MITSUBISHI ELECTRIC

MELSEC System Q

Programmable Logic Controllers

Reference Manual
(PLC to PLC network)

MELSECNET/H Modules
QJ71LP21(-25), QJ71LP21S-25, QJ71LP21G(E), QJ71BR11

Art. no.: 130455
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Version E

MITSUBISHI ELECTRIC INDUSTRIAL AUTOMATION

• SAFETY PRECAUTIONS •

(Always read before starting use.)

Before using this product, please read this manual and the relevant manuals introduced in this manual 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 instructions are ranked as "DANGER" and "CAUTION".

◇! DANGER	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 medium or slight personal injury or physical damage.

Note that the ⚠CAUTION level may lead to a serious consequence according to the circumstances. Always follow the instructions of both levels because they are important to personal safety.

Please store this manual in a safe place and make it accessible when required. Always forward it to the end user.

[Design Precautions]

◇! DANGER

- Make sure to see this manual for information about each station's operating status when a communication error occurs in the network. Erroneous outputs and malfunctions may result in serious accidents.
- When performing control operations to a PLC (modifying data) in operation by connecting GX Developer to the CPU module or connecting personal computers to the intelligent functional modules, configure an interlocking circuit in a sequence program so that the safety of the overall system is maintained. Also, before performing other control operations (program modifications and operating status modifications (status control)) on the PLC in operation, be sure to read the manual thoroughly and confirm the safety. Especially if the above mentioned control operations are performed from an external device to a remote PLC, problems arising on the PLC side may not be dealt with immediately due to abnormal data communication. Thus, in addition to configuring an interlocking circuit in a sequence program, determine how the system should handle data communication errors between the PLC CPU and external devices.

⚠ CAUTION

- Do not bundle the control wires and communication cables with the main circuit or power wires, or install them close to each other. They should be installed at least 100 mm (3.94 in.) away from each other. Failure to do so may generate noise that may cause malfunctions.

[Installation Precautions]

⚠ CAUTION

- Use the PLC in the operating environment that meets the general specifications of this manual. Using the PLC in any other operating environments may cause electric shocks, fires or malfunctions, or may damage or degrade the product.
- To install the module, securely insert the module fastening latch in the installation hole on the base unit while holding down the module installation lever on the lower part of the module. If the module is not installed properly, it may cause the module to malfunction, fail or fall off.
  Secure the module with screws especially when it is used in an environment where constant vibrations may occur.
  Be sure to tighten the screws using the specified torque. If the screws are loose, it may cause the module to short-circuit, malfunction or fall off. If the screws are tightened excessively, it may damage the screws and cause the module to short-circuit, malfunction or fall off.
- Before mounting or dismounting the module, make sure to shut off all phases of the external power supply. Failure to do so may damage the product.
- Do not directly touch the conducting parts and electronic parts of the module. This may cause the module to malfunction or fail.

[Wiring Precautions]

DANGER

- Before starting any installation or wiring work, make sure to shut off all phases of the external power supply to the entire system. Failure to completely shut off the power supply to the system may cause electric shocks and damage the product.

⚠ CAUTION

- Be sure to ground the FG terminals independently for PLC by class D (class 3) or higher. Failure to do so may cause malfunctions.
- When connecting cables to the terminal block for external power supply, check the rated voltage and terminal arrangement of the product for correct wiring.
  Connecting a cable to power supply of different voltage or incorrect wiring may cause a fire or fault.
- Tighten the terminal screws with the specified torque.
  Loose tightening may lead to a short circuit, fire or malfunction.
- Solder coaxial cable connectors properly. Incomplete soldering may result in malfunctioning.
- Be careful not to let foreign particles such as chaff and wire chips get inside the module. They may cause a fire, mechanical breakdown or malfunction.
- The top surface of the module is covered with a protective film to prevent foreign objects such as wire chips from entering the module during wiring work. Do not remove this film until all the wiring work is complete. Before operating the system, be sure to remove the film to provide adequate heat ventilation.

[Wiring Precautions]

⚠ CAUTION

- Make sure to place the communication and power cables to be connected to the module in a duct or fasten them using a clamp. If the cables are not placed in a duct or fastened with a clamp, their positions may become unstable and may move, or they may be pulled inadvertently. This may damage the module and the cables or cause the module to malfunction because of faulty cable connections.
- When disconnecting the communication and power cables from the module, do not pull the cables by hand. When disconnecting a cable with a connector, hold the connector to the module by hand and pull it out to remove the cable. When disconnecting a cable connected to a terminal block, loosen the screws on the terminal block first before removing the cable. If a cable is pulled while being connected to the module, it may cause the module to malfunction or damage the module and cables.

[Setup and Maintenance Precautions]

⚠ CAUTION

- Please read this manual thoroughly and confirm the safety before starting online operations (especially, program modifications, forced outputs, and operating status modifications), which are performed by connecting the GX Developer via the MELSECNET/H network system to a running CPU module of other station. Performing incorrect online operations may damage the machinery or result in accidents.
- Never disassemble or modify the module. This may cause breakdowns, malfunctions, injuries or fire.
- When using a cellular phone, use it at least 25 cm (9.84 in.) away from the PLC. Failing to do so may cause malfunctions.
- Before mounting or dismounting the module, make sure to shut off all phases of the external power supply. Failure to do so may damage the module or result in malfunctions.
- Do not touch the terminals while the power is on. Doing so may cause malfunctions.
- Before cleaning the module or retightening the terminal screws and module installation screws, make sure to shut off all phases of the external power supply. Failure to completely shut off all phases of the external power supply may cause module breakdowns and malfunctions. If the screws are loose, it may cause the module to short-circuit, malfunction or fall off. If the screws are tightened excessively, it may damage the screws and cause the module to short circuit, malfunction or fall off.
- Before handling the module, always touch grounded metal, etc. to discharge static electricity from the human body.
  Failure to do so can cause the module to fail or malfunction.

[Disposal Precautions]

⚠ CAUTION

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

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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 Safty Precautions, Contents, About Manuals, About the Generic Terms and Abbreviations, Capter 1, Section 1.1, 1.2, Capter 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, Capter 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, Capter 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, Capter 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 Delection Section 2.4
May, 2001	SH(NA)-080049-C	Module addition QJ71LP21G, QJ71LP21GE Correction Safty 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

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

Print Date	∗ Manual Number	Revision
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

Japanese Manual Version SH-080026-G

INTRODUCTION

Thank you for purchasing the MELSEC-Q series PLC.
Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the Q series PLC you have purchased, so as to ensure correct use.
Please forward a copy of this manual to the end user.

CONTENTS

About Manuals

The following manuals are also related to this product.
In necessary, order them by quoting the details in the tables below.

Related Manuals

Manual Name	Manual Number (Model Code)
Q corresponding MELSECNET/H Network System Reference Manual (Remote I/O network) This manual describe the system configuration of MELSECNET/H network system (Remote I/O network), performance, specifications and programming. (Sold separately)	SH-080124 (13JF96)
Basic Model QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection) This manual describes the specifications of the QCPU, power supply module, base unit, extension cables and memory card battery, loading and installation, maintenance and inspection and troubleshooting. (Sold separately)	SH-080187 (13JR43)
Basic Model QCPU (Q Mode) User's Manual (Functions Explanation, Program Fundamentals) This manual describes the programming methods, functions, devices and other information required for programming. (Sold separately)	SH-080188 (13JR44)
High Performance Model QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection) This manual describes the specifications of the QCPU, power supply module, base unit, extension cables and memory card battery, loading and installation, maintenance and inspection, and troubleshooting. (Sold separately)	SH-080037 (13JL97)
High Performance Model QCPU (Q Mode) User's Manual (Function Explanation, Program Fundamentals) This manual describes the programming functions, programming methods, devices and other information that are required for programming using the QCPU (Q mode). (Sold separately)	SH-080038 (13JL98)
Process CPU User's Manual (Hardware Design, Maintenance and Inspection) This manual describes the specifications of the QCPU, power supply module, base unit, extension cables and memory card battery, loading and installation, maintenance and inspection and troubleshooting. (Sold separately)	SH-080314E (13JR55)
Process CPU User's Manual (Functions Explanation, Program Fundamentals) This manual describes the programming methods, functions, devices and other information required for programming. (Sold separately)	SH-080315E (13JR56)
GX Developer version 8 Operating Manual This manual describes the programming procedures, printing procedures, monitoring procedures, debugging procedures, and other online functions using GX Developer. (Sold separately)	SH-080373E (13JU41)

Conformation to the EMC Directive and Low Voltage Instruction

For details on making Mitsubishi PLC conform to the EMC directive and low voltage instruction when installing it in your product, please see Chapter 3, "EMC Directive and Low Voltage Instruction" of the PLC CPU User's Manual (Hardware).
The CE logo is printed on the rating plate on the main body of the PLC that conforms to the EMC directive and low voltage instruction.

About the Generic Terms and Abbreviations

Generic term/abbreviation	Description of generic term/abbreviation
QJ71LP21	The abbreviation of the QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21G and QJ71LP21GE model MELSECNET/H network modules. However, QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21G and QJ71LP21GE are used in this manual to indicate special machine types.
QJ71BR11	The abbreviation of the QJ71BR11 model MELSECNET/H network modules.
Network modules	The general name of the QJ71LP21 and QJ71BR11.
MELSECNET/H	Abbreviation for Q corresponding MELSECNET/H.
MELSECNET/10	Abbreviation for AnU and QnA/Q4AR corresponding MELSECNET/10.
QCPU	Generic term for Model Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q12PHCPU and Q25PHCPU modules.
Q02/Q02H/Q06H/Q12H/Q25H/ Q12PH/Q25PHCPU	Abbreviation for Model Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q12PHCPU and Q25PHCPU modules.
Q00J/Q00/Q01CPU	Abbreviation for Model Q00JCPU, Q00CPU and Q01CPU CPU modules.
GX Developer	Abbreviation for GX Developer software package.

Product Configuration

Model name	Part name	Quantity
QJ71LP21	Model QJ71LP21 MELSECNET/H Network Module (optical loop type)	1
QJ71LP21-25	Model QJ71LP21-25 MELSECNET/H Network Module (optical loop type)	1
QJ71LP21S-25	Model QJ71LP21S-25 MELSECNET/H Network Module (Optical type, with external power supply function)	1
QJ71LP21G	Model QJ71LP21G MELSECNET/H Network Module (optical loop type)	1
QJ71LP21GE	Model QJ71LP21GE MELSECNET/H Network Module (optical loop type)	1
QJ71BR11	Model QJ71BR11 MELSECNET/H Network Module (coaxial bus type)	1
	F-type connector	1

REMARK

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

1 OVERVIEW

1

The MELSECNET/H network system includes an PLC to PLC network for interactively communicating between control stations and normal stations, and a remote I/O network for interactively communicating between remote master stations and remote I/O stations.
This manual is to be read when structuring PLC to PLC networks on MELSECNET/H network systems (hereinafter known as MESECNET/H.)
The Q corresponding MELSECNET/H Network System Reference Manual (Remote I/O networks) is to be read when structuring remote I/O networks with MELSECNET/H.

REMARK

Networks previously known as MELSECNET/10H are abbreviated here as MELSECNET/H.

