameter receive status. Off: Receive completed On: Not received	○	○	○	○	○	○	○	○
SB0055 (85)	Received parameter error	Indicates the status of the received parameters. Off: Parameters normal On: Parameters abnormal	○	○	○	○	○	○	○	○
＊3 SB0056 (86)	Communication status	Indicates the status of the transient transmission Off: Transient transmission by the control station On: Transient transmission by the sub-control station	○	○	○	○	○	○	○	○
SB0057 (87)	Parameter type	Indicates the parameter type. Off: MELSECNET/10 parameter On: MELSECNET/H parameter	○	○	○	○	○	○	○	○
SB0058 (88)	Operation designation at fault of control station	On PLC to PLC network Indicates the setting of "With data link by sub control station when control station is down." Off: Cyclic transmission made by sub control station when control station fails. On: Cyclic transmission not made by sub control station when control station becomes faulty	○	○	○	○	×	×	×	×
	Operation designation at fault of (multiplexed) remote master station	On remote I/O network Indicates the status of designating cyclic transmission when the (multiplexed) remote master station fails. Off: Cyclic transmission made by multiplexed remote sub-master station when multiplexed remote master station fails (multiplexed remote I/O network) On: Cyclic transmission not made when remote master station fails (remote I/O network)	×	×	×	×	○	○	○	○
SB0059 (89)	Low-speed cyclic designation	Indicates whether or not there are any parameter settings for the low-speed cyclic transmission. Off: No settings On: Settings exist	○	○	○	○	○	○	○	○
SB005A (90)	Parameter type 2	Indicates the parameter type of the control station. Off: MELSECNET/10 mode, MELSECNET/H mode On: MELSECNET/H Extended mode	○	○	○	○	×	×	×	×
SB005B (91)	END asynchronous settings	Indicates the END asynchronous settings status of the remote I/O network. Off: END asynchronous settings disabled On: END asynchronous settings enabled	×	×	×	×	○	○	×	×
SB005C (92)	I/O master station (Block 1)	Indicates the I/O master station setting (Common parameter setting) of block 1. (Valid when SB0049 is OFF) Off: No setting On: Setting exists. (Station No. is stored in SW005C.)	○	○	○	○	×	×	×	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

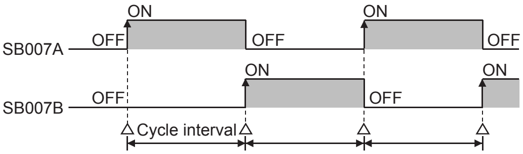
Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
SB005D (93)	I/O master station (Block 2)	Indicates the I/O master station setting (Common parameter setting) of block 2. (Valid when SB0049 is OFF) Off: No setting On: Setting exists. (Station No. is stored in SW005D.)	○	○	○	○	×	×	×	×
SB0064 (100)	Reserved station designation	Indicates whether or not the station is reserved. (Valid when the SB0049 is off.) Off: No reserved station On: Reserved station exists If a reserved station is found, the status of each station can be checked by Reserved station designation (SW0064 to SW0067). Depending on the timing of the link refresh, Reserved station designation (SW0064 to SW0067) and the update may be offset by one sequence scan.	○	○	○	○	○	○	○	○
SB0068 (104)	Communication mode	Indicates the link scan mode (status of supplementary settings of the common parameters). (Valid when the SB0049 is off.) Off: Normal mode On: Constant link scan mode	○	○	○	○	○	○	○	○
SB0069 (105)	Multiplex transmission designation	Indicates the transmission designation status (status of supplementary settings of the common parameters). (Valid when the SB0049 is off.) Off: Normal transmission designation On: Multiplex transmission designation	○	×	○	×	○	×	○	×
＊3 SB006A (106)	Multiplex transmission status	Indicates the transmission status. Off: Normal transmission On: Multiplex transmission In the case of multiplex transmission, the status of each station can be checked in Multiplex transmission status (1) (SW00B0 to SW00B3) and (2) (SW00B4 to SW00B7).	○	×	○	×	○	×	○	×
＊3 SB006B (107)	Multiplex remote function designation	Indicates the status of designating the multiplex remote function. Off: Not designated. On: Designated.	×	×	×	×	○	○	○	○
＊3 SB0070 (112)	Baton pass status of each station	Indicates the baton pass status of each station. (Not applicable to reserved stations and the station with the maximum station number or higher) Off: All stations normal On: Faulty station exists When any faulty station exists, each station status can be checked in Baton pass status of each station (SW0070 to SW0073). Depending on the timing of the link refresh, Baton pass status of each station (SW0070 to SW0073) and the update may be offset by one sequence scan.	○	○	○	○	○	○	○	○
＊3 SB0071 (113)	Baton pass status of the remote master station	Indicates the baton pass status of the master station. (Including when there is an online loop test.) Off: Master station baton pass normal. On: Master station baton pass error.	×	×	×	×	○	○	○	○
＊3 SB0072 (114)	Remote sub-master station transient transmission status	Indicates the transient transmission status of the remote sub-master station. Off: Normal On: Abnormal	×	×	×	×	○	○	○	○
＊3 SB0074 (116)	Cyclic transmission status of each station	Indicates the cyclic transmission status of each station. (Not applicable to reserved stations and the station with the maximum station number or higher) Off: All stations are executing data linking On: Stations that are not executing data linking exist When any non-executing station exists, each station status can be checked in Cyclic transmission status of each station (SW0074 to SW0077). Depending on the timing of the link refresh, Cyclic transmission status of each station (SW0074 to SW0077) and the update may be offset by one sequence scan.	○	○	○	○	○	○	○	○

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
∗3 SB0075 (117)	Cyclic transmission status of the remote master station	Indicates the master station cyclic transmission status. (Includes online loop test.) Off: Master station cyclic transmission normal. On: Master station cyclic transmission error.	×	×	×	×	○	○	○	○
∗3 SB0076 (118)	Remote sub-master station cyclic transmission status	Indicates the cyclic transmission status of the remote sub-master station. (Including the status at an online loop test) Off: Cyclic transmission normal On: Cyclic transmission abnormal	×	×	×	×	○	○	○	○
∗3 SB0077 (119)	Remote master station cyclic transmission control status	Indicates the station type that is controlling cyclic transmission at the remote I/O stations. Off: Remote master station On: Remote sub-master station	×	×	×	×	○	○	○	○
∗3 SB0078 (120)	Parameter communication status of each station	Indicates the parameter transmission status of each station. (Not applicable to reserved stations and the station with the maximum station number or higher) Off: Executing communication other than parameter communication On: Executing parameter communication Stations that are communicating parameters can be checked in Parameter communication status of each station (SW0078 to SW007B). Depending on the timing of the link refresh, Parameter communication status of each station (SW0078 to SW007B) and the update may be offset by one sequence scan.	○	○	×	×	○	○	×	×
∗3 SB007A (122)	Low-speed cyclic communication status	Indicates the low-speed cycle communication status. It is indicated to have transmitted by turning the bit on for either the SB007A or SB007B. 	○	○	○	○	×	×	×	×
∗3 SB007B (123)										
∗3 SB007C (124)	Parameter status of each station	Indicates the parameter status of each station. (Not applicable to reserved stations and the station with the maximum station number and higher) Off: No station detected parameter errors On: A station detected parameter errors Stations that have parameter errors can be checked in Parameter error status of each station (SW007C to SW007F). Depending on the timing of the link refresh, Parameter error status of each station (SW007C to SW007F) and the update may be offset by one sequence scan.	○	○	×	×	○	○	×	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus

○: Available, ×: Not available

∗3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
∗3 ∗5 SB0080 (128)	CPU operation status of each station (1)	On PLC to PLC network Indicates the CPU operating status of each station (including the own station). Off: All stations normal On: A moderate or serous error identified If a moderate or serious error is identified, the status of each station can be checked in CPU operation status of each station (1) (SW0080 to SW0083). Depending on the timing of the link refresh, CPU operation status of each station (1) (SW0080 to SW0083) and the update may be offset by one sequence scan.	○	○	○	○	×	×	×	×
		On remote I/O network Indicates the operating status of each remote I/O station (including the own station). Off: All stations normal On: Faulty station exists If any faulty station exists, the status of each station can be checked in CPU operation status of each station (1) (SW0080 to SW0083). Depending on the timing of the link refresh, CPU operation status of each station (1) (SW0080 to SW0083) and the update may be offset by one sequence scan.	×	×	×	×	○	○	○	○
∗3 SB0084 (132)	CPU RUN status of each station	Indicates the CPU RUN status of each station. Off: All stations are in the RUN or STEP RUN status On: Stations in the STOP or PAUSE status exist (including the host) When some stations are in the STOP or PAUSE status, each station status can be checked in CPU RUN status of each station (SW0084 to SW0087). Depending on the timing of the link refresh, CPU RUN status of each station (SW0084 to SW0087) and the update may be offset by one sequence scan.	○	○	○	○	×	×	×	×
∗3 SB0085 (133)	CPU RUN status of the remote master station	Indicates the CPU run status of remote master station. Off: Run or STEP RUN status On: STOP or PAUSE status	×	×	×	×	○	○	○	○
∗3 SB0086 (134)	Remote sub-master station CPU RUN status	Indicates the CPU status of the multiplexed remote sub-master station. Off: RUN or STEP RUN status On: STOP or PAUSE status	×	×	×	×	○	○	○	○
∗3 ∗4 SB0088 (136)	CPU operation status of each station (2)	Indicates the operation status of each station's CPU or of each remote I/O station (including the host station). Off: All stations normal On: Stations with minor errors exist If any station with a minor error exists, the status of each station can be checked in CPU operation status of each station (2) (SW0088 to SW008B). Depending on the timing of the link refresh, CPU operation status of each station (2) (SW0088 to SW008B) and the update may be offset by one sequence scan.	○	○	○	○	○	○	○	○

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

∗3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.
∗4: Minor errors are the type of errors that do not affect the CPU operation.
∗5: Serious errors are the type of errors that stop the CPU operation.
Fatal errors are also the type of errors that stop the CPU operation.
∗7: Available only in the remote sub-master station.

Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
*3 SB008C (140)	External power supply information	Indicates the information of the external power supply (including the host). Off: All stations are without external power supply On: Stations with external power supply exist When any station with external power supply exists, the status of each station can be checked in Power supply status of each station (SW008C to SW008F). Depending on the timing of the link refresh, Power supply status of each station (SW008C to SW008F) and the update may be offset by one sequence scan.	○	×	○	×	○	×	○	×
*3 SB008D (141)	Module type of each station	Indicates the module type of each station. Off: All stations are NET/10 type modules On: NET/10H type modules exist	○	○	○	○	×	×	×	×
SB0090 (144)	Host loop status	Indicates the host's loop status. Off: Normal On: Abnormal When an error is identified, the error details can be checked by Loopback information (SW0090).	○	×	○	×	○	×	○	×
*3 SB0091 (145)	Forward loop status	Indicates the status of stations connected to the forward loop. Off: All stations normal On: Faulty station exists When any faulty station exists, the status of each station can be checked in Forward loop status of each station (SW0091 to SW0094). Depending on the timing of the link refresh, Forward loop status of each station (SW0091 to SW0094) and the update may be offset by one sequence scan.	○	×	○	×	○	×	○	×
*3 SB0092 (146)	Forward loop status of remote master station	Indicates the forward loop status of the remote master station. Off: Normal On: Error	×	×	×	×	× *7	×	○	×
*3 SB0095 (149)	Reverse loop status	Indicates the status of stations connected to the reverse loop. Off: All stations normal On: Faulty station exists When any faulty station exists, the status of each station can be checked in Reverse loop status of each station (SW0095 to SW0098). Depending on the timing of the link refresh, Reverse loop status of each station (SW0095 to SW0098) and the update may be offset by one sequence scan.	○	×	○	×	○	×	○	×
*3 SB0096 (150)	Reverse loop status of remote master station	Indicates the reverse loop status of the remote master station. Off: Normal On: Error	×	×	×	×	×	×	○	×
*3 SB0099 (153)	Forward loop loopback	Indicates the loopback status of the forward loop while the system is operating. Off: Not executed On: Executing stations exist (Executing stations are stored in the SW0099)	○	×	○	×	○	×	○	×
*3 SB009A (154)	Reverse loop loopback	Indicates the loopback status of the reverse loop while the system is operating. Off: Not executed On: Executing stations exist (Executing stations are stored in the SW009A)	○	×	○	×	○	×	○	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

*3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.
*7: Available only in the remote sub-master station.

Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
＊3 SB009C (156)	Send transmission path mismatch status	Indicates the status of the transmission path used for sending by other stations. Off: All matched On: Mismatching stations exist Depending on the timing of the link refresh, Loop usage status of each station (SW009C to SW009F) and the update may be offset by one sequence scan.	○	×	○	×	× ＊7	×	○	×
＊3 SB00A0 (160)	RECV instruction execution request flag (1)	Stores the data reception status of channel 1 of the host station. Off: No data reception On: Data received	○	○	○	○	×	×	×	×
＊3 SB00A1 (161)	RECV instruction execution request flag (2)	Stores the data reception status of channel 2 of the host station. Off: No data reception On: Data received	○	○	○	○	×	×	×	×
＊3 SB00A2 (162)	RECV instruction execution request flag (3)	Stores the data reception status of channel 3 of the host station. Off: No data reception On: Data received	○	○	○	○	×	×	×	×
＊3 SB00A3 (163)	RECV instruction execution request flag (4)	Stores the data reception status of channel 4 of the host station. Off: No data reception On: Data received	○	○	○	○	×	×	×	×
＊3 SB00A4 (164)	RECV instruction execution request flag (5)	Stores the data reception status of channel 5 of the host station. Off: No data reception On: Data received	○	○	○	○	×	×	×	×
＊3 SB00A5 (165)	RECV instruction execution request flag (6)	Stores the data reception status of channel 6 of the host station. Off: No data reception On: Data received	○	○	○	○	×	×	×	×
＊3 SB00A6 (166)	RECV instruction execution request flag (7)	Stores the data reception status of channel 7 of the host station. Off: No data reception On: Data received	○	○	○	○	×	×	×	×
＊3 SB00A7 (167)	RECV instruction execution request flag (8)	Stores the data reception status of channel 8 of the host station. Off: No data reception On: Data received	○	○	○	○	×	×	×	×
SB00A8 (168)	Online test instruction	Indicates the online test instruction status. Off: Not instructed On: Instructed	○	○	○	○	○	○	○	○
SB00A9 (169)	Online test completion	Indicates the online test completion status. Off: Not completed On: Completed If "Completed" is indicated, the online test information can be obtained in Online test execution item/faulty station (requesting side) (SW00A8) and Online test result (requesting side) (SW00A9).	○	○	○	○	○	○	○	○
SB00AA (170)	Online test response instruction	Indicates the online test response status. Off: No response On: Responded	○	○	○	○	○	○	○	○
SB00AB (171)	Online test response completion	Indicates the online test response completion status. Off: Response not completed On: Response completed If "Response completed" is indicated, the online test information can be obtained in Online test execution item/faulty station (responding side) (SW00AA) and Online test result (responding side) (SW00AB).	○	○	○	○	○	○	○	○
SB00AC (172)	Offline test instruction	Indicates the offline test instruction status. Off: Not instructed On: Instructed	○	○	○	○	○	○	○	○
SB00AD (173)	Offline test completion	Indicates the offline test completion status. Off: Not completed On: Completed If "Completed" is indicated, the offline test information can be obtained in Offline test execution item/faulty station (requesting side) (SW00AC) and Offline test result (requesting side) (SW00AD).	○	○	○	○	○	○	○	○

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus

○: Available, ×: Not available

＊3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

＊7: Available only in the remote sub-master station.

Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
SB00AE (174)	Offline test response	Indicates the response status for offline test. Off: No response On: Response	○	○	○	○	○	○	○	○
SB00AF (175)	Offline test response completion	Indicates the response status for offline test end. Off: Response not completed On: Response completed If "Response completed" is indicated, the offline test information can be obtained in Offline test execution item (responding side) (SW00AE) and Offline test result (responding side) (SW00AF).	○	○	○	○	○	○	○	○
SB00EE (238)	Transient error	Indicates the transient transmission error status. Off: No error On: Errors exist	○	○	○	○	○	○	○	○
∗3 SB01C4 (452)	Remote sub-master station switching acceptance status	Indicates the status of accepting the directive to shift from master operation to sub-master operation. Off: Without acceptance On: With acceptance	×	×	×	×	○	○	×	×
∗3 SB01C5 (453)	Remote sub-master station switching status	Indicates the operation status of a shift from master operation to sub-master operation. Off: Without shift On: Shift completion	×	×	×	×	○	○	×	×
∗3 SB01C8 (456)	Send/receive device number valid/invalid status	Indicates whether the send/receive device numbers (SW01C8 to SW01CF) of the remote master station or remote sub-master station are valid or invalid. Off: Invalid On: Valid	×	×	×	×	○	○	×	×
∗3 SB01E0 (480)	Network type consistency check	Indicates whether there is a mismatch between the network types of the control station and normal stations on the network. • When the control station is in the MELSECNET/H Extended mode Off: All normal stations are set to the MELSECNET/H Extended mode. On: There is a normal station set to the MELSECNET/H mode or MELSECNET/10 mode. • When the control station is in the MELSECNET/H mode or MELSECNET/10 mode Off: All normal stations are set to the MELSECNET/H mode or MELSECNET/10 mode. On: There is a normal station set to the MELSECNET/H Extended mode. When a mismatch is found, the status of each station can be checked by Network type consistency check (SW01E0 to SW01E3). Depending on the timing of the link refresh, Network type consistency check (SW01E0 to SW01E3) and the update may be offset by one sequence scan.	○	○	○	○	×	×	×	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

∗3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Table 3 Link special relay (SB) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
∗3 SB01F4 (500)	Redundant system status (1)	Indicates the operation mode of each station's CPU. Off: CPUs of all stations in backup mode On: Separate mode (excluding reserved stations and stations of the number exceeding the maximum) This relay turns off when all of SW01F4 to SW01F7 are "0." In the separate mode, the status of each station can be checked by Redundant system status (1) (SW01F4 to SW01F7). Depending on the timing of the link refresh, Redundant system status (1) (SW01F4 to SW01F7) and the update may be offset by one sequence scan.	○	○	○	○	×	×	×	×
∗3 SB01F8 (504)	Redundant system status (2)	Indicates the pairing setting status of each station. Off: No pairing setting On: Pairing set station exists (excluding stations after the maximum station number) This relay turns off when all of SW01F8 to SW01FB are "0." When a pairing set station exists, the status of each station can be checked by Redundant system status (2) (SW01F8 to SW01FB). Depending on the timing of the link refresh, Redundant system status (2) (SW01F8 to SW01FB) and the update may be offset by one sequence scan.	○	○	○	○	×	×	×	×
∗3 SB01FC (508)	Redundant system status (3)	Indicates the operation status of each station's CPU (control system/standby system). Off: Control system CPUs on all stations On: Standby system CPU exists (excluding reserved stations and stations after the maximum station number) This relay turns off when all of SW01FC to SW01FF are "0." When a standby system CPU exists, the status of each station can be checked by Redundant system status (3) (SW01FC to SW01FF). Depending on the timing of the link refresh, Redundant system status (3) (SW01FC to SW01FF) and the update may be offset by one sequence scan.	○	○	○	○	×	×	×	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

∗3: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Appendix 4 Link Special Register (SW) List

In the link special register (SW), the data linking information is stored as numeric values. Thus, faulty areas and causes of errors can be checked using or monitoring the link special registers in the sequence programs.
Moreover, the link special register (SW) that stores the link status is used for the detailed information of the network diagnostics of GX Developer. For a list of the device numbers for each display item, refer to Section 8.1, "Network Diagnostics (Network Monitor)" and Section 8.3.1, "How to check error codes".

(1) Mounting multiple network modules

The link special register (SW) of each network module is refreshed by the link special register (SW) of the CPU module shown below when the refresh parameters of each network module remain default.

Module installing position	Module 1	Module 2	Module 3	Module 4
Device number	SW0000 to 01FF	SW0200 to 03FF	SW0400 to 05FF	SW0600 to 07FF

(2) Range turned ON/OFF by user and range turned ON/OFF by system

The link special register (SW) has the user setting area range (SW0000 to SW001F) and the system setting area range (SW0020 to SW01FF). (When the module is installed in the position of Module 1)

(3) Link special register (SW) list

Assignments of SW0000 to SW01FF are shown in the special register (SW) list.

POINT

(1) Do not write data to the area of the No. which does not exist in the link special register (SW) list.
Writing data to the area of the No. which does not exist in the list may cause malfunction of the programmable controller system.

(2) For how to use link special register (SW), refer to Section 6.4.