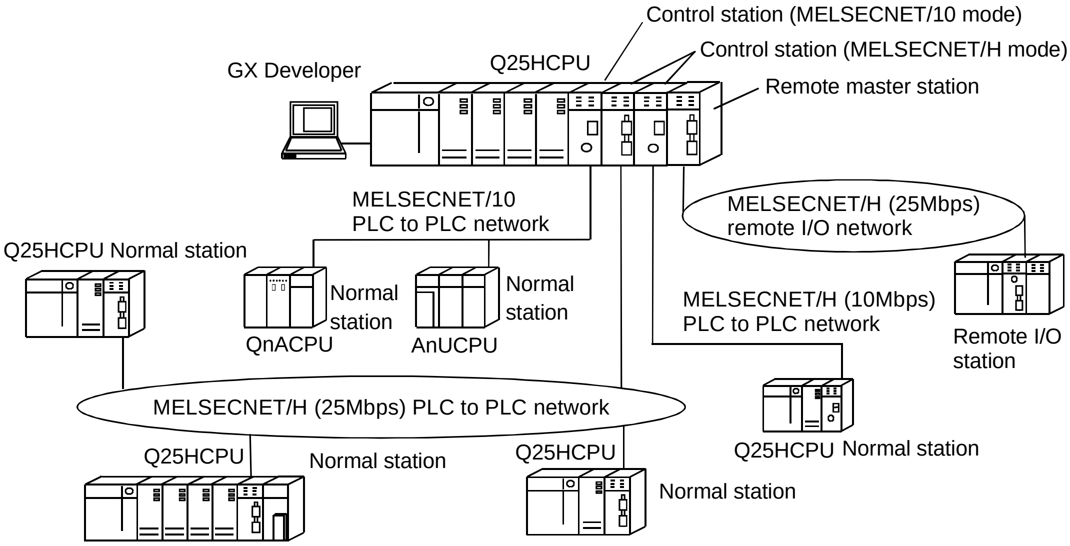
1.1 Overview

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 network system supports the MELSEC NET/H mode (high functionality and high-speed mode) and the MELSEC NET/10 mode (functional compatibility and performance compatibility mode) to improve the performance of the MELSECNET/10 network system and provide compatibility between these two systems.
This manual is written assuming that the MELSENCET/H network system is used in the MELSEC NET/H mode. Thus, if the MELSECNET/H network system is to be used in the MELSEC NET/10 mode, please see the QnA/Q4AR Corresponding MELSECNET/10 Network System Reference Manual.
MELSECNET/H PLC to PLC network optical loop systems can be set at communications speeds of 25Mbps and 10Mbps.

	Network system	Communication speed
MELSECNET/H	Optical loop, coaxial bus	10Mbps
	Optical loop∗1	25Mbps

∗1: QJ71LP21-25 and QJ71LP21S-25 only

Unless otherwise categorized, this is abbreviated as MELSECNET/H for explanatory purposes in this manual.



POINT

(1) Select a QCPU as a PLC 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) MELSECNET/H mode network modules and MELSECNET/10 mode network modules cannot be combined together on the same network.

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

CPU module		MELSECNET/10		MELSECNDE/H	
		PLC to PLC network	Remote I/O network	PLC to PLC network	Remote I/O network
QCPU	MELSECNET/H (10Mbps)	○ (MESLECNET/10 mode)	×	○ (MESLECNET/10 mode)	○
	MELSECNET/H (25Mbps)	×			
AnUCPU	MELSECNET/10	○	○	×	×
QnACPU	MELSECNET/10				

○: Use possible ×: Use not possible

1.2 Features

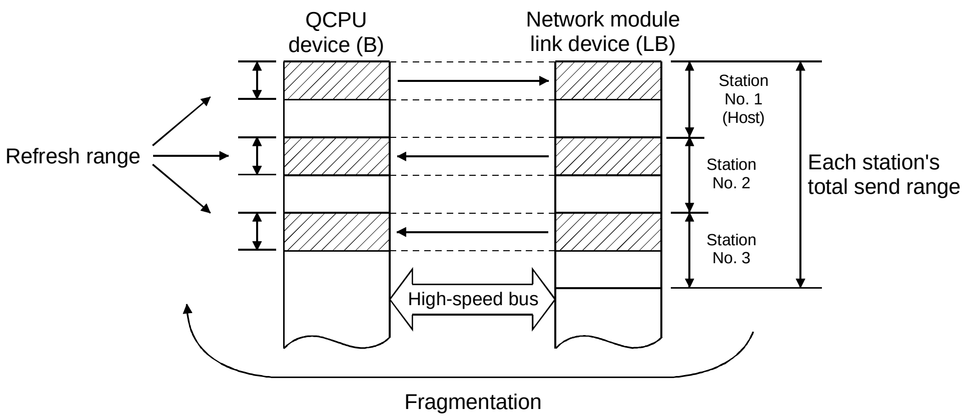
The MELSECNET/H is designed to provide higher processing speed, more capacity, and more functionality while maintaining the connectivity with the MELSECNET/10; it is easier to use than ever in combination with GX Developer. Furthermore, the MELSECNET/H has the following features that were not available 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 (25Mbps for only the QJ71LP21-25 and QJ71LP21S-25 optical loop system)

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

(c) The fragmented refresh parameters (divided into 64 ranges (not including those of SB and SW) per module for the Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU or into 8 ranges (not including those of SB and SW) per module for the Q00J/Q00/Q01HCPU) allows you to omit the refresh processing of devices not used in sequence programs and refresh only the required parts, reducing the refresh time. (See Section 5.7, "Network Refresh Parameters.")
Furthermore, the bus speed between the QCPU and the network module has been increased, which has also given a reduction in the refresh time.



(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

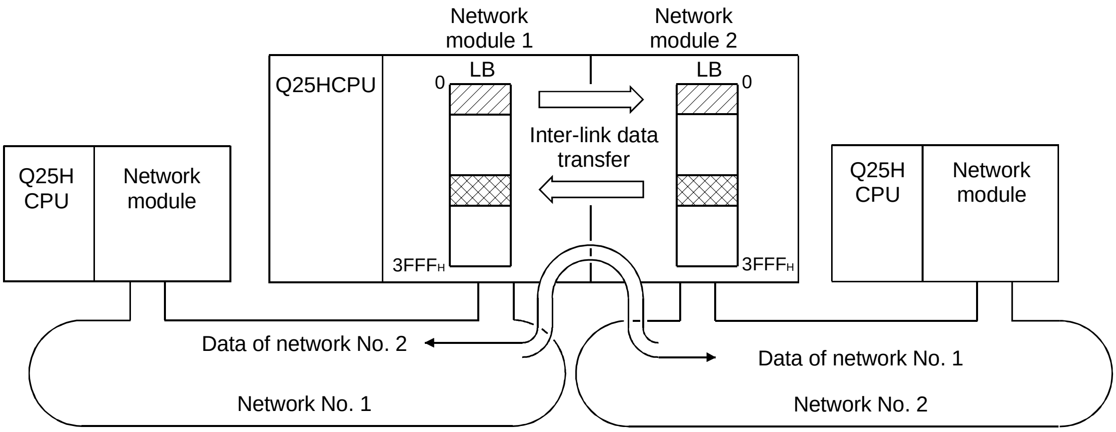
(a) The link device has a larger capacity: 16384 points for the link relay (LB) and 16384 points for the link register (LW). (See Section 2.1.4, "Available device range settings.")

(b) The number of link points can now be set up to a maximum of 2000 bytes per station. Furthermore, by installing multiple network modules with the same network number, the number of link points that equals to the "number of cards × 2000 bytes" can be sent. (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only) (See Section 7.9, "Increasing the Number of Send Points by Installing Multiple Modules Having the Same Network Number.")

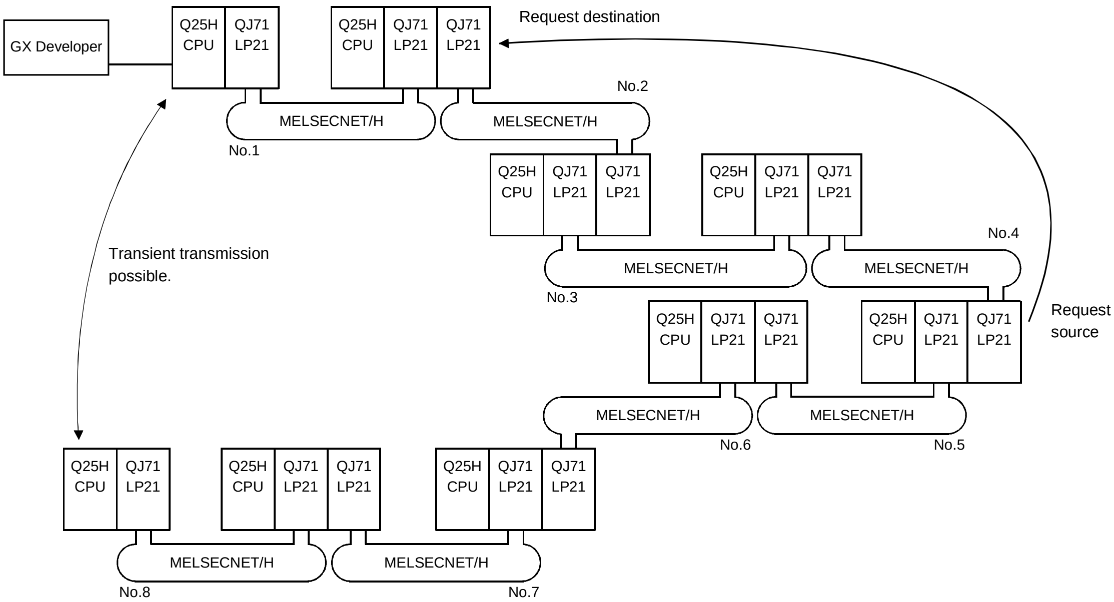
(c) The commands for transmitting and receiving data with other stations on the MELSECNET/H network system (SEND, RECV, RECVS, READ, SREAD, WRITE, SWRITE) enable a maximum of 960 words of data to be transmitted and received (refer to Programming in section 7.4.5.)

(d) A system can be expanded to contain a maximum of 239 networks. (See Section 2.2, "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. (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only) (See 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 PLCs as relay stations can be performed using the routing function. (See Section 7.4.2, "Routing Function.")
Transient transmission can be performed using the routing function in a network system configured only with the MELSECNET/Hs as well as a network system that also contains the MELSECNET/10s.



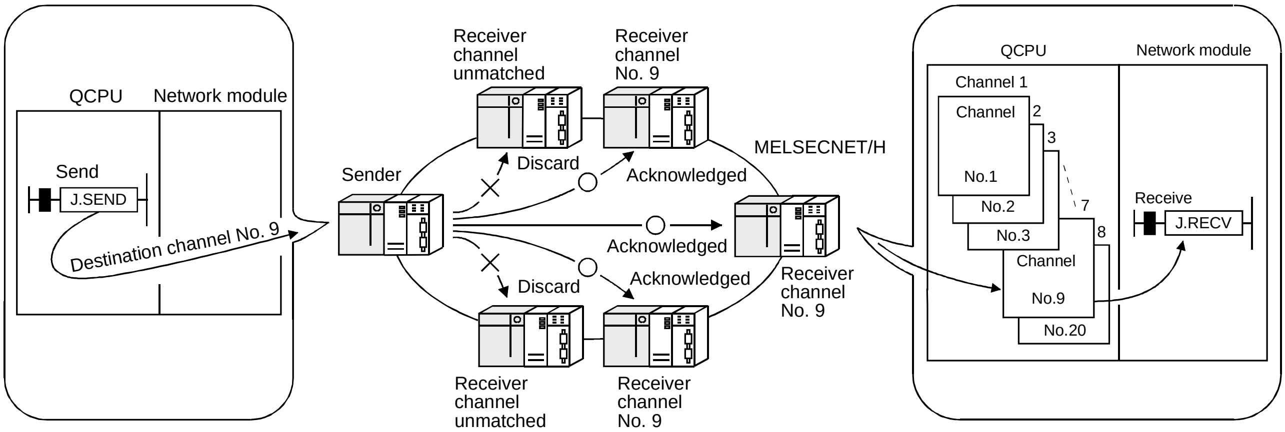
＊: Only the Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU accepts multiple network modules.

(g) Either of the following systems can be chosen: the optical loop system (maximum total extension of 30 km (98430 ft.)) which has a long station-to-station distance and total distance, and is resistant to noise, or the coaxial bus system (maximum total extension of 500 m (1640.5 ft.) which can easy be wired.
(See Section 3.1, "Performance Specifications.")

(h) It is not necessary to designate reserved stations which are treated as stations to be connected in future or to connect stations in the order of station numbers. The optical loop system executes a loopback when a station is down. Because of these functions, connecting networks has become easier than ever. (See Section 5.3.4, "Designation of the reserved station.")

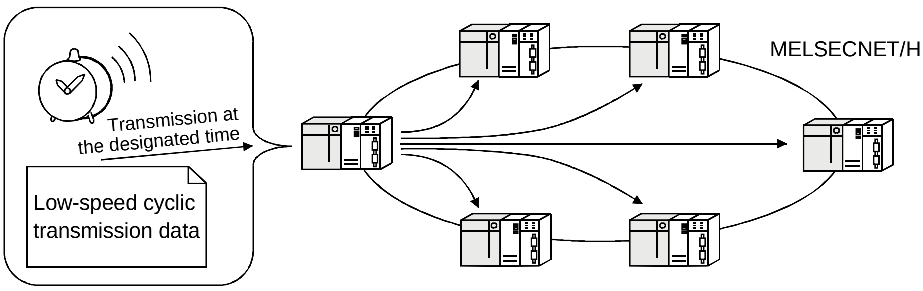
(3) Providing various communication services

(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.
(See Section 7.4.4, "Message Sending Function Using the Logical Channel Numbers.")

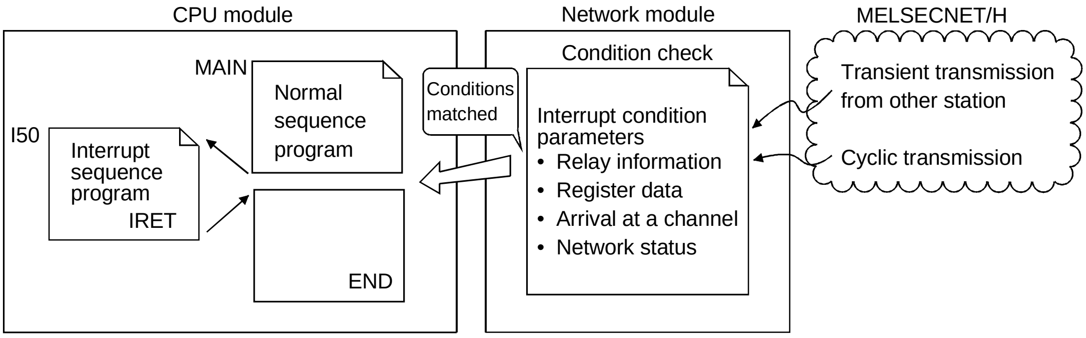


(b) By using the low-speed cyclic transmission function, it is possible to cyclically send data that does not require high-speed transmission in a batch mode, separately from the normal cyclic transmission (LB/LW). High-speed transmission can be achieved by efficiently dividing the data to transmit into 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 (h/min/s)
3) "System times" which transmits at the designated time (year/month/day/h/min/s) (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)
(See 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. (See Section 7.5, "Starting Up the Interrupt Sequence Program.")



(4) Expanded RAS functions (See Section 3.2.2, "RAS function.")

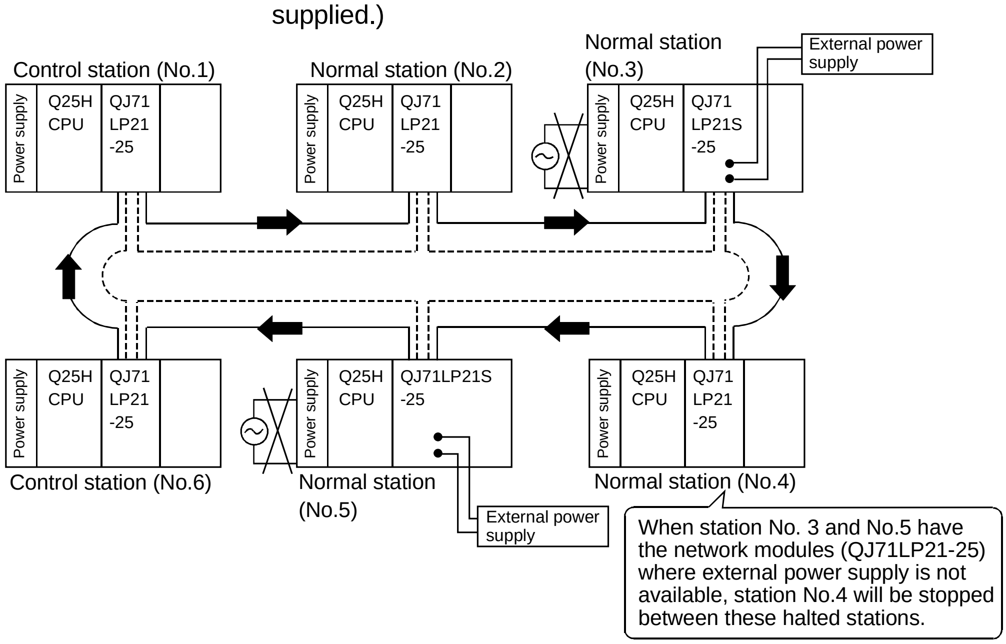
(a) By using the control station switch function, if the control station of the network is down, a normal station is substituted for the control station, enabling to continue the network communication.

(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 network stop time can be reduced because a control station that was down can return to the network as a normal station by means of the automatic return control.

(d) By using the loopback function (the optical loop system), it is possible to continue data transmission among operational stations by disconnecting faulty areas such as a part of the network where there is a cable disconnection, a faulty station, etc.

(e) When two or more stations are faulty and halted in the 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), 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 PLC CPU (simple dual-structured network). (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

(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.

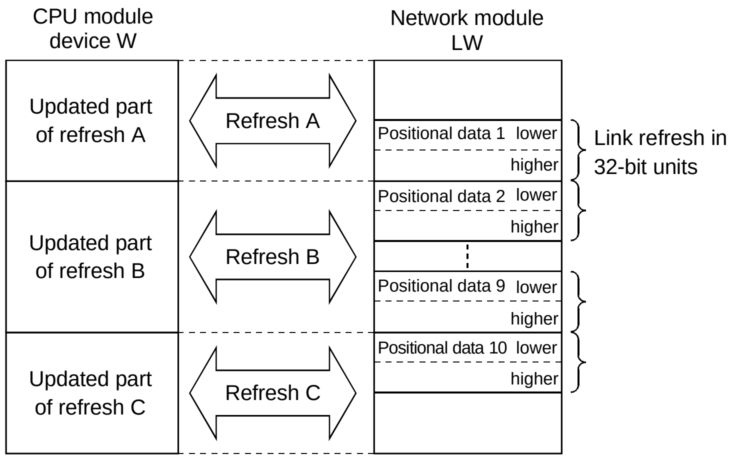
REMARK

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

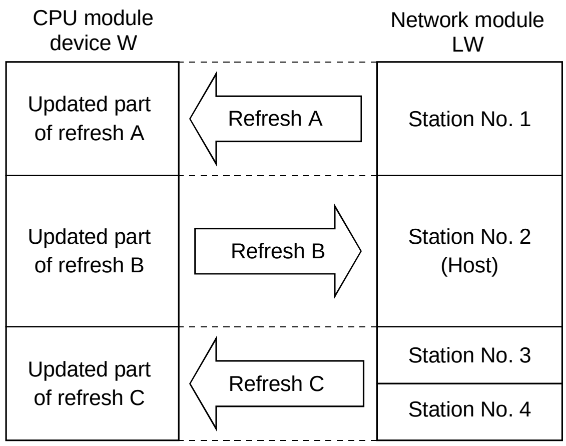
If the network module has become faulty, the RAS functions may not be activated depending on the fault.

(5) Enhancement and compatibility of the network functions

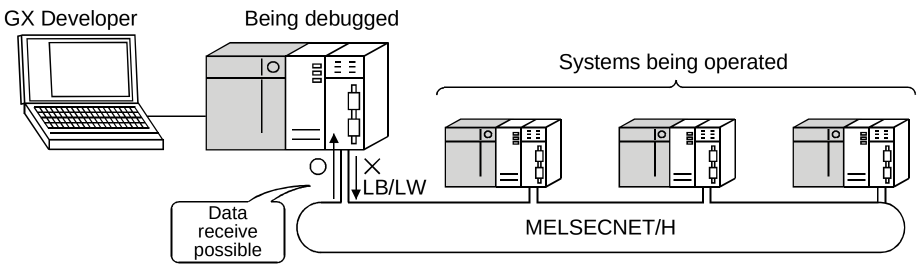
(a) Because of the 32-bit data guarantee, data with double word precision (32 bits) can be guaranteed without an interlock.
(See Section 6.2.1, "32-bit data guarantee.")



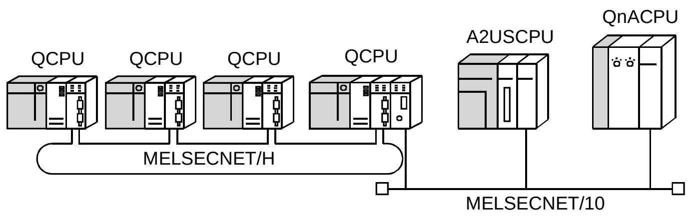
(b) Through the block guarantee of cyclic data per station, it is possible to manipulate multiple word data without interlocks.
(See Section 6.2.2, "Block guarantee of cyclic data per station.")



(c) In the network debug mode, the network functions of user programs can be tested in the online environment without affecting systems being operated.
(See 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 PLC network system.
To use the MELSECNET/H in the MELSECNET/10 mode (functional compatibility and performance compatibility mode), please see the QnA/Q4AR Corresponding MELSECNET/10 Network System Reference Manual.