Table 4 Link special register (SW) list

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
＊1 SW0000 (0)	Link stop/startup direction content	Sets the station that stops/restarts data linking. 00_H: Host 01_H: All stations 02_H: Designated station 80_H: Host (forced stop/restart) 81_H: All stations (forced stop /restart) 82_H: Designated station (forced stop /restart)	○	○	○	○	○	○	○	○
＊1 SW0001 (1)/ SW0002 (2)/ SW0003 (3)/ SW0004 (4)		Sets whether the designated station executes data linking. (When the SW0000 is 02_H or 82_H.) Sets the bits to 1 for stations whose data linking is stopped/restarted. 0: Invalid data linking stop/restart instruction 1: Valid data linking stop/restart instruction b15 b14 b13 b12 to b4 b3 b2 b1 b0 SW0001 16 15 14 13 to 5 4 3 2 1 SW0002 32 31 30 29 to 21 20 19 18 17 SW0003 48 47 46 45 to 37 36 35 34 33 SW0004 64 63 62 61 to 53 52 51 50 49 The numbers 1 to 64 in the above table indicate the station numbers.	○	○	○	○	○	○	○	○
SW0008 (8)	Logical channel setting (channel 1)	Sets the logical channel number for physical channel number 1. (Valid only for channels on the receiving side) 0 : Logical channel number 1 (default) 1 to 64 : Other logical channel number is set.	○	○	○	○	×	×	×	×
SW0009 (9)	Logical channel setting (channel 2)	Sets the logical channel number for physical channel number 2. (Valid only for channels on the receiving side) 0 : Logical channel number 2 (default) 1 to 64 : Other logical channel number is set.	○	○	○	○	×	×	×	×
SW000A (10)	Logical channel setting (channel 3)	Sets the logical channel number for physical channel number 3. (Valid only for channels on the receiving side) 0 : Logical channel number 3 (default) 1 to 64 : Other logical channel number is set.	○	○	○	○	×	×	×	×
SW000B (11)	Logical channel setting (channel 4)	Sets the logical channel number for physical channel number 4. (Valid only for channels on the receiving side) 0 : Logical channel number 4 (default) 1 to 64 : Other logical channel number is set.	○	○	○	○	×	×	×	×
SW000C (12)	Logical channel setting (channel 5)	Sets the logical channel number for physical channel number 5. (Valid only for channels on the receiving side) 0 : Logical channel number 5 (default) 1 to 64 : Other logical channel number is set.	○	○	○	○	×	×	×	×
SW000D (13)	Logical channel setting (channel 6)	Sets the logical channel number for physical channel number 6. (Valid only for channels on the receiving side) 0 : Logical channel number 6 (default) 1 to 64 : Other logical channel number is set.	○	○	○	○	×	×	×	×
SW000E (14)	Logical channel setting (channel 7)	Sets the logical channel number for physical channel number 7. (Valid only for channels on the receiving side) 0 : Logical channel number 7 (default) 1 to 64 : Other logical channel number is set.	○	○	○	○	×	×	×	×
SW000F (15)	Logical channel setting (channel 8)	Sets the logical channel number for physical channel number 8. (Valid only for channels on the receiving side) 0 : Logical channel number 8 (default) 1 to 64 : Other logical channel number is set.	○	○	○	○	×	×	×	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊1: Used in the network test of GX Developer.

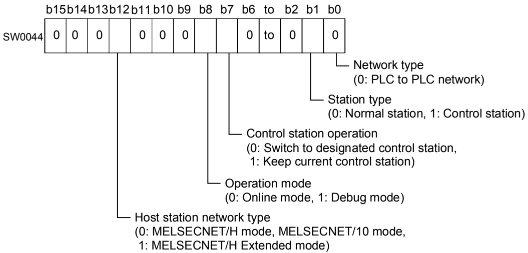
Table 4 Link special register (SW) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
SW0018 (24)	System switching monitoring time setting	Set the time from the occurrence of a data link error to the recognition of data link stop in the redundant system. 0 : 2 seconds (default) 1 to 500 : Units of 10 ms (Units of 10 ms for 10 ms to 5 seconds)	○	○	○	○	○	○	×	×
＊2 SW001C (28)	Number of retries	Indicates the change of the number of retries for the time of the issue of a request in send and receive instructions. 0 : 7 times (default) 1 to 7 : Setting exists	○	○	○	○	○	○	×	×
＊2 SW001D (29)	Retry interval	Indicates the change of the retry interval for the time of the issue of a request in send and receive instructions. 0 : 100 ms (default) 1 to FE_H : Setting exists (unit: ms)	○	○	○	○	○	○	×	×
＊2 SW001E (30)	Number of gates	Indicates the change of the number of gates for the time of the issue of a request in send and receive instructions. 0 : 7 (default) 1 to EF_H : Setting exists	○	○	○	○	○	○	×	×
SW0020 (32)	Module status	Stores the communication status between the network module and CPU module. 0 : Normal Other than 0 : Stored an error code. (Refer to the user's manual for the CPU module used.)	○	○	○	○	○	○	×	×
SW0031 (49)	ZNRD instruction processing result	Indicates the processing result of the ZNRD instruction. 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	×	×	×	×
	Send/receive instruction (1) processing result	Indicates the processing results of the SEND/RECV/READ/ WRITE/REQ/RECVS/RRUN/RSTOP/RTMRD/RTMWR/REMFR/ REMTO instructions (when physical channel 1 is used). 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	×	×
SW0033 (51)	ZNWR instruction processing result	Indicates the processing result of the ZNWR instruction. 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	×	×	×	×
	Send/receive instruction (2) processing result	Indicates the processing results of the SEND/RECV/READ/ WRITE/REQ/RECVS/RRUN/RSTOP/RTMRD/RTMWR/REMFR/ REMTO instructions (when physical channel 2 is used). 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	×	×
SW0035 (53)	Send/receive instruction (3) processing result	Indicates the processing results of the SEND/RECV/READ/ WRITE/REQ/RECVS/RRUN/RSTOP/RTMRD/RTMWR/REMFR/ REMTO instructions (when physical channel 3 is used). 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	×	×
SW0037 (55)	Send/receive instruction (4) processing result	Indicates the processing results of the SEND/RECV/READ/WRITE/ REQ/RECVS/RRUN/RSTOP/RTMRD/RTMWR/REMFR/REMTO instructions (when physical channel 4 is used). 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	×	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

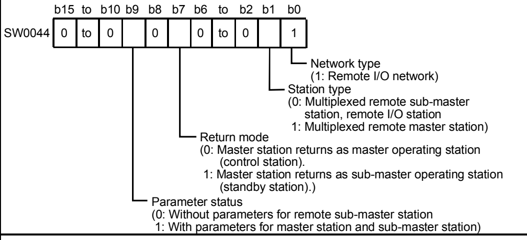
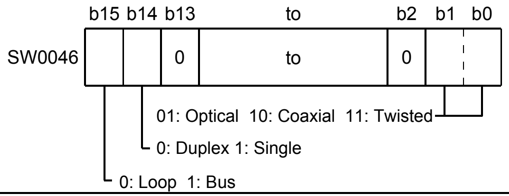
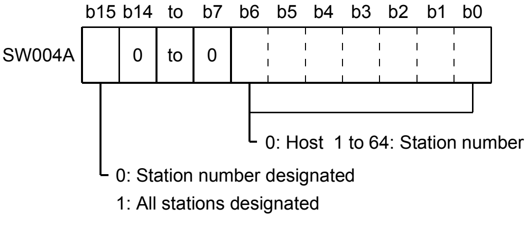
＊2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Table 4 Link special Register (SW) List (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
SW0039 (57)	Send/receive instruction (5) processing result	Indicates the processing results of the SEND/RECV/READ/WRITE/ REQ/RECVS/RRUN/RSTOP/RTMRD/RTMWR/REMFR/REMTO instructions (when physical channel 5 is used). 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	×	×
SW003B (59)	Send/receive instruction (6) processing result	Indicates the processing results of the SEND/RECV/READ/WRITE/ REQ/RECVS/RRUN/RSTOP/RTMRD/RTMWR/REMFR/REMTO instructions (when physical channel 6 is used). 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	×	×
SW003D (61)	Send/receive instruction (7) processing result	Indicates the processing results of the SEND/RECV/READ/WRITE/ REQ/RECVS/RRUN/RSTOP/RTMRD/RTMWR/REMFR/REMTO instructions (when physical channel 7 is used). 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	×	×
SW003F (63)	Send/receive instruction (8) processing result	Indicates the processing results of the SEND/RECV/READ/WRITE/ REQ/RECVS/RRUN/RSTOP/RTMRD/RTMWR/REMFR/REMTO instructions (when physical channel 8 is used). 0 : Normal completion Other than 0 : Abnormal completion (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	×	×
SW0040 (64)	Network No.	Stores the network number of the host. Range: 1 to 239	○	○	○	○	○	○	○	○
SW0041 (65)	Group No.	Stores the group number of the host. 0 : No group designation 1 to 32 : Group No.	○	○	○	○	×	×	×	×
SW0042 (66)	Station No.	Stores the station No. of host station. 1 to 64 : Station No. 7D$_H$: Remote master station	○	○	○	○	○	○	○	○
SW0043 (67)	Mode status	Stores the mode status of the host. 0 : Online 2 : Offline 3 or more : Applicable test	○	○	○	○	○	○	○	○
SW0044 (68)	Station setting	On inter-PLC network: Stores the condition setting switch status of the host. 0: Off 1: On 	○	○	○	○	×	×	×	×

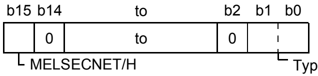
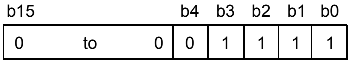
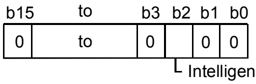
[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

Table 4 Link special register (SW) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
SW0044 (68)	Station setting	On remote I/O network: Stores the condition setting switch status of the host. 0: Off 1: On 	×	×	×	×	○	○	○	○
SW0046 (70)	Module type	Stores the network module type of the host. 	○	○	○	○	○	○	○	○
SW0047 (71)	Baton pass status (host)	Stores the baton pass status of the host. 00_H: Executing data linking 01_H: Data linking stopped (instructed by other station) 02_H: Data linking stopped (instructed by host) 03_H: Executing baton pass (parameter received (no transmission area in the host)) 04_H: Executing baton pass (parameter error) 05_H: Executing baton pass (parameter not received) 06_H: Being disconnected (no baton pass) 07_H: Being disconnected (line error) 11_H: Loop test 12_H: Setup confirmation test 13_H: Station order check test 14_H: Communication test $1F_H$: Offline test	○	○	○	○	○	○	○	○
SW0048 (72)	Cause of baton pass interruption	Stores the cause of baton pass interruption of the host. 0 : Normal communication 1 : Offline 2 : Offline test 3 or more : Cause of interruption (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	○	○
SW0049 (73)	Cause of data link stop	Stores the cause of data linking stop of the host. 0: Normal 1: Stop instructed 2: No common parameters 3: Common parameter error 4: Host CPU error 6: Communication aborted	○	○	○	○	○	○	○	○
＊2 SW004A (74)	Data linking stop request station	Stores the station that stopped the host data linking. (Valid when the SW0049 is 1.)  b0 to b6 store $7D_H$ if a data link stop request is received from the remote master station/multiplexed remote master station.	○	○	○	○	○	○	○	○

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

Table 4 Link special register (SW) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
＊2 SW004B (75)	Host CPU status	Indicates the CPU status of the host. 0 : Normal Other than 0 : Abnormal (For the error codes, refer to Section 8.3 or the "Error Code" chapter of QCPU User's Manual (Hardware Design, Maintenance and Inspection).)	○	○	○	○	○	○	×	×
＊2 SW004D (77)	Data linking start status (host)	Stores the result of starting cyclic transmission with Link startup (host) (SB0000). 0 : Normal Other than 0 : Abnormal (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	○	○
＊2 SW004F (79)	Data linking stop status (host)	Stores the result of stopping cyclic transmission with Link stop (host) (SB0001). 0 : Normal Other than 0 : Abnormal (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	○	○
＊2 SW0051 (81)	Data linking start status (entire system)	Stores the result of starting cyclic transmission with System link startup (SB0002). 0 : Normal Other than 0 : Abnormal (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	○	○
＊2 SW0053 (83)	Data linking stop status (entire system)	Stores the result of stopping cyclic transmission with System link stop (SB0003). 0 : Normal Other than 0 : Abnormal (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	○	○
SW0054 (84)	Parameter information	At the PLC to PLC network. Stores the parameter information. (When the SB0054 and SB0055 are off.)  MELSECNET/H 0: Not designated 1: Designated Type 00: Use only common parameters 01: Common parameters + station specific parameters 10: Use only default parameters 11: Default parameters + station specific parameters (When the SB0055 is on.)  = 0FH: Parameter error Check the error code in the SW055.	○	○	○	○	×	×	×	×
		When remote I/O net Stores the parameter information. (When the SB0054 and SB0055 are off.)  Intelligent function module parameter 0: No 1: Yes	×	×	×	×	×	×	○	○
SW0055 (85)	Parameter setting status	At the PLC to PLC network. Stores the status of the parameters. 0 : Normal parameter 1 or more : Abnormal parameter (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	○	○

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Table 4 Link special register (SW) list (continued)

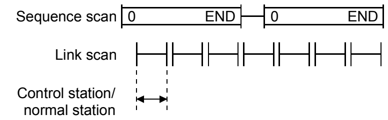
No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
＊2 SW0056 (86)	Current control station	At the PLC to PLC network. Stores the number of the station that actually operates as the control station (including a sub-control station). Range: 1 to 64	○	○	○	○	×	×	×	×
	Current remote master station	When remote I/O network Stores the station number controlling the current baton pass. 7D$_H$: Remote master station or multiplexed remote master station 1 to 64 : Multiplexed remote sub-master station	×	×	×	×	○	○	○	○
SW0057 (87)	Designated control station	At the PLC to PLC network. Stores the number of the station that is set as the control station. Range: 1 to 64 0: Designated control station error	○	○	○	○	×	×	×	×
	Designated remote master station	When remote I/O network. 7D$_H$: Remote master station Other than 7D$_H$: Remote master station error.	×	×	×	×	○	○	○	○
SW0059 (89)	Total number of link stations	Stores the total number of link stations that is set with the parameters. Range: 1 to 64 (64 when there is no parameter.)	○	○	○	○	○	○	○	○
＊2 SW005A (90)	Maximum baton pass station	Stores the maximum station number among the stations executing the baton pass. Range: 1 to 64	○	○	○	○	○	○	○	○
＊2 SW005B (91)	Maximum cyclic transmission station	Stores the maximum station number among the stations executing the cyclic transmission. Range: 1 to 64	○	○	○	○	○	○	○	○
SW005C (92)	I/O master station (block 1)	Stores the station number of the I/O master station of block 1 with PLC to PLC network. 0 : None 1 to 64 : Station number Valid when the SB0049 is off.	○	○	○	○	×	×	×	×
SW005D (93)	I/O master station (block 2)	Stores the station number of the I/O master station of block 2 with PLC to PLC network. 0 : None 1 to 64 : Station number Valid when the SB0049 is off.	○	○	○	○	×	×	×	×
SW0064 (100)/ SW0065 (101)/ SW0066 (102)/ SW0067 (103)	Reserved station designation	Stores the stations that are set as reserved stations. 0: Other than reserved station 1: Reserved station Valid when the SB0049 is off. b15 b14 b13 b12 to b4 b3 b2 b1 b0 SW0064 16 15 14 13 to 5 4 3 2 1 SW0065 32 31 30 29 to 21 20 19 18 17 SW0066 48 47 46 45 to 37 36 35 34 33 SW0067 64 63 62 61 to 53 52 51 50 49 Numbers 1 to 64 in the above table indicate the station numbers.	○	○	○	○	○	○	○	○
SW0068 (104)	Communication mode	Stores the status of the constant link scan settings. 0 : No storage 1 to 500 : Setting time (ms) Valid when the SB0049 is off.	○	○	○	○	○	○	○	○
＊12 SW0069 (105)	Communication speed setting value	Stores the value set in the communication speed parameter. 0: Twist [156kbps] 1: Twist [312kbps] 2: Twist [625kbps] 3: Twist [1.25Mbps] 4: Twist [2.5Mbps] 5: Twist [5Mbps] 6: Twist [10Mbps]	×	○	×	×	×	×	×	×

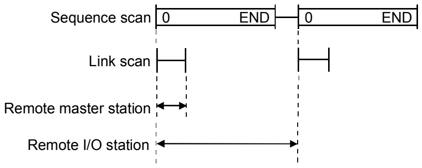
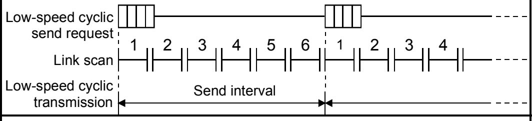
[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

＊12: Available only in the twisted bus system.

Table 4 Link special register (SW) list (continued)

<table>
<tr><th rowspan="3">No.</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="8">Use permitted/prohibited</th></tr>
<tr><th colspan="2">Control station</th><th colspan="2">Normal station</th><th colspan="2">Remote master station</th><th colspan="2">Remote I/O station</th></tr>
<tr><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th></tr>
<tr><td>＊12
SW006A
(106)</td><td>Current communication speed value</td><td>Stores the current communication speed.
0: 156kbps
1: 312kbps
2: 625kbps
3: 1.25Mbps
4: 2.5Mbps
5: 5Mbps
6: 10Mbps
FF: Not detected</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>＊2
SW006B
(107)</td><td>Maximum link scan time</td><td rowspan="3">Stores the maximum/minimum/current values of the link scan time (unit (ms)).
The values for the control station and normal stations vary.
(PLC to PLC network)


When the constant link scan is set, the values are as follows:
Control station
(Setting value) < (Measured link scan value + KB of the link scan time equation)
→ Measured link scan value + KB of the link scan time equation
(Setting value) > (Measured link scan value + KB of the link scan time equation)
→ Measured link scan value
Normal station → Constant link scan that has been set
(Remote I/O network)

 </td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊2
SW006C
(108)</td><td>Minimum link scan time</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊2
SW006D
(109)</td><td>Current link scan time</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊2
SW006E
(110)</td><td>Low-speed cyclic scan time</td><td>Stores the number of link scans in the send interval of the low-speed cyclic transmission.

 </td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>＊2
SW0070
(112)/
SW0071
(113)/
SW0072
(114)/
SW0073
(115)</td><td>Baton pass status of each station</td><td>Stores the baton pass status of each station (Including the host).
<Online>
0: Normal (including the stations with the maximum station number and smaller numbers as well as reserved stations)
1: Abnormal
<Offline test>
0: Normal
1: Abnormal (including the stations with the maximum station number and smaller numbers as well as reserved stations)<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0070</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0071</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0072</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0073</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
</table>

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.
＊12: Available only in the twisted bus system.

Table 4 Link special register (SW) list (continued)

<table>
<tr><th rowspan="3">No.</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="8">Use permitted/prohibited</th></tr>
<tr><th colspan="2">Control station</th><th colspan="2">Normal station</th><th colspan="2">Remote master station</th><th colspan="2">Remote I/O station</th></tr>
<tr><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th></tr>
<tr><td>＊2
SW0074
(116)/
SW0075
(117)/
SW0076
(118)/
SW0077
(119)</td><td>Cyclic transmission status of each station</td><td>Stores the cyclic transmission status of each station (including the host).
0: Executing cyclic transmission (including the station with the maximum station number and smaller number as well as reserved stations)
1: Cyclic transmission not executed
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0074</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0075</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0076</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0077</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.
If a CPU module installed together with QJ71LP21S-25 is turned OFF, detection of a data link error may take more time than usual.
For immediate detection of a data link error, program an interlock using the link relay (LB) in each station's send range. (Refer to Section 6.2.3.)</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊2
SW0078
(120)/
SW0079
(121)/
SW007A
(122)/
SW007B
(123)</td><td>Parameter communication status of each station</td><td>Stores the parameter communication status of each station.
0: Executing communication other than parameter communication (including the stations with the maximum station number and smaller numbers as well as reserved stations)
1: Executing parameter communication
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0078</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0079</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW007A</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW007B</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>×</td><td>×</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>＊2
SW007C
(124)/
SW007D
(125)/
SW007E
(126)/
SW007F
(127)</td><td>Parameter error status of each station</td><td>Stores the parameter status of each station
0: Normal parameter (including the maximum station number and smaller numbers as well as reserved stations)
1: Abnormal parameter
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW007C</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW007D</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW007E</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW007F</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>×</td><td>×</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
</table>

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Table 4 Link special register (SW) list (continued)

<table>
<tr><th rowspan="3">No.</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="8">Use permitted/prohibited</th></tr>
<tr><th colspan="2">Control station</th><th colspan="2">Normal station</th><th colspan="2">Remote master station</th><th colspan="2">Remote I/O station</th></tr>
<tr><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th></tr>
<tr><td>＊2 ＊11
SW0080
(128)/
SW0081
(129)/
SW0082
(130)/
SW0083
(131)</td><td>CPU operation status of each station (1)</td><td>Stores each station's CPU status (including the host).
Valid only for stations registered as normal in the SW0070 to SW0073.
0: Normal (including the stations with the maximum station number and smaller numbers as well as reserved stations)
1: Serious/fatal error
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0080</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0081</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0082</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0083</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>＊2
SW0084
(132)/
SW0085
(133)/
SW0086
(134)/
SW0087
(135)</td><td>CPU RUN status of each station</td><td>Stores the CPU RUN status of each station (including the host).
The standby-system Q4ARCPU stores the key switch status at normal state.
Valid only for stations registered as normal in the SW0070 to SW0073.
0: RUN or STEP RUN (including the stations with the maximum station number and smaller numbers as well as reserved stations)
1: STOP, PAUSE, ERROR
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0084</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0085</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0086</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0087</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>＊2 ＊10
SW0088
(136)/
SW0089
(137)/
SW008A
(138)/
SW008B
(139)</td><td>CPU operation status of each station (2)</td><td>Stores each station's CPU status (including the host).
Valid only for stations registered as normal in the SW0070 to SW0073.
0: Normal (including the stations with the maximum station number and smaller numbers as well as reserved stations)
1: Minor error
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0088</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0089</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW008A</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW008B</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
</table>

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.
＊10: Minor errors are the type of errors that do not affect the CPU operation.
＊11: Serious errors are the type of errors that stop the CPU operation.
Fatal errors are also the type of errors that stop the CPU operation.