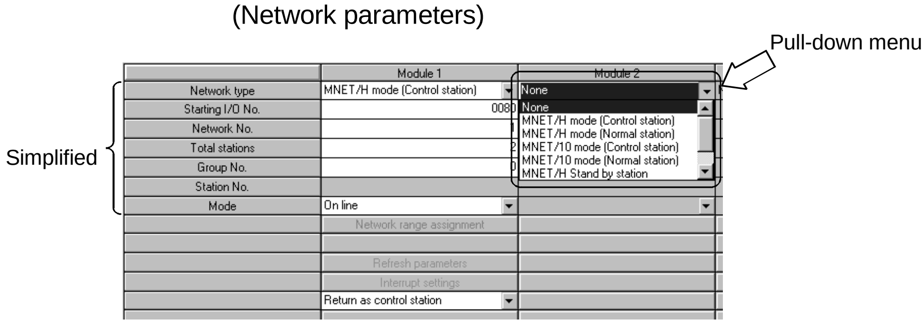


(6) Increased ease of network configuration in combination with GX Developer

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

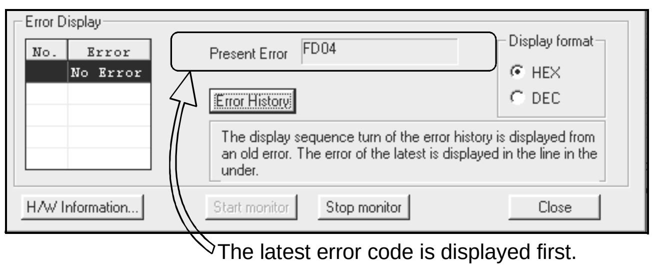
(b) The settings of network Nos., group numbers and operation modes have been simplified so that these values can be designated only through software settings.

(Network parameters)

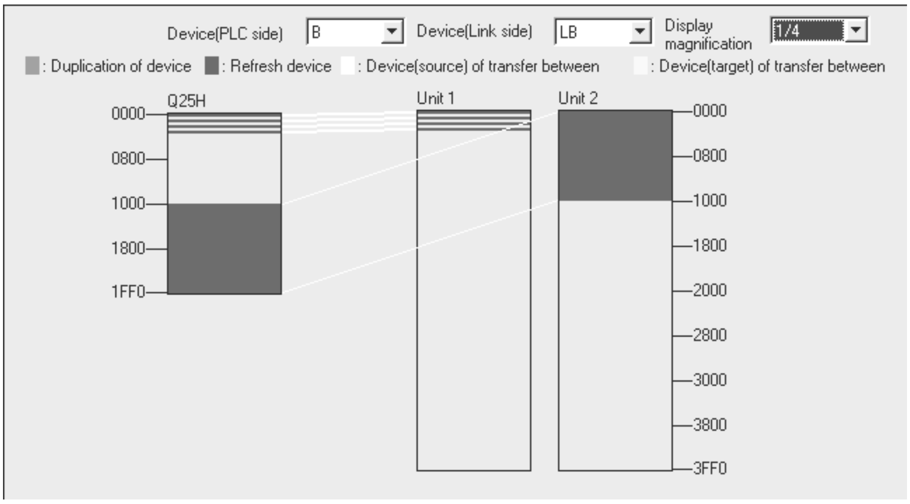


(c) Troubleshooting process has been simplified through system monitoring.

(System monitor/error code display)



(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].

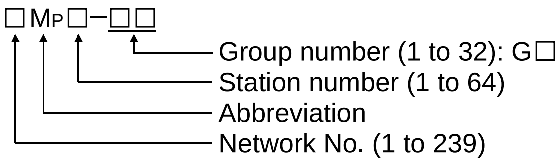


1.3 Abbreviations Used in the Text, Tables and Diagrams of This Manual

(1) Abbreviation

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

(2) Symbol format



[Example]

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

2 SYSTEM CONFIGURATION

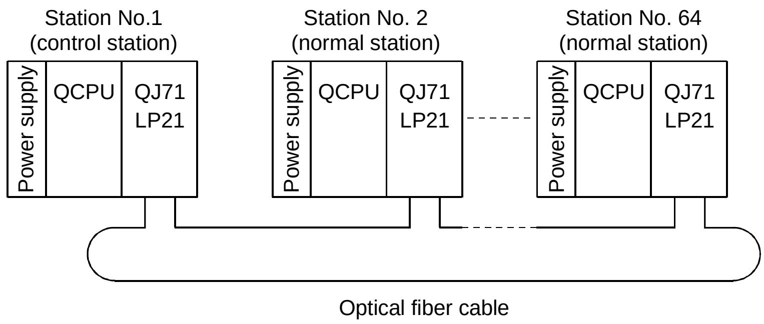
This chapter explains different system configurations that are available with the MELSECNET/H.

2.1 Single Network System

A single network system is one system that connects the control station and the normal stations with an optical fiber cable or a coaxial cable.

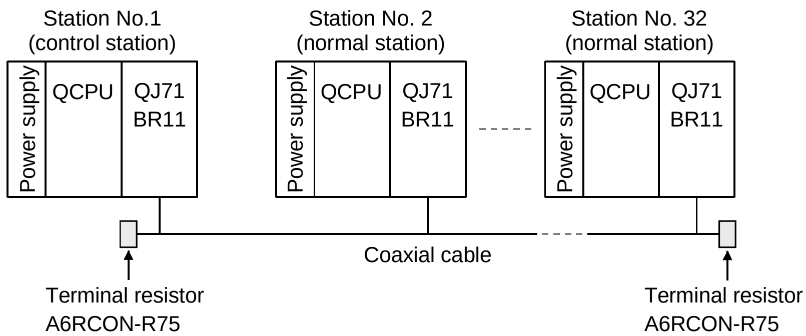
2.1.1 Optical loop system

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. However, only one station can be set as the control station per system.
In the following sample system, station number 1 has been assigned as the control station.



2.1.2 Coaxial bus system

In the coaxial bus system, 1 control station and 31 normal stations (a total of 32 stations) can be connected. As in the optical loop system, any station number can be assigned as the control station. However, only 1 station can be assigned as the control station per system.



2.1.3 Setting items

Table 2.1 lists the setting items for the network module main body of both the control station (M_P) and the normal stations (N_S) as well as the parameter setting items with GX Developer.

2

Table 2.1 Settings by the station type

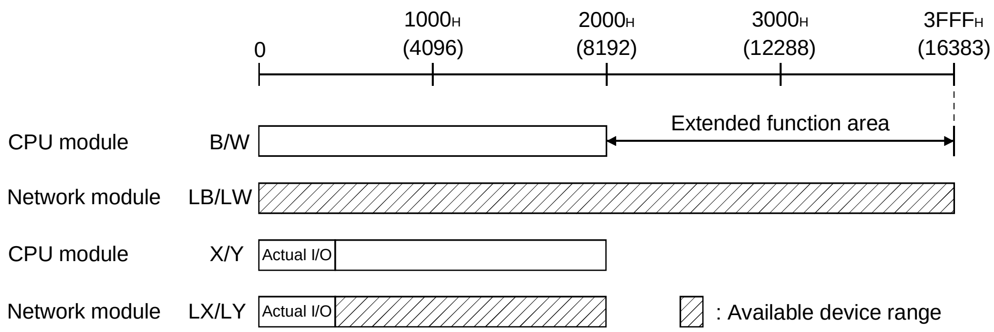
Setting item \ Station type	Control station	Normal station	Reference section
Network module main body switches			Section 4.2
STATION No.	●	●	
MODE	●	●	
Parameter settings			Chapter 5
Setting the number of MELSECNET/H Ethernet cards			Section 5.1
Network type	MELSECNET/H control station	MELSECNET/H normal station	Section 5.1.1
Starting I/O No.	●	●	Section 5.1.2
Network No.	●	●	Section 5.1.3
Group No.	△	△	Section 5.1.5
Common parameters	●	×	Section 5.2
Station specific parameters ＊1	△	△	Section 5.4
Refresh parameters	▲	▲	Section 5.5
Valid module number during other station access	△	△	Section 5.1.8
Inter-link data transfer parameters ＊1	×	×	Section 7.2
Routing parameters	×	×	Section 5.9

●: Always set △: Set as needed ▲: Default setting ×: Setting not required
＊1: Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only

2.1.4 Available device range settings

In the MELSECNET/H mode, the following range settings of devices in the network module can be used.

Device	Range setting	Other
LB	0_H to $3FFF_H$ (16384 points)	The extended function area from 2000_H to $3FFF_H$ can also be used with the low-speed cyclic transmission function and the random cyclic transmission function.
LW	0_H to $3FFF_H$ (16384 points)	
LX	0_H to $1FFF_H$ (8192 points)	The available ranges, excluding the device ranges of the input/output modules, should be assigned to each network module.
LY	0_H to $1FFF_H$ (8192 points)	



The above diagram indicates the number of B/W points for the Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU.
The number of B/W points is 2048 for the Q00J/Q00/Q01CPU.

In the MELSECNET/10 mode, the device range for LB/LW is 0_H to $1FFF_H$ (8192 points). The device range for LX/LY is 0_H to $1FFF_H$ (8192 points), the same as in the MELSECNET/H mode.

POINT

When using the entire device range of 16k points, change [Device settings] of [PLC parameters] on the CPU module side, or assign different devices using the refresh parameters.

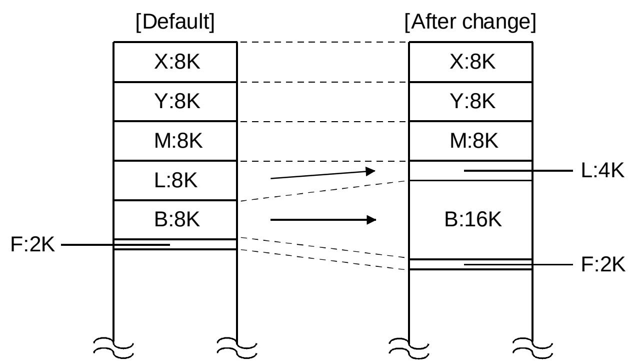
[Example]

To change [Device settings] of [PLC parameters] in order to use all 16k points of the LB and LW device range

Note the following points when assigning device points:

1) The total number of device points is 29k words for the Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU or 16.4k words for the Q00J/Q00/Q01CPU.
2) The total number of bit devices must be 64k bits.

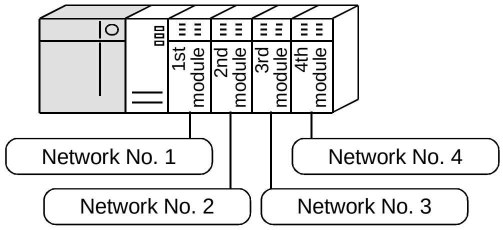
		[Default]	[After change]
Input relay	X	8K	8K
Output relay	Y	8K	8K
Internal relay	M	8K	8K
Latch relay	L	8K	→ 4K
Link relay	B	8K	→ $\boxed{16K}$
Annunciator	F	2K	2K
Link special relay	SB	2K	2K
Edge relay	V	2K	2K
Step relay	S	8K	8K
Timer	T	2K	2K
Retentive timer	ST	0K	0K
Counter	C	1K	1K
Data register	D	12K	→ 4K
Link register	W	8K	→ $\boxed{16K}$
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



2.2 A Network System Containing Multiple Networks (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

The following figure shows a network system in which multiple networks are connected by relay stations.