Table 4 Link special register (SW) list (continued)

<table>
<tr><th rowspan="3">No.</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="8">Use permitted/prohibited</th></tr>
<tr><th colspan="2">Control station</th><th colspan="2">Normal station</th><th colspan="2">Remote master station</th><th colspan="2">Remote I/O station</th></tr>
<tr><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th></tr>
<tr><td>*2
SW008C
(140)/
SW008D
(141)/
SW008E
(142)/
SW008F
(143)/</td><td>Power supply status of each station</td><td>Indicates whether external power supply is available to each station (For QJ71LP21-25, 0 is ON.)
Valid only for stations registered as normal in the SW0070 to SW0073.
0: Without external power supply (Including stations reserved or numbered greater than the maximum)
1: With external power supply
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW008C</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW008D</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW008E</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW008F</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>SW0090
(144)</td><td>Loopback information</td><td>Stores the loop status of the host.
0: Loop normal
1: Forward loop error
2: Reverse loop error
3: Loopback
4: Data linking disabled</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>*2
SW0091
(145)/
SW0092
(146)/
SW0093
(147)/
SW0094
(148)</td><td>Forward loop status of each station</td><td>Stores the forward loop status of each station (including the host).
0: Normal (including the station with the maximum station number and smaller stations as well as reserved stations)
1: Abnormal
Disconnected station remains in the status when it was disconnected.
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0091</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0092</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0093</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0094</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
</table>

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

*2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

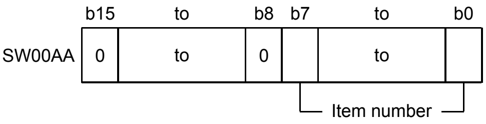
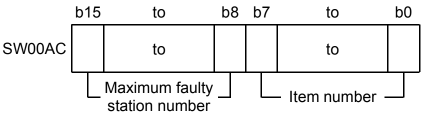
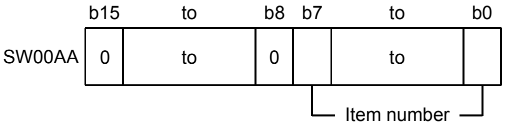
Table 4 Link special register (SW) list (continued)

<table>
<tr><th rowspan="3">No.</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="8">Use permitted/prohibited</th></tr>
<tr><th colspan="2">Control station</th><th colspan="2">Normal station</th><th colspan="2">Remote master station</th><th colspan="2">Remote I/O station</th></tr>
<tr><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th></tr>
<tr><td>∗2
SW0095
(149)/
SW0096
(150)/
SW0097
(151)/
SW0098
(152)</td><td>Reverse loop status of each station</td><td>Stores the reverse loop status of each station (including the host).
0: Normal (including the stations with the maximum station number and smaller numbers as well as reserved stations)
1: Abnormal
Disconnected station remains in the status when it was disconnected.
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW0095</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW0096</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW0097</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW0098</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>∗2
SW0099
(153)</td><td>Loopback station (forward loop side)</td><td>Stores the station number of which station is performing the loopback in the forward loop.
1 to 64 : Station No.
7D_H : Remote master station</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>∗2
SW009A
(154)</td><td>Loopback station (reverse loop side)</td><td>Stores the station number of which station is performing the loopback in the reverse loop.
1 to 64 : Station No.
7D_H : Remote master station</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>∗2
SW009C
(156)/
SW009D
(157)/
SW009E
(158)/
SW009F
(159)</td><td>Loop usage status of each station</td><td>Stores the optical fiber cable reverse insertion (IN-IN, OUT-OUT) status. (Refer to section 8.2.10)
All 0 or all 1: Correct connection of optical fiber cables
Other than above: Reverse insertion station of optical fiber cables
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW009C</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW009D</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW009E</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW009F</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>SW00A8
(168)</td><td>Online test execution item/faulty station (requesting side)</td><td>Stores both the online test item requested by the requesting station and the faulty station. (Valid when the SB00A9 is on.)
Stations disconnected from the network are not included among the faulty stations because there is no response.
<table>
<tr><th></th><th>b15</th><th>to</th><th>b8</th><th>b7</th><th>to</th><th>b0</th></tr>
<tr><td>SW00A8</td><td></td><td>to</td><td></td><td></td><td>to</td><td></td></tr>
<tr><td></td><td colspan="3">Faulty station number</td><td colspan="3">Test item number</td></tr>
</table>
When there are multiple faulty stations, the station number detected first is stored.
10H: Loop test
20H: Setup confirmation test
30H: Station order check test
40H: Communication test</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SW00A9
(169)</td><td>Online test result (requesting side)</td><td>Stores the online result on the requesting side.
(Valid when the SB00A9 is on.)
0 : Test normal
Other than 0 : Test error content (Refer to the error codes in Section 8.3)</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
</table>

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

∗2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Table 4 Link special register (SW) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
SW00AA (170)	Online test execution item (responding side)	Stores the online test items on the responding side. (Valid when the SB00AB is on.) Stations disconnected from the network are not included among the faulty stations because there is no response.  10_H: Loop test 20_H: Setup confirmation test 30_H: Station order check test 40_H: Communication test	○	○	○	○	○	○	○	○
SW00AB (171)	Online test result (responding side)	Stores the online test result of the responding side. (Valid when the SB00AB is on.) 0 : Test normal Other than 0 : Test error content (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	○	○
SW00AC (172)	Offline test execution item/faulty station (requesting side)	Stores the offline test items and faulty station on the requesting side. (Valid when the SB00AD is on.) Stations disconnected from the network are not included among the faulty stations because there is no response. Any given station number (0 to 64, $7D_H$) is saved in the maximum faulty station number (b8 to b15) for the loop test.  3: Loop test (forward loop) 4: Loop test (reverse loop) 5: Station-to-station test (master station) 6: Station-to-station test (slave station) 7: Self-loopback test 8: Internal self-loopback test	○	○	○	○	○	○	○	○
SW00AD (173)	Offline test result (requesting side)	Stores the offline result of the requesting side. (Valid when the SB00AD is on.) 0 : Test normal Other than 0 : Test error content (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	○	○
SW00AE (174)	Offline test execution item (responding side)	Stores the request-side offline test items and error stations. (Enabled when SB00AF is on.) When station breaks from network, it is not included with error stations because there is no response.  3: Loop test (forward loop) 4: Loop test (reverse loop)	○	○	○	○	○	○	○	○
SW00AF (175)	Offline test result (responding side)	Stores results of request-side offline test. (Enabled when SB00AF is on.) 0 : Test normal Other than 0 : Test error content (Refer to the error codes in Section 8.3)	○	○	○	○	○	○	○	○

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

Table 4 Link special register (SW) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
＊2 SW00B0 (176)/ SW00B1 (177)/ SW00B2 (178)/ SW00B3 (179)	Multiplex transmission status (1)	Stores each station's forward loop usage status during multiplex transmission. 0: Uses other than the forward loop 1: Uses the forward loop b15 b14 b13 b12 to b4 b3 b2 b1 b0 SW00B0 16 15 14 13 to 5 4 3 2 1 SW00B1 32 31 30 29 to 21 20 19 18 17 SW00B2 48 47 46 45 to 37 36 35 34 33 SW00B3 64 63 62 61 to 53 52 51 50 49 Numbers 1 to 64 in the above table indicate the station numbers.	○	×	○	×	○	×	○	×
＊2 SW00B4 (180)/ SW00B5 (181)/ SW00B6 (182)/ SW00B7 (183)	Multiplex transmission status (2)	Stores each station's reverse loop usage status during multiplex transmission. 0: Uses other than the reverse loop 1: Uses the reverse loop b15 b14 b13 b12 to b4 b3 b2 b1 b0 SW00B4 16 15 14 13 to 5 4 3 2 1 SW00B5 32 31 30 29 to 21 20 19 18 17 SW00B6 48 47 46 45 to 37 36 35 34 33 SW00B7 64 63 62 61 to 53 52 51 50 49 Numbers 1 to 64 in the above table indicate the station numbers.	○	×	○	×	○	×	○	×
＊3 SW00B8 (184)	UNDER on the forward loop side	Optical loop: Stores the number of "UNDER" errors on the forward loop side. Coaxial/twisted bus: Stores the number of "UNDER" errors. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	○	○	○	○	○	○	○
＊3 SW00B9 (185)	CRC on the forward loop side	Optical loop: Stores the number of "CRC" errors on the forward loop side. Coaxial/twisted bus: Stores the number of "CRC" errors. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	○	○	○	○	○	○	○
＊3 SW00BA (186)	OVER on the forward loop side	Optical loop: Stores the number of "OVER" errors on the forward loop side. Coaxial/twisted bus: Stores the number of "OVER" errors. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	○	○	○	○	○	○	○
＊3 SW00BB (187)	Short frame on the forward loop side	Optical loop: Stores the number of "short frame" errors on the forward loop side. Coaxial/twisted bus: Stores the number of "short frame" errors. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	○	○	○	○	○	○	○
＊3 SW00BC (188)	Abort on the forward loop side (AB, IF)	Optical loop: Stores the number of "AB.IF" errors on the forward loop side. Coaxial/twisted bus: Stores the number of "AB.IF" errors. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	○	○	○	○	○	○	○

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

＊3: To reset the SW00B8 to SW00C7, turn on the SB0006.
The number of times information stored in the SW00B8 to SW00C7 will not cause any problems if they are counted up gradually over a long period of time. If they are counted up rapidly in a short period of time (while monitoring with GX Developer, etc.), the cable may be faulty.

Table 4 Link special register (SW) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
＊3 SW00BD (189)	Timeout on the forward loop side (TIME)	Optical loop: Stores the number of "TIME" errors on the forward loop side. Coaxial/twisted bus: Stores the number of "TIME" errors. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	○	○	○	○	○	○	○
＊3 SW00BE (190)	Receiving 2k bytes or more on forward loop side (DATA)	Optical loop: Stores the number of "DATA" errors on the forward loop side. Coaxial/twisted bus: Stores the number of "DATA" errors. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	○	○	○	○	○	○	○
＊3 SW00BF (191)	DPLL error on the forward loop side	Optical loop: Stores the number of "DPLL" errors on the forward loop side. Coaxial/twisted bus: Stores the number of "DPLL" errors. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	○	○	○	○	○	○	○
＊3 SW00C0 (192)	UNDER on the reverse loop side	Accumulates and stores the number of "UNDER" errors on the reverse loop side. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	×	○	×	○	×	○	×
＊3 SW00C1 (193)	CRC on the reverse loop side	Accumulates and stores the number of "CRC" errors on the reverse loop side. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	×	○	×	○	×	○	×
＊3 SW00C2 (194)	OVER on the reverse loop side	Accumulates and stores the number of "OVER" errors on the reverse loop side. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	×	○	×	○	×	○	×
＊3 SW00C3 (195)	Short frame on the reverse loop side	Accumulates and stores the number of "Short frame" errors on the reverse loop side. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	×	○	×	○	×	○	×
＊3 SW00C4 (196)	Abort on the reverse loop side (AB, IF)	Accumulates and stores the number of "AB.IF" errors on the reverse loop side. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	×	○	×	○	×	○	×
＊3 SW00C5 (197)	Timeout on the reverse loop side (TIME)	Accumulates and stores the number of "TIME" errors on the reverse loop side. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	×	○	×	○	×	○	×
＊3 SW00C6 (198)	Receiving 2k bytes or more on reverse loop side (DATA)	Accumulates and stores the number of "DATA" errors on the reverse loop side. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	×	○	×	○	×	○	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊3: To reset from the SW00B8 to C7, turn on the SB0006.
The numbers of times stored in the SW00B8 to SW00C7 will not cause any problems if they are counting up gradually over a long period of time. If they are counted up rapidly in a short period of time (while monitoring with GX Developer, etc.), the cable may be faulty.