1) 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.
2) A maximum of four network modules can be installed per PLC.

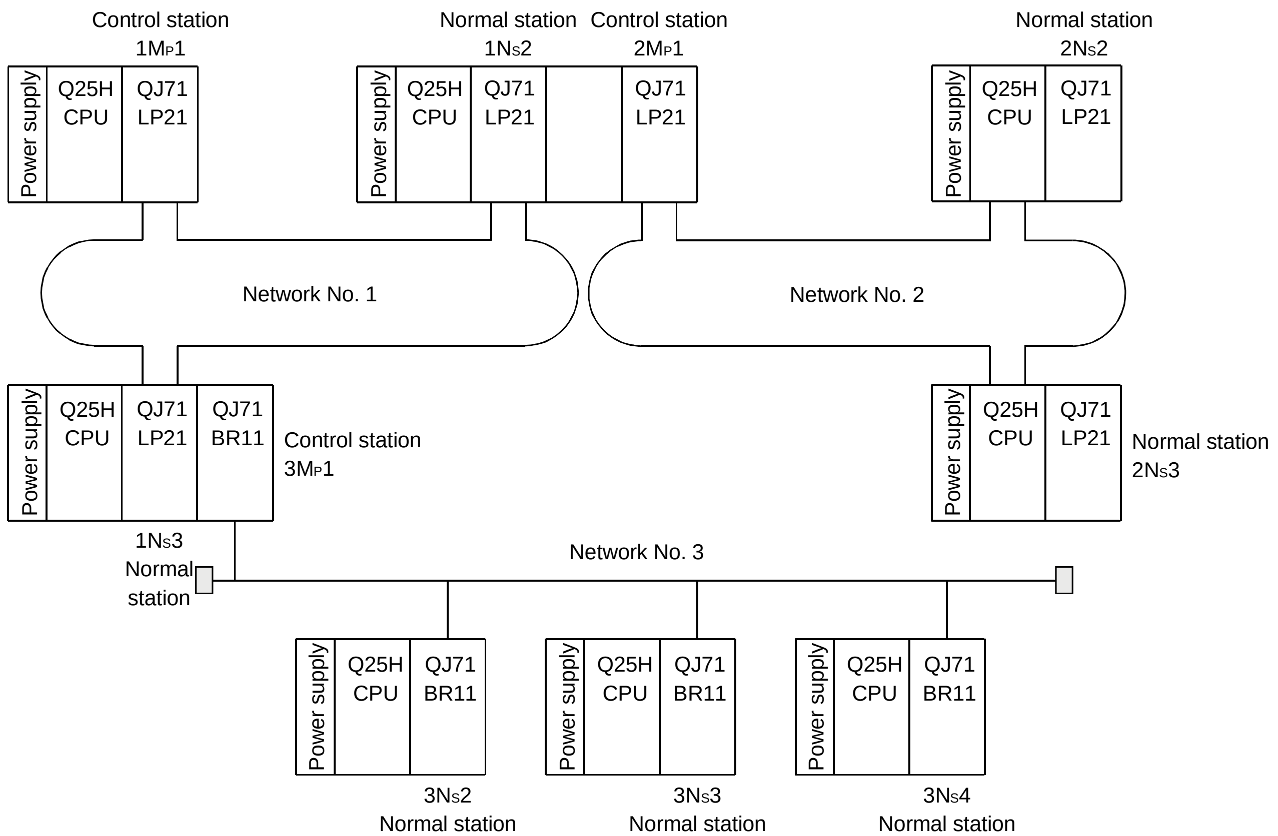


POINT

The Q00J/Q00/Q01CPU accepts one network module.
Hence, when using the Q00J/Q00/Q01CPU on a relay station, you cannot configure multiple network systems using MELSECNET/H.

2.2.1 Configuration

The following example shows how three networks can be connected.



2.2.2 Setting items

Table 2.2 lists the setting items for the network module main body of both the control station (MP) and the normal stations (NS) as well as the parameter setting items with GX Developer.
The difference from a single network system is that the inter-link data transfer parameters and routing parameters for controlling among networks can be set as needed.

Table 2.2 Settings by the station type

Setting item \ Station type	Control station (Mp)	Normal station (Ns)	Reference section
Network module main body switches			Section 4.2
STATION No.	●	●	
MODE	●	●	
Parameter settings			Chapter 5
Setting the number of MELSECNET/H Ethernet cards			Section 5.1
Network type	MELSECNET/H control station	MELSECNET/H normal station	Section 5.1
Starting I/O No.	●	●	Section 5.2.1
Network No.	●	●	Section 5.2.2
Group No.	△	△	Section 5.2.4
Common parameters	●	×	Section 5.3
Station inherent parameters	△	△	Section 5.6
Refresh parameters	▲	▲	Section 5.7
Valid module number during other station access	△	△	Section 5.8
Inter-link data transfer parameters	△	△	Section 7.2
Routing parameters	△	△	Section 7.4.2

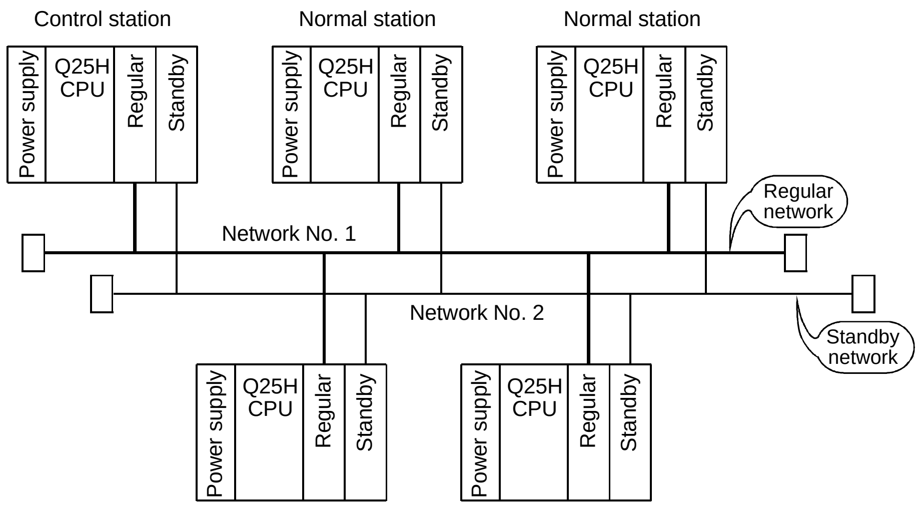
●: Always set △: Set as needed ▲: Default setting ×: Setting not required

2.2.3 Available device range settings

The same device range settings as in a single network system (see Section 2.1.4) can be used.

2.3 Simple Dual-Structured System (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

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 more details, see Section 7.7.



POINT

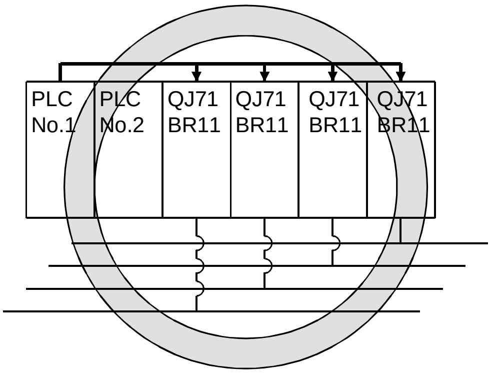
The Q00J/Q00/Q01CPU accepts one network module.
Hence, you cannot configure a simple dual-structured system.

2.4. When using multipul PLC systems

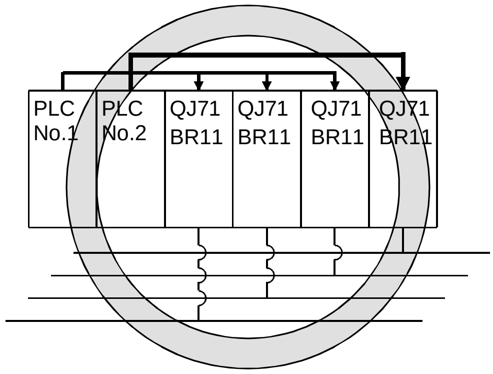
Pay precaution to the following points when structuring a MELSECNET/H network system with a multipul PLC system.

(1) Use function version B for the network modules.
(2) Set the network parameters in the control PLC by the network modules.
(3) A maximum of four network modules can be set for each control PLC module. However, a total of four network modules that can be mounted onto the multipul PLC system can be set up.

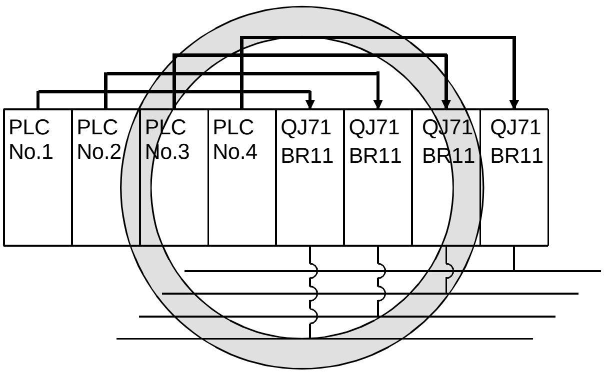
(a) The PLC No.1 controls all network modules



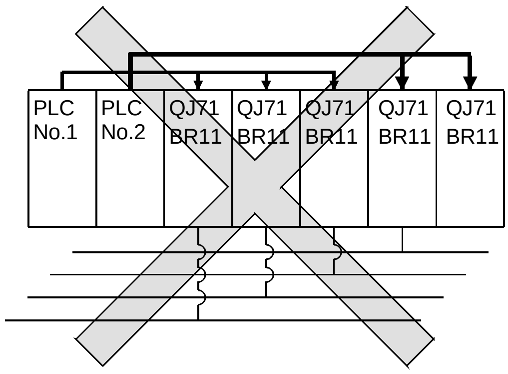
(b) The PLC No.1 and PLC No.2 control each network module



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



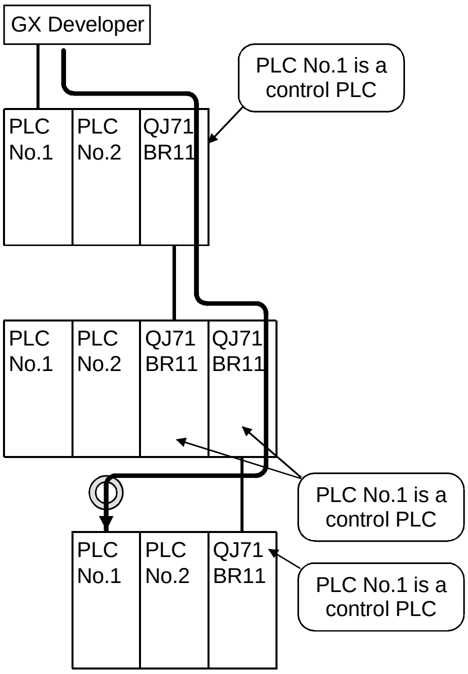
(d) A maximum of four modules that can be mounted onto network modules can be set on the system



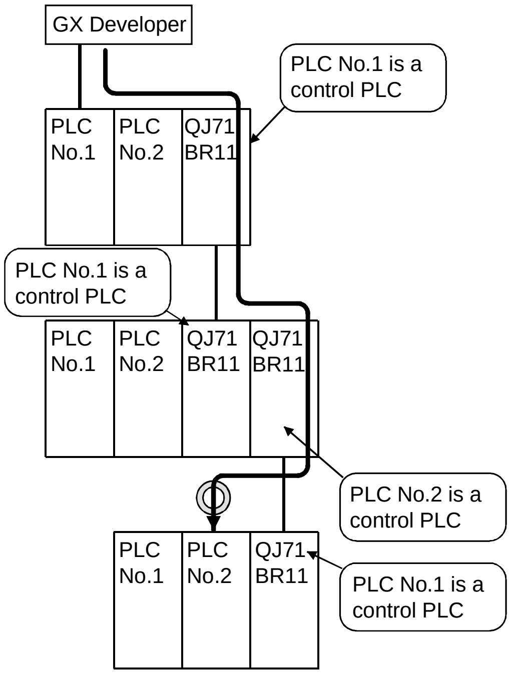
✻ The number of modules mounted is one too many

(4) When connecting the GX Developer to a CPU module and accessing other stations, it is possible for the GX Developer to access eight network systems with either control PLC by relay stations on the multipul PLC system or non-control PLC.
(Refer to Routine Functions in section 7.5.2.)
It is also possible for the GX Developer to carry out access with either control PLC or non-control PLC if the relevant station is a multipul PLC system.

(a) Relaying is possible if the relay station's control PLC is the same

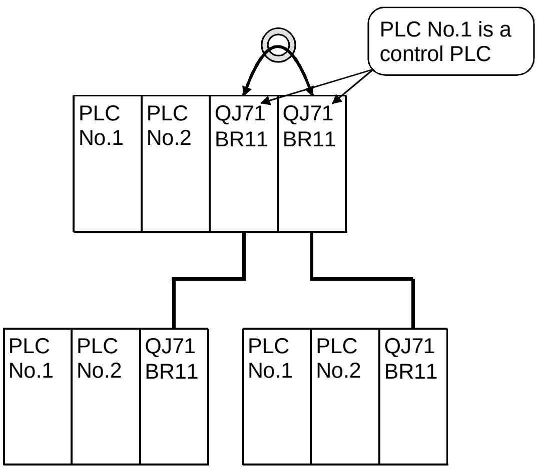


(b) Relaying is also possible if the relay station's control PLC is different

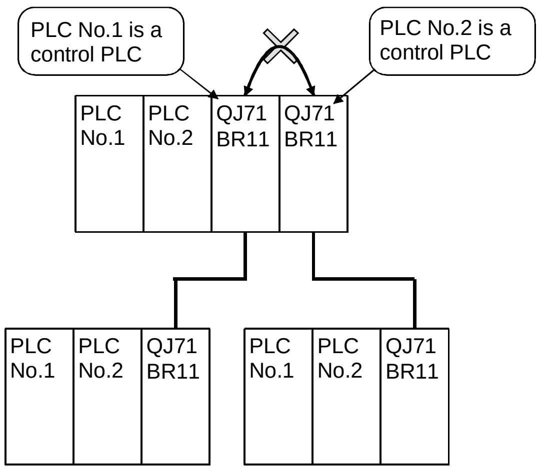


(5) Data transmission with transmission parameters between data links is not possible if the network module control PLC that exist on the multipul PLC system are different.
Transmit data with sequence programs when sending data to other networks.

(a) Transmission between data links possible



(b) Transmission between data links not possible



2.5 Using the Q00J/Q00/Q01CPU

Note the following points when using the Q00J/Q00/Q01CPU to configure a MELSECNET/H network system.

(1) The Q00J/Q00/Q01CPU accepts only one network module.

(2) The Q00J/Q00/Q01CPU is incompatible with some items of the functions and performance of the MELSECNET/H network (PLC to PLC network).
The corresponding items are listed below.

Item		Compatibility
Cyclic transmission function		○
	Refresh parameters	△ (Restriction 1))
	Common parameters	△ (Restriction 2))
	Station inherent parameters	×
	Inter-link data transfer parameters	×
	Routing parameters	△ (Restriction 3))
	I/O master station designation	○
	Reserved station designation	○
Automatic return function		○
Control station switch function		○
Control station return control function		○
Loopback function		○
Station detach function		○
Transient transmission enabled even at CPU module error		○
Checking transient transmission abnormal detection time		○
Diagnostic function		○
Inter-link data transfer function		×
Low-speed cyclic transmission function		×
Routing function		△ (Restriction 3))
Group function		○
Message sending function using logical channel numbers		○
Dedicated link instructions		—
	Data sending/receiving (SEND/RECV)	○
	Other station word device read/write (READ/SREAD/WRITE/SWRITE)	△ (Restriction 4))
	Other station transient request (REQ)	○
	Other station word device read/write (ZNRD/ZNWR)	○
	Remote RUN/Remote STOP (RRUN/RSTOP)	○
	Reading and writing other station CPU module's clock data (RTMRD/RTMWR)	○
Time setting to stations on a network using GX Developer		○
Starting interrupt sequence program (RECVS) Interrupt setting parameters		○*1
Multiplex transmission function		○
Simple dual-structured network (standby station-compatible module)		×

○: Compatible, △: Compatible with restriction, ×: Incompatible
*1: The Q00J/Q00/Q01CPU of function version B or later is compatible.

(Continued to next page)

(Continued from previous page)

Item	Compatibility
Network test	○
Increasing number of send points by installing multiple modules with the same network number	×
Network diagnostic	○

○: Compatible, △: Compatible with restriction, ×: Incompatible

(3) The Q00J/Q00/Q01CPU has restrictions on some items of the functions and performance of the MELSECNET/H network (PLC to PLC network).
The corresponding items are listed below.

No.	Item	Q00J/Q00/Q01CPU	Q02/Q02H/Q06H/ Q12H/Q25H/ Q12PH/Q25PHCPU
Restriction 1)	Number of set refresh parameters	8	64
Restriction 2)	Common parameter setting item	Low-speed LB/LW setting cannot be made.	Low-speed LB/LW setting can be made.
Restriction 3)	Number of set routing parameters	8	64
Restriction 4)	Designation of read/write notification device in SREAD/SWRITE instruction	Invalid (Executing the instruction performs the same operation as that of the READ/WRITE instruction.)	Valid

2.6. Precautions with the system configuration

The handling methods when accessing other stations from function version B MELSECNET/H network modules with special link instructions are different depending on the target station's module.
The handling methods for each target station's module are explained below.v

(1) Special link instructions amended with function version B

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

Request issued by	Request sent to				
MELSECNET/H network modules function version B	MELSECNET/H network modules		MELSECNET/10 network modules	Ethernet modules	
	Function version B	Function version A		Function version B	Function version A
480 words or less	○	○	○	○	○
481 to 960 words	○	△*1	×	△*1	△*2

○ : Processed normally
× : Ends abnormally. Error code returned to the requester.
△*1 : The SEND instruction ends abnormally. Error code returned to the requester.
The READ, SREAD, WRITE and SWRITE instructions are processed normally.
△*2 : The operations for the SEND instruction are different. (Error support available F7C3H)
The READ, SREAD, WRITE and SWRITE instructions are processed normally.

(2) Instructions added with function version B

Request issued by	Request sent to				
MELSECNET/H network modules function version B	MELSECNET/H network modules		MELSECNET/10 network modules	Ethernet modules	
	Function version B	Function version A		Function version B	Function version A
RRUN, RSTOP RTMRD, RTMWR	○	○	×	—	—

○ : Processed normally
× : Ends abnormally. Error code returned to the requester.
— : Cannot be used. Use the REQ instruction.

2.7. Added and amended functions with function version B

The following functions have been added or amended for network modules with function version B.

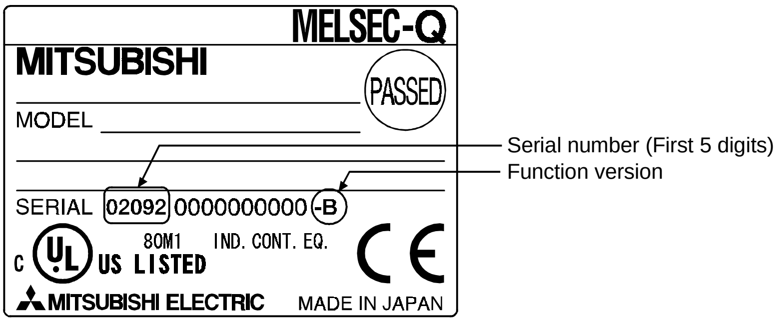
(1) Added functions

Function	Description
Multipul PLC system support	Supports multipul PLC systems
Special link instructions added (four instructions)	RRUN instruction (remote RUN instruction) RSTOP instruction (remote stop instruction) RTMRD instruction (instruction for reading clock data from other stations) RTMWR instruction (instruction for writing clock data in other stations)

(2) Amended functions

Function	Description
960 word support with the special link instructions	Special link instruction data lengths extended from 480 words to 960 words. Object Special instructions: SEND RECV, RECVS, READ, SREAD, WRITE, SWRITE

Check the network module's function version on the name plate adhering to the surface of the network module.



The function version for network modules can also be confirmed with the GX Developer's system monitor. Refer to section 8.3.

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 on the general specifications, see the User's Manual of the CPU module used in the network system.

3.1 Performance Specifications

3.1.1 Performance specifications of the QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21G, QJ71LP21GE and QJ71BR11 network modules

3

Table 3.1 lists the performance specifications of the network modules.

Table 3.1 Performance specifications of the network modules

Item		Optical loop system			
		QJ71LP21	QJ71LP21-25	QJ71LP21S-25	QJ71LP21G
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		((LY + LB) / 8 + (2 × LW)) ≦ 2000 bytes			
Communication speed		10 Mbps	25 Mbps/10 Mbps (Change with MODE switch)		10 Mbps
Number of stations connected in one network		Up to 64 stations (1 control station, 63 normal stations)			
Connection cable		Optical fiber cable *1			
Total extension distance		30km			
Distance between stations	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-PCE optical cables: 1km QSI optical cables: 1km			GI-50/125 optical cables: 2km
Maximum number of networks		239 (total including remote I/O networks)			
Maximum number of groups		32 (9 in the NET/10 mode)			
Transmission path format		Double 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			
Occupied I/O points		32 (Intelligent function module: 32)		48 (I/O Allocation: vacant; first 16, intelli.; last 32)*2	32 (Intelligent function module: 32)
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	—		42 to 50 N. cm	—
Special cyclic transmission function		• Low-speed cyclic transmission function			
Current consumed internally with 5VDC		0.55 A			
Weight		0.11 kg		0.20 kg	0.11 kg

＊1 For old optical fiber cables (A-2P-□), L type differs from H type in the distance between stations. See Section 4.6.1 for details.
＊2 Two I/O slots will be occupied. Add 10H to the I/O number of the module-placed slot and enter the value into the field of Start I/I No. of the network parameters.
(Example) When the module is placed in slot 0, enter 10H into the field of Start I/O No.