Table 4 Link special register (SW) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
＊3 SW00C7 (199)	DPLL error on reverse loop side	Accumulates and stores the number of "DPLL" errors on the reverse loop side. Other than 0: Number of errors Turning ON Clear communication error count (SB0006) clears the stored value.	○	×	○	×	○	×	○	×
＊4 SW00C8 (200)	Number of retries on the forward loop side	Optical loop: Stores the number of retries on the forward loop side. Coaxial/twisted bus: Stores the number of retries. Other than 0: Number of errors Turning ON Clear retry count (SB0005) clears the stored value.	○	○	○	○	○	○	○	○
＊4 SW00C9 (201)	Number of retries on the reverse loop side	Accumulates and stores the number of retries on the reverse loop side. Other than 0: Number of errors Turning ON Clear retry count (SB0005) clears the stored value.	○	×	○	×	○	×	○	×
＊5 SW00CC (204)	Line error on the forward loop side	Accumulates and stores the number of detected line errors on the forward loop side. Other than 0: Number of detected line errors Turning ON Clear forward loop transmission errors (SB0007) clears the stored value.	○	×	○	×	○	×	○	×
＊6 SW00CD (205)	Line error on the reverse loop side	Accumulates and stores the number of detected line errors on the reverse loop side. Other than 0: Number of detected line errors Turning ON Clear reverse loop transmission errors (SB0008) clears the stored value.	○	×	○	×	○	×	○	×
＊7 SW00CE (206)	Number of loop switches	Accumulates and stores the number of loop checks conducted. Other than 0: Number of loop switches Turning ON Clear loop switch count (SB0009) clears the stored value.	○	×	○	×	○	×	○	×
＊7 SW00CF (207)	Loop switch data pointer	Stores the pointer that indicates the next loop switch data. 0 to 15: Loop switch data (SW00D0 to SW00DF) Turning ON Clear loop switch count (SB0009) clears the stored value.	○	×	○	×	○	×	○	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊3: To reset from the SW00B8 to C7, turn on the SB0006.
The numbers of times stored in the SW00B8 to SW00C7 will not cause any problems if they are counting up gradually over a long period of time. If they are counted up rapidly in a short period of time (while monitoring with GX Developer, etc.), the cable may be faulty.

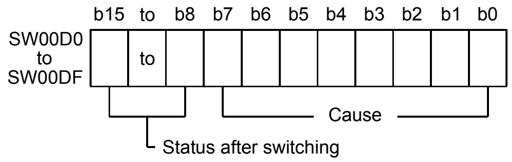
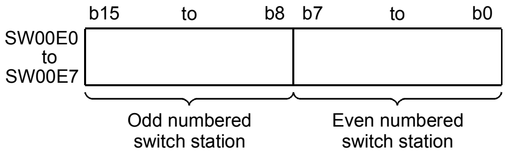
＊4: This may be counted up at power on/reset, but it is not an error.
Clear with the SB0005 when the number of retries is not required before starting data linking.

＊5: To reset the SW00CC, turn on the SB0007.

＊6: To reset the SW00CD, turn on the SB0008.

＊7: To reset the SW00CE to SW00E7, turn on the SB0009.

Table 4 Link special register (SW) list (continued)

<table>
<tr><th rowspan="3">No.</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="8">Use permitted/prohibited</th></tr>
<tr><th colspan="2">Control station</th><th colspan="2">Normal station</th><th colspan="2">Remote master station</th><th colspan="2">Remote I/O station</th></tr>
<tr><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th></tr>
<tr><td>∗7
SW00D0
(208)
to
SW00DF
(223)</td><td>Loop switch data</td><td>Stores the cause and status of the loop switch.
Whether the data are overwritten or retained is set in the common parameters.

<Cause> The bit corresponding to each error is set to 1.
All 0: Return direction
b0: Forward loop H/W error
b1: Reverse loop H/W error
b2: Forward loop forced error
b3: Reverse loop forced error
b4: Forward loop continuous communication error
b5: Reverse loop continuous communication error
b6: Forward loop continuous line error
b7: Reverse loop continuous line error
< Status after the switching>
0: Multiplex transmission (Forward loop/reverse loop normal)
1: Data link by forward loop
2: Data linking by reverse loop
3: Data linking by loopback
Turning ON Clear loop switch count (SB0009) clears the stored value.</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>∗7 ∗8
SW00E0
(224)
to
SW00E7
(231)</td><td>Switch request station</td><td>Stores the number of the stations that requested the loop switch.

Turning ON Clear loop switch count (SB0009) clears the stored value.</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>∗2
SW00E8
(232)
to
SW00EB
(235)</td><td>Module type of each station</td><td>Stores each station's module type.
0: MELSECNET/10 module
1: MELSECNET/H module
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW00E8</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW00E9</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW00EA</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW00EB</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>∗2
SW00EC
(236)</td><td>Low-speed cyclic transmission start execution results</td><td>Stores execution results for low-speed cyclic transmission start execution results.
0 : Test normal
Other than 0 : Test error content (Refer to the error codes in Section 8.3)</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
</table>

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

∗2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

∗7: To reset the SW00CE to SW00E7, turn on the SB0009.

∗8: For the loop switch request station, stations other than the ones at both ends of the loop may be stored because the loop switch request is issued by the station that first detected the loop error.

Table 4 Link special register (SW) list (continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Loop	Bus	Loop	Bus	Loop	Bus	Loop	Bus
＊9 SW00EE (238)	Transient transmission error	Accumulates and stores the number of transient transmission errors. Other than 0: Number of errors Turning ON Clear transient transmission errors (SB000A) clears the stored value.	○	○	○	○	○	○	○	○
＊9 SW00EF (239)	Transient transmission error pointer	Stores the pointer that sets the data for the next transient transmission error. Turning ON Clear transient transmission errors (SB000A) clears the stored value.	○	○	○	○	○	○	○	○
＊2 SW00F0 (240) to SW00FF (255)	Transient transmission error history	Stores the error codes of the transient transmission errors (Refer to the error codes in Section 8.3).	○	○	○	○	○	○	○	○
＊2 SW01C4 (452)	Remote sub-master station switching result	Stores the result of a shift from master operation to sub-master operation. 0 : Normal completion 1 or later : Abnormal completion (refer to Section 8.3 for error codes)	×	×	×	×	○	○	×	×
＊2 SW01C8 (456)	Send LY device number	(Valid only when SB01C8 is ON) For remote master station : The send LY device number to the remote sub-master station is stored. In 1 point units. For remote sub-master station : The send LY device number to the remote master station is stored. In 1 point units.	×	×	×	×	○	○	×	×
＊2 SW01C9 (457)	Receive LX device number	(Valid only when SB01C8 is ON) For remote master station : The receive LX device number from the remote sub-master station is stored. In 1 point units. For remote sub-master station : The receive LX device number from the remote master station is stored. In 1 point units.	×	×	×	×	○	○	×	×
＊2 SW01CC (460)	Send LB device number	(Valid only when SB01C8 is ON) For remote master station : The send LB device number to the remote sub-master station is stored. In 1 point units. For remote sub-master station : The send LB device number to the remote master station is stored. In 1 point units.	×	×	×	×	○	○	×	×
＊2 SW01CD (461)	Receive LB device number	(Valid only when SB01C8 is ON) For remote master station : The receive LB device number from the remote sub-master station is stored. In 1 point units. For remote sub-master station : The receive LB device number from the remote master station is stored. In 1 point units.	×	×	×	×	○	○	×	×
＊2 SW01CE (462)	Send LW device number	(Valid only when SB01C8 is ON) For remote master station : The send LW device number to the remote sub-master station is stored. In 1 point units. For remote sub-master station : The send LW device number to the remote master station is stored. In 1 point units.	×	×	×	×	○	○	×	×
＊2 SW01CF (463)	Receive LW device number	(Valid only when SB01C8 is ON) For remote master station : The receive LW device number from the remote sub-master station is stored. In 1 point units. For remote sub-master station : The receive LW device number from the remote master station is stored. In 1 point units.	×	×	×	×	○	○	×	×

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

＊2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.
＊9: To reset the SW00EE to SW00EF, turn on the SB000A.

Table 4 Link special register (SW) list (continued)

<table>
<tr><th rowspan="3">No.</th><th rowspan="3">Name</th><th rowspan="3">Description</th><th colspan="8">Use permitted/prohibited</th></tr>
<tr><th colspan="2">Control station</th><th colspan="2">Normal station</th><th colspan="2">Remote master station</th><th colspan="2">Remote I/O station</th></tr>
<tr><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th><th>Loop</th><th>Bus</th></tr>
<tr><td>*2
SW01E0
(480)/
SW01E1
(481)/
SW01E2
(482)/
SW01E3
(483)</td><td>Network type consistency check</td><td>Indicates whether there is a mismatch between the network types of the control station and normal stations on the network.
• When the control station is in the MELSECNET/H Extended mode
0: Set to the MELSECNET/H Extended mode. (Including stations of station Nos. greater than the maximum, reserved stations and communication error stations)
1: Set to the MELSECNET/H mode or MELSECNET/10 mode.
• When the control station is in the MELSECNET/H mode or MELSECNET/10 mode
0: Set to the MELSECNET/H mode or MELSECNET/10 mode. (Including stations of station Nos. greater than the maximum, reserved stations and communication error stations)
1: Set to the MELSECNET/H Extended mode.
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW01E0</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW01E1</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW01E2</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW01E3</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
1 to 64 in the table indicate the station Nos.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>*2
SW01F4
(500)/
SW01F5
(501)/
SW01F6
(502)/
SW01F7
(503)</td><td>Redundant system status (1)</td><td>Indicates the operation mode of each station's CPU.
0: Backup mode (including the single CPU system) (including stations exceeding the maximum station number and reserved stations)
1: Separate mode
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW01F4</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW01F5</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW01F6</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW01F7</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>*2
SW01F8
(504)/
SW01F9
(505)/
SW01FA
(506)/
SW01FB
(507)</td><td>Redundant system status (2)</td><td>Indicates the pairing setting status of each station.
In the case of a redundant system, the bit of the station with the larger number is turned on (1).
0: No pairing designation (including the single CPU system) (including stations exceeding the maximum station number)
1: Station with pairing designation
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW01F8</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW01F9</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW01FA</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW01FB</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>*2
SW01FC
(508)/
SW01FD
(509)/
SW01FE
(510)/
SW01FF
(511)</td><td>Redundant system status (3)</td><td>Indicates the operation status of each station's CPU (control system/standby system).
0: The host station CPU is on the control system (including the single CPU system) (including stations exceeding the maximum station number and reserved stations).
1: The host system CPU is on the standby system.
<table>
<tr><th></th><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>to</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SW01FC</td><td>16</td><td>15</td><td>14</td><td>13</td><td>to</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>SW01FD</td><td>32</td><td>31</td><td>30</td><td>29</td><td>to</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr>
<tr><td>SW01FE</td><td>48</td><td>47</td><td>46</td><td>45</td><td>to</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td></tr>
<tr><td>SW01FF</td><td>64</td><td>63</td><td>62</td><td>61</td><td>to</td><td>53</td><td>52</td><td>51</td><td>50</td><td>49</td></tr>
</table>
Numbers 1 to 64 in the above table indicate the station numbers.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
</table>

[Availability column] Loop: optical loop, Bus: coaxial/twisted bus
○: Available, ×: Not available

*2: Valid only when the SB0047 is off. When it turns on (error), the last data are retained.