3

Table 3.1 Performance specifications of the network modules (continued)

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		((LY + LB) / 8 + (2 × LW)) ≦ 2000 bytes	
Communication speed		10 Mbps	
Number of stations connected in one network		Up to 32 stations (1 control station, 31 normal stations)	
Connection cable		Coaxial cable	
Total extension distance for one network (distance between stations)		3C-2V	300m (300m between stations) ＊3
		5C-2V	500m (500m between stations) ＊3
		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 NET/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	
I/O occupied points		32 points (intelligent function modules: 32 points)	
Current consumed internally with 5 V DC		0.75A	
Weight		0.11kg	

＊3 Certain restrictions exist in cable length between stations depending on the number of stations connected. Refer to section 4.6.2 for further details.

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. Confirm that the cable in use conforms to the details of the optical fiber cable specifications.
The optical fiber cable and connector are specially-designed products. Optical fiber cables complete with connectors are sold my Mitsubishi Electric System Services Corp (a catalogue on optical cables is available.)
These cables are also used for laying work, and details can be obtained from your nearest Mitsubishi Electric System Services Corp.

Table 3.2 Optical fiber cable specifications

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 conformance)					

REMARK

(1) The following types of optical cable are available.
A-type: Internal control panel connection cable
B-type: Indoor inter-control panel connection cable
C-type: Outdoor connection cable
D-type: Reinforced outdoor connection cable
Special cables for mobile use and that can withstand heat, etc., are also available. Contact your nearest Mitsubishi Electric System Services Corp. for further details.

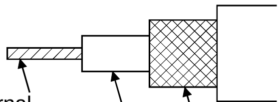
3.1.3 Coaxial cable specifications

The following table lists the specifications of the coaxial cables used for the coaxial bus system.
The high frequency coaxial cable "3C-2V" or "5C-2V" (conforms to JIS 3501) is used.

(1) Coaxial cable specifications

The specifications of the coaxial cable are shown in Table 3.3.

Table 3.3 Coaxial cable specifications

Item	3C-2V	5C-2V
Structure		
Cable diameter	5.4 mm (0.21 in.)	7.4 mm (0.29 in.)
Minimum allowable bend radius	22 mm (0.87 in.) or more	30 mm (1.18 in.) or more
Internal conductor diameter	0.5 mm (0.02 in.) (annealed copper wire)	0.8 mm (0.03 in.) (annealed copper wire)
Insulating material diameter	3.1 mm (0.12 in.) (polyethylene)	4.9 mm (0.19 in.) (polyethylene)
External conductor diameter	3.8 mm (0.15 in.) (single annealed copper wire mesh)	6.6 mm (0.26 in.) (single annealed copper wire mesh)
Applicable connector plug	3C-2V connector plug (BNC-P-3-Ni-CAU is recommended.)	5C-2V connector plug (BNC-P-5-Ni-CAU is recommended.)

REMARK

Consult the nearest Mitsubishi representative with connector plugs.

(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.

⚠CAUTION	• Solder the coaxial cable connectors properly. Insufficient soldering may result in malfunctions.

(1) Structure of the BNC connector and coaxial cable

The structure of the BNC connector and coaxial cable are shown in Figure 3.1.

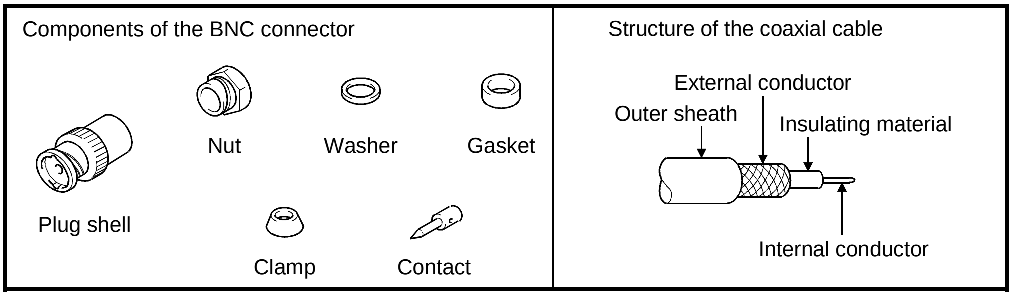
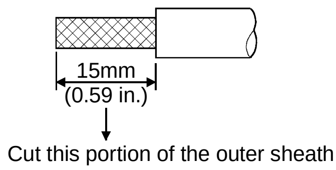


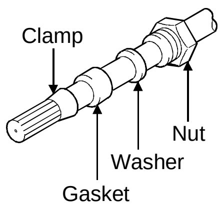
Figure 3.1 Structure of the BNC connector and coaxial cable

(2) How to connect the BNC connector and the coaxial cable

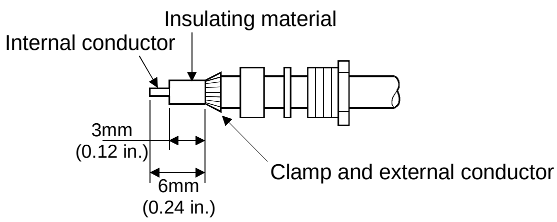
(a) Cut the portion of the outer sheath of the coaxial cable as shown in the diagram below.



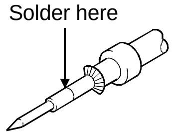
(b) Fit the nut, washer, gasket and clamp onto the coaxial cable, as shown below, and then loosen the external conductor.



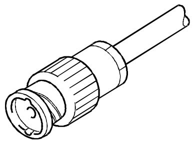
(c) Cut the external conductor, insulating material and internal conductor to the dimensions shown below. Note that the external conductor should be cut to the same dimension as the tapered section of the clamp and smoothed down to the clamp.



(d) Solder the contact to the internal conductor.



(e) Insert the connector assembly shown in (d) into the plug shell and screw the nut into the plug shell.



The following precautions should be observed when soldering the internal conductor and contact:
- Make sure that the solder does not bead up at the soldered section.
- Make sure that there are no gaps between the connector and cable insulating material and that they do not cut into each other.
- Solder as quick as possible so the insulating material does not deform.

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) ······ 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)
  - Time 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
  - Network diagnostic (line 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

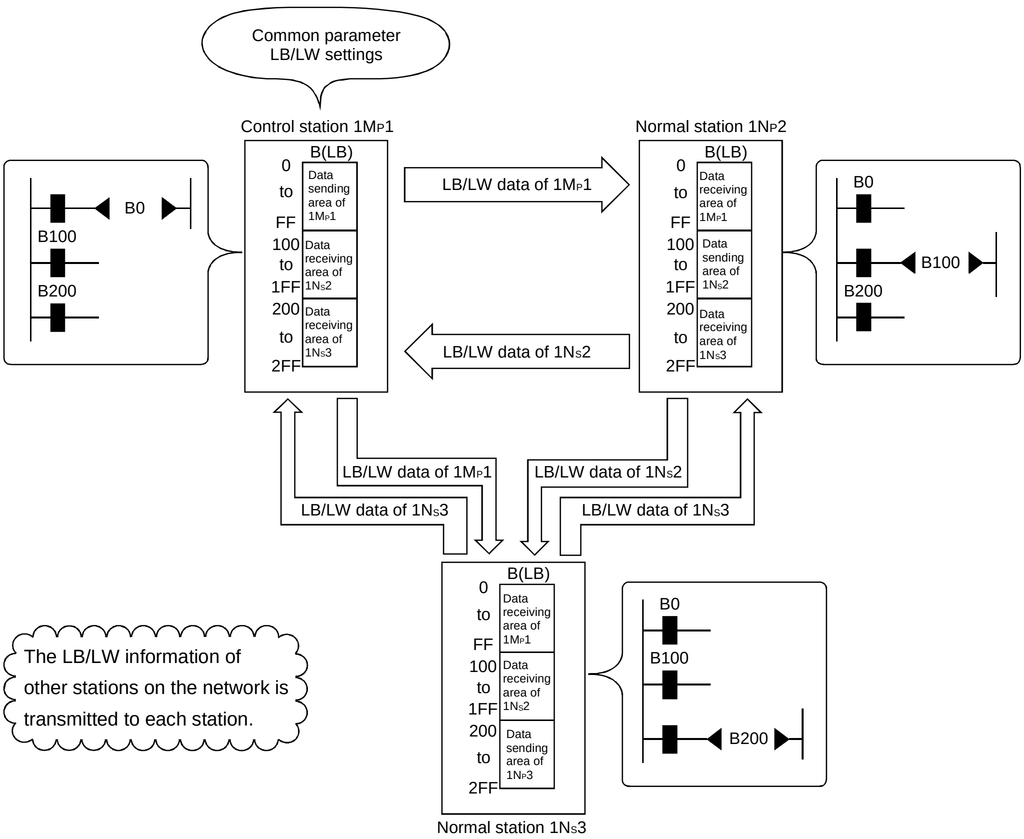
By using this function, it is possible to write data to the link relay (LB) and link register (LW) of the network module and to send the data to all the stations connected within the same network.

(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).

(a) Available device range

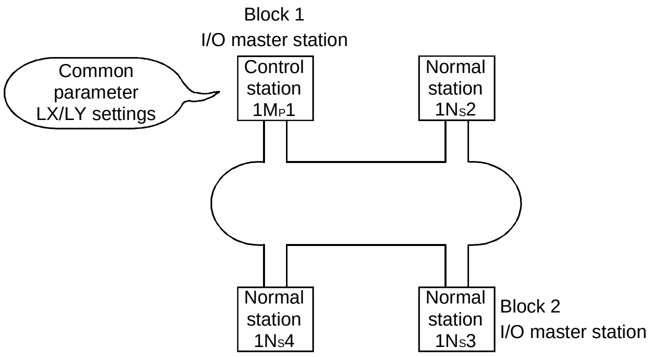
Data communication is performed using the input (X) and output (Y) after the actual I/O of the host.