Appendix 5 Screwdriver

The following is a screwdriver used for connecting and removing cables to and from a spring clamp terminal block of the QJ71NT11B.

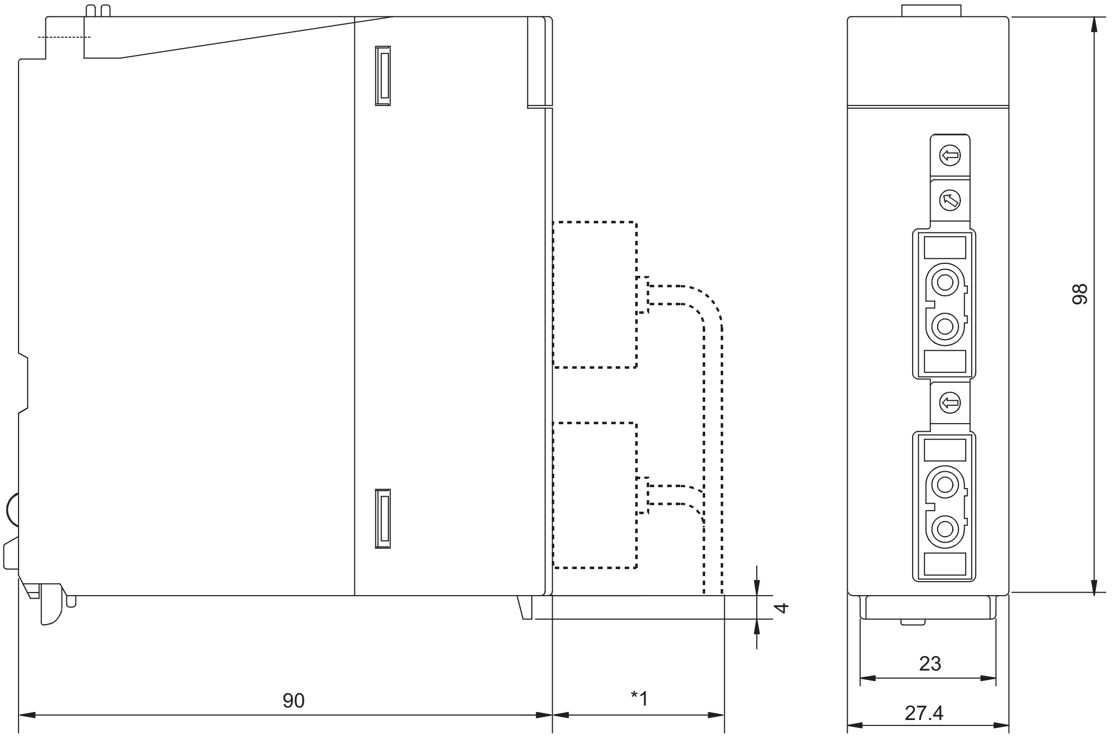
Model	Manufacturer
SZS 0,6×3,5	Phoenix Contact

REMARKS

For inquiries and orders, please contact your local Phoenix Contact.

Appendix 6 External Dimensions

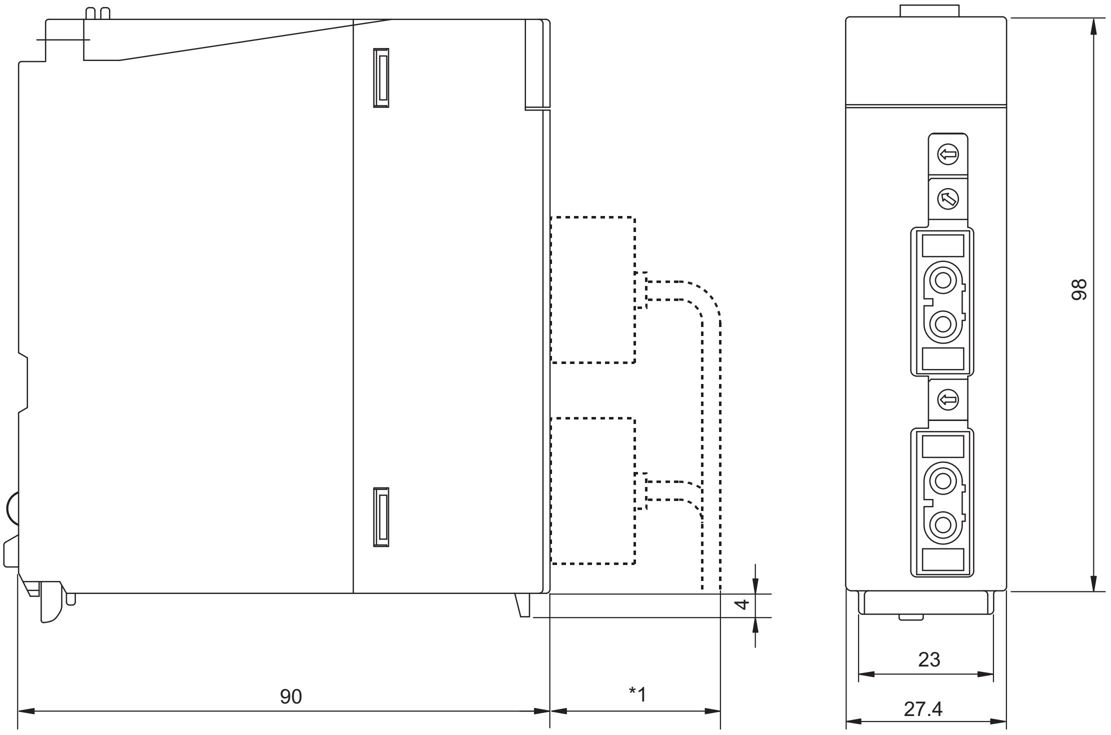
(1) QJ71LP21, QJ71LP21-25



Unit: mm

＊1: For details, contact your local Mitsubishi Electric System & Service Co., Ltd.

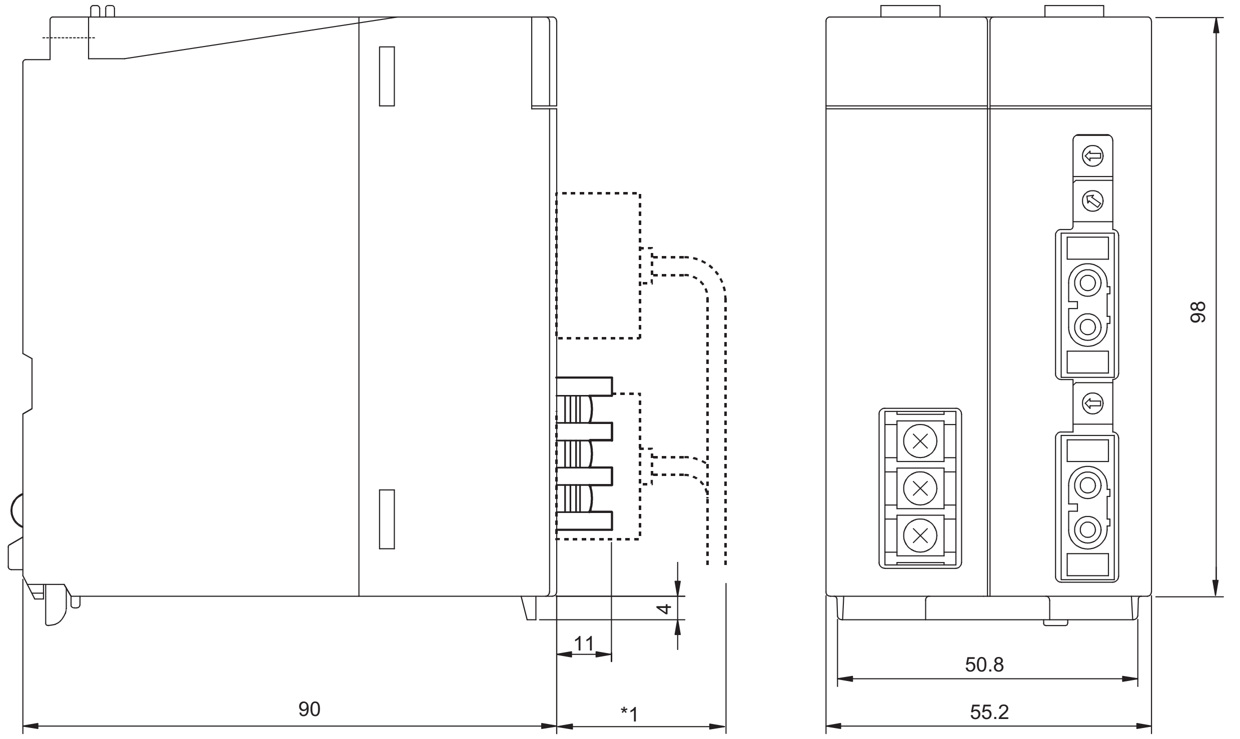
(2) QJ71LP21G, QJ71LP21GE



Unit: mm

＊1: For details, contact your local Mitsubishi Electric System & Service Co., Ltd.

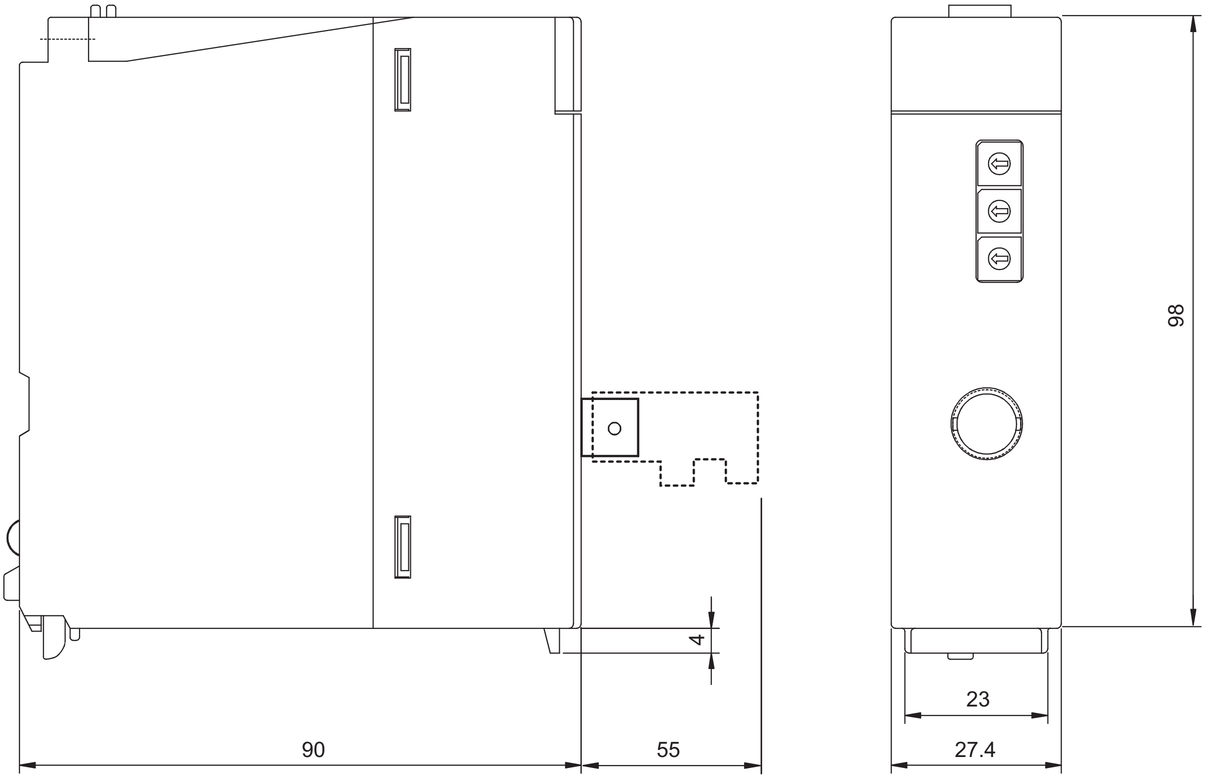
(3) QJ71LP21S-25



Unit: mm

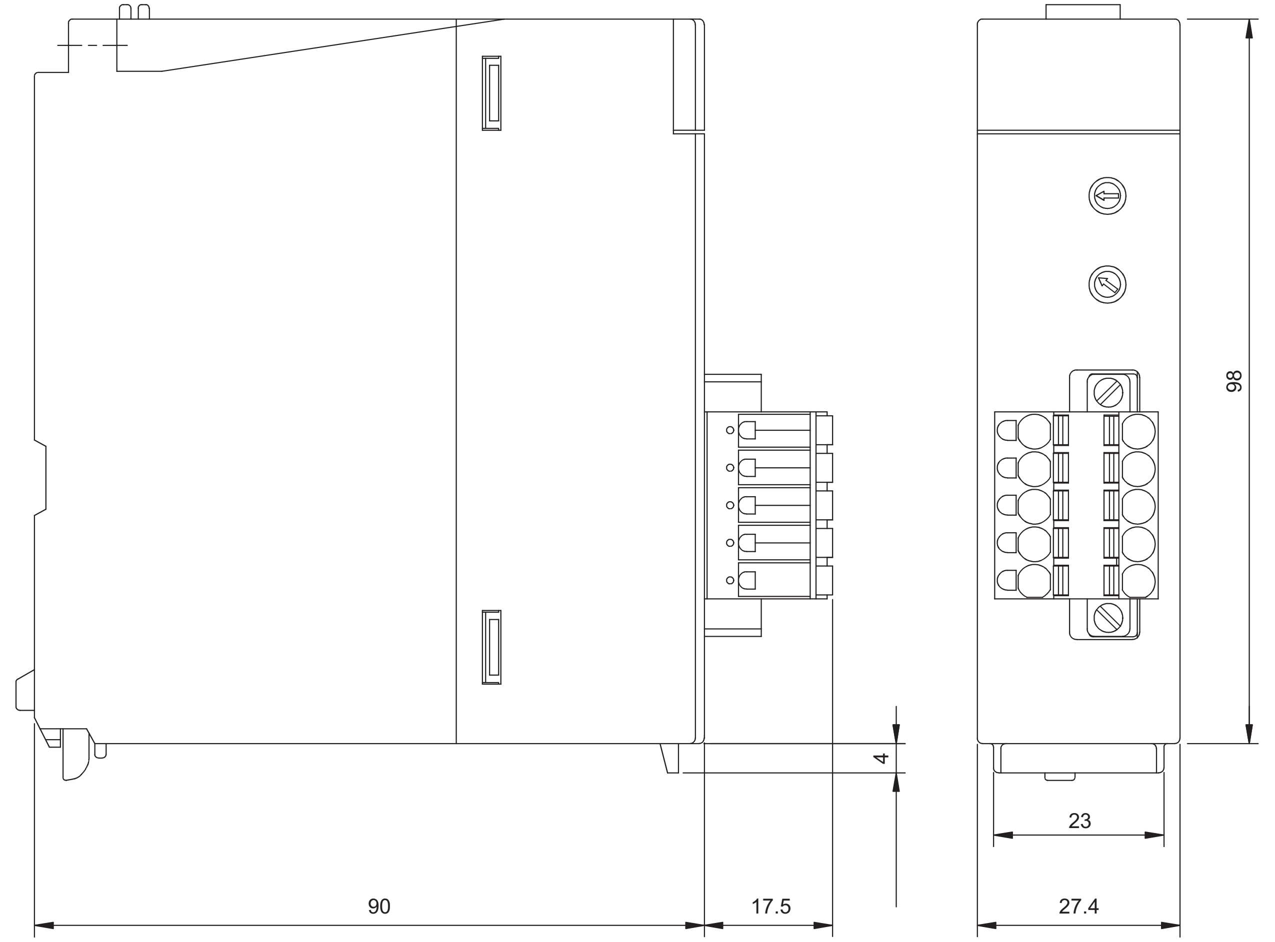
＊1: For details, contact your local Mitsubishi Electric System & Service Co., Ltd.

(4) QJ71BR11



Unit: mm

(5) QJ71NT11B



Unit: mm

MEMO

INDEX

[A]
- Applicable Systems 2-7

[C]
- Coaxial cable 3-6
- Common parameter
  - Send range for each station (LB/LW settings) 5-14
  - Send range for each station (LX/LY settings) 5-15
  - Specification of the I/O master station 5-16
  - Specification of the reserved station 5-16
- Control Station Shift Time A-17, 3-51
- Cyclic transmission.. 3-15
- Communication speed setting 5-12
- CC-Link Ver. 1.10-compatible cable............. 3-13

[D]
- Dedicated instruction error code storage location 8-36

[E]
- Error code
  - Checking for dedicated instruction error... 8-36
  - Error code list... 8-37
  - How to check error codes 8-32
- External power supply................................... 6-31

[F]
- Function 2-20, 3-14

[G]
- Group function 7-27
- Group No. A-17, 5-10

[H]
- H/W information... 8-47

[I]
- Inter-link data transfer
  - Inter-link data transfer function.................... 7-6
  - Interlink transmission parameters 7-7
  - Inter-link data transfer stations.................... 7-8

[L]
- Link dedicated instruction 6-9,6-30,8-36
- Link device
  - Direct device (Link direct device).................7-2
  - Address specification range.........................7-4
- Link refresh 3-30
- Link refresh assignment image..................... 5-26
- Link scan 3-30
- Link special relay (SB) 6-13, App-6
- Link special register (SW).............. 6-13, App-18
- Low-speed cyclic transmission 7-9

[M]
- MELSECNET/H Extended Mode 3-1, 3-3, 5-7
- MELSECNET/H Mode 3-1, 3-3, 5-7
- MELSECNET/10 Mode.....................3-1, 3-3, 5-7
- Message sending 7-28
- Module error history 8-34
- Multiple CPU system..2-8
- Multiplex transmission................................. 7-123

[N]
- Network diagnostics
  - Error history monitor.................................. 8-15
  - Error history detail monitoring 8-17
  - Network monitor details............................. 8-11
  - Station order check test 4-44
  - Communication test.................................. 4-45
  - Host information 8-5
  - Setup confirmation test 4-43
  - Other station information..............................8-7
  - Loop test 4-42
- Network setting
  - Starting I/O No. 5-9
  - Network No. 5-9
  - Total stations 5-10
  - Group No. 5-10
- Network test
  - Stopping/restarting the cyclic transmission 7-129
  - Stopping link refreshing........................... 7-129
- Network type
  - MELSECNET/H Extended Mode 3-1, 3-3, 3-4, 5-7
  - MELSECNET/H Mode 3-1, 3-3, 3-4, 5-7
  - MELSECNET/10 Mode 3-1, 3-3, 5-7

[O]
- Operation mode
  - Online.. 5-11
  - Online debug mode 5-11
  - Offline.. 5-11
  - Forward loop test...................................... 5-11
  - Reverse loop test...................................... 5-11
  - Station-to-station test (station to execute test) 5-11
  - Station-to-station test (station to be tested).................................. 5-11
- Optical fiber cable.. 3-5

[P]
- Performance Specifications 3-1
  - Coaxial bus system 2-1, 4-22
  - Optical loop system 2-1, 4-19
  - Twisted bus system............................2-2, 4-27

[R]
- RAS function
  - Control station switch function 3-19
  - Control station return control function....... 3-20
  - Station detach function............................. 3-25
  - Automatic return function 3-18
  - Diagnostic function 3-28
  - Loopback function 3-21
- READ instruction 7-53
- RECV instruction 7-41
- RECVS instruction 7-117
- Redundant system
  - System switching request 7-150
  - Outline of the redundant system operation 7-134
  - Redundant settings 7-149
  - Network configuration.............................. 7-137
  - Pairing setting 7-145
- Refresh parameter 5-25
- REQ instruction 7-71
- Routing function
  - Routing parameter..................................... 7-21
  - Transmission delay time 7-24
- RRUN instruction... 7-91
- RSTOP instruction 7-94
- RTMRD instruction...................................... 7-100
- RTMWR instruction 7-102
- RTWRITE instruction 7-160

[S]
- SEND instruction 7-36
- Shielded twisted pair cable 3-9
- Simple dual-structured network
  - Regular network 7-124
  - Standby network...................................... 7-124
- Simple dual-structured
  - Control special relay 7-125
  - Program 7-127
- SREAD instruction 7-53
- Supplementary setting
  - Monitoring time 5-17
  - Parameter name... 5-17
  - Constant scan.. 5-18
  - Maximum No. of return to system stations in 1 scan....................................... 5-18
  - With multiplex transmission 5-18
  - There is a data link through the sub-controlling station when the controlling station is down.. 5-18
  - Block send data assurance per station/Block receive data assurance per station........... 5-18
  - Transient setting 5-19
  - Specification of low-speed cyclic transmission 5-19
- Switch settings
  - Station number setting switch 4-3, 4-6
  - Mode setting switch............................. 4-4, 4-7
  - Station number/mode setting switch............4-6
- SWRITE instruction....................................... 7-58
- System error history 8-34

[T]
- Test
  - Station-to-station test 4-28
  - Self-loopback test...................................... 4-13
  - Forward loop/reverse loop test 4-36
  - Internal self-loopback test 4-15
  - Hardware test 4-17
- Transient transmission
  - Parameter setting 7-17
  - Range 7-18

[W]
- WRITE instruction 7-59

[Z]
ZNRD instruction 7-82
ZNWR instruction 7-84

[0 to 9]
32-bit data assurance...................................... 6-5

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

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

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

SH(NA)-080049-P

SH(NA)-080049-P(1609)MEE
MODEL: Q-NET/10H-R-E
MODEL CODE: 13JF92

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