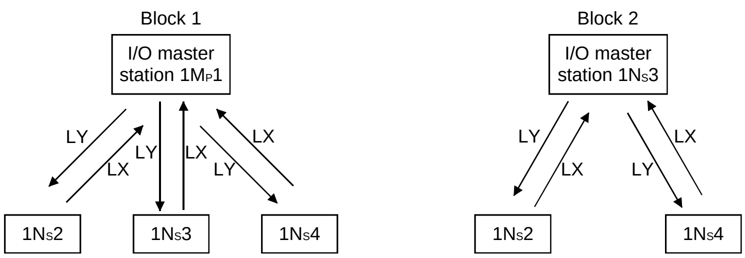
For the assignments of the link devices (LB/LW) in the network, the I/O master station and the valid range for writing data for each station are set on the common parameter LB/LW setting screens (two screens) of the control station. The actual available device range can further be set with the refresh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

(b) Data communication

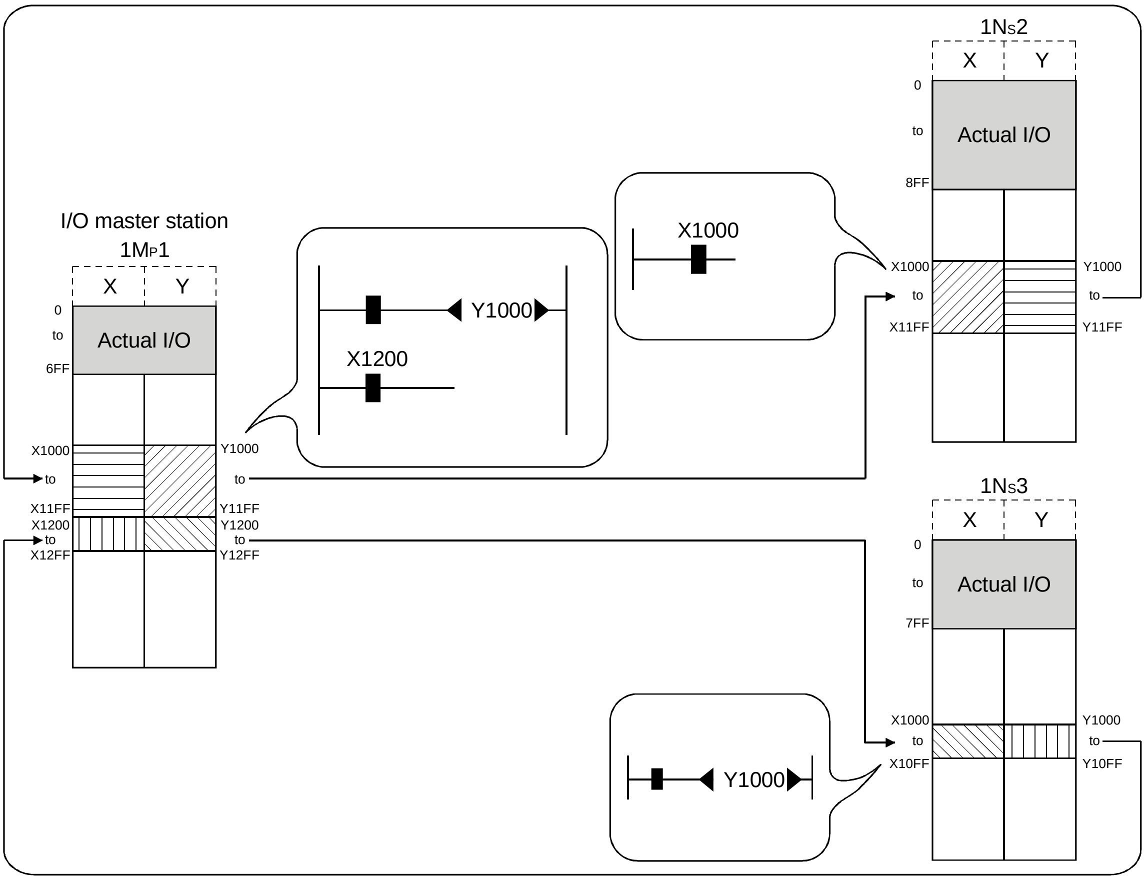
The link input (LX) can send/receive the input information of each station in the block and the link output (LY) can send/receive the output information of the I/O master station.

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.



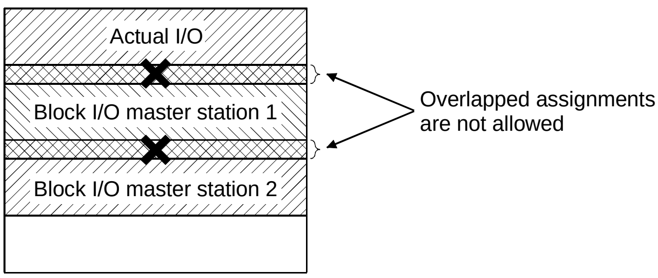


The following diagram shows an example of the LX/LY communication assignments between the 1MP1 station (I/O master station) and the 1NS2 and 1NS3 stations.
When the 1MP1 station turns on Y1000, X1000 of the 1NS2 station turns on.
Also, when the 1NS3 station turns on Y1000, X1200 of the 1MP1 station turns 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 should be set in 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 installing multiple network modules to also set the I/O master station using another network module (MELSECNET/H, CC-Link, etc.).
   • When setting two I/O master stations.

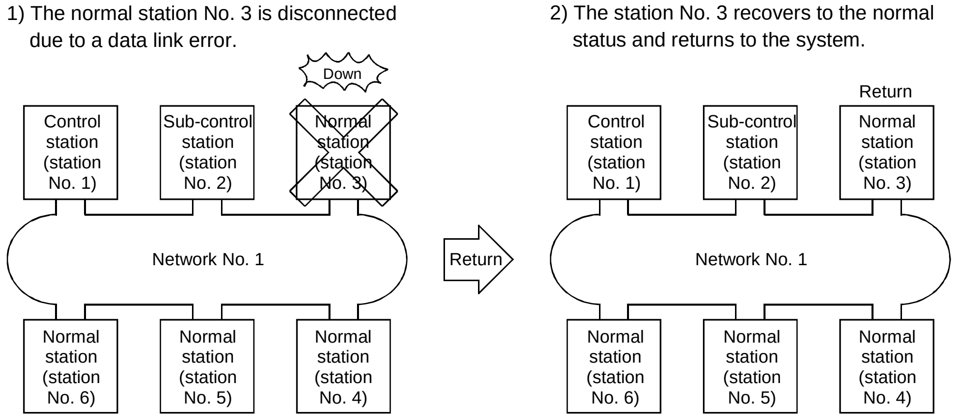


3.2.2 RAS function

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

By using this function, when a station that has been disconnected from the data link due to a data link error returns to the normal status, it automatically returns to the system to resume the data link.

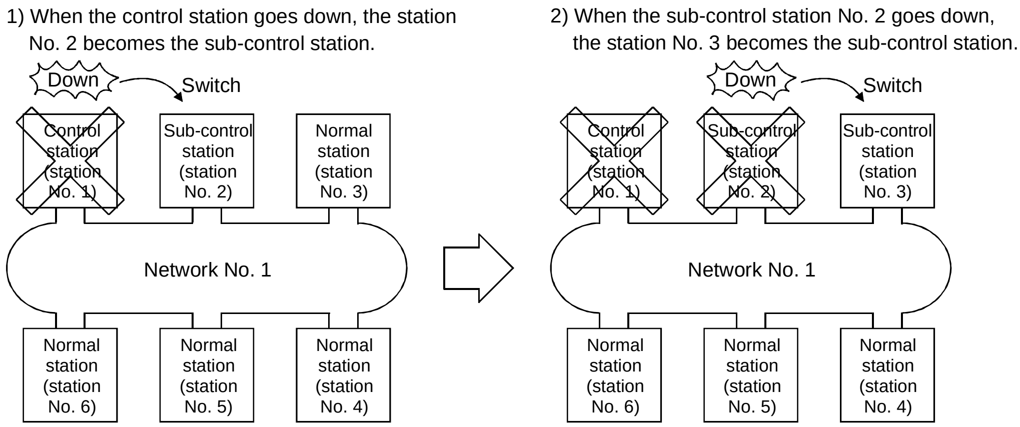


POINT

There is a limit to the number of faulty stations that can return to the system within one link scan. For details, see Section 5.4, "Supplemental 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) This function can be selected with the common parameter supplemental setting, "Data link by sub-control station when control station is down." For more details, see Section 5.4, "Supplemental Settings."

	Selection of function	Handling by network
1	Select	The control is switched to the sub-control station and both cyclic and transient transmissions can be performed.
2	Do not select	Cyclic transmission is discontinued until the control station recovers, but transient communication can still be performed.

(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. (See Section 8.3.2.)

REMARK

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

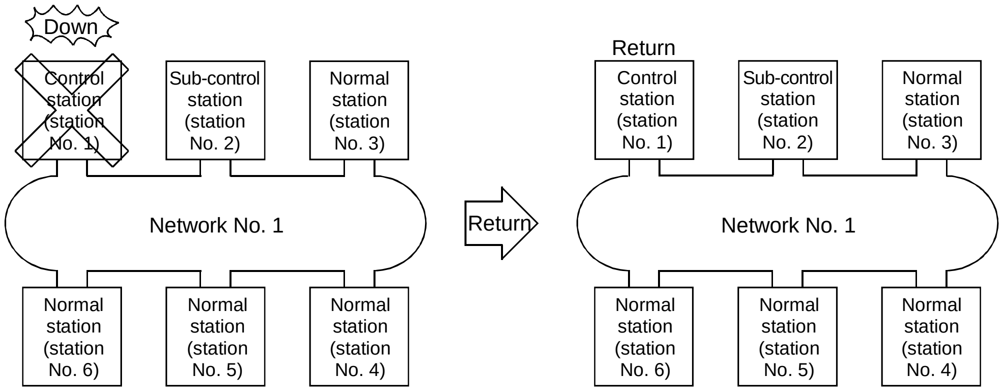
(3) Control station return control function

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 on the network setting, see Section 5.5, "Control Station Return Setting."

	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.



REMARK

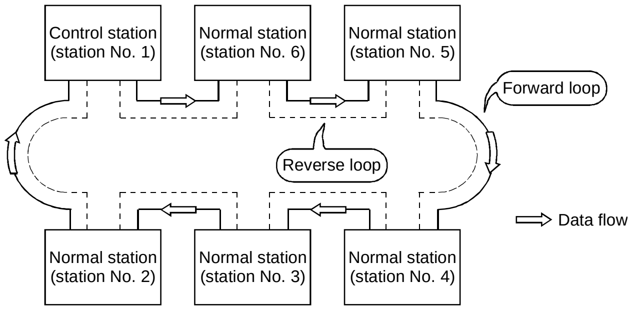
- When "Return as the control station" is selected, the network stop time becomes longer because the baton pass is stopped, but the common parameters can be changed only by resetting the CPU of the control station.
- If "Return as a normal station" is selected, the network does not stop because the control 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

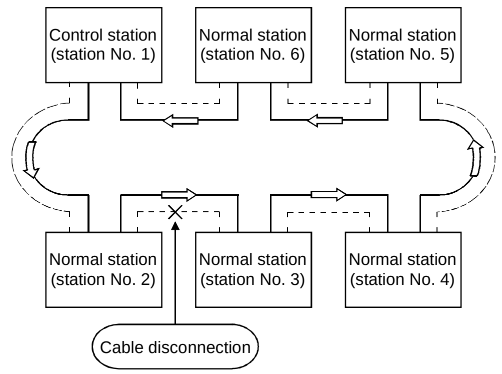
The data link is performed using the forward loop (or the reverse loop).



(b) When abnormal

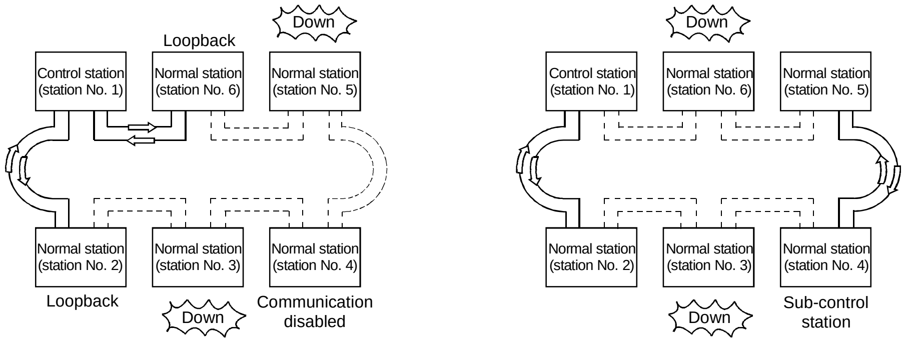
1) Error in the forward loop (reverse loop)

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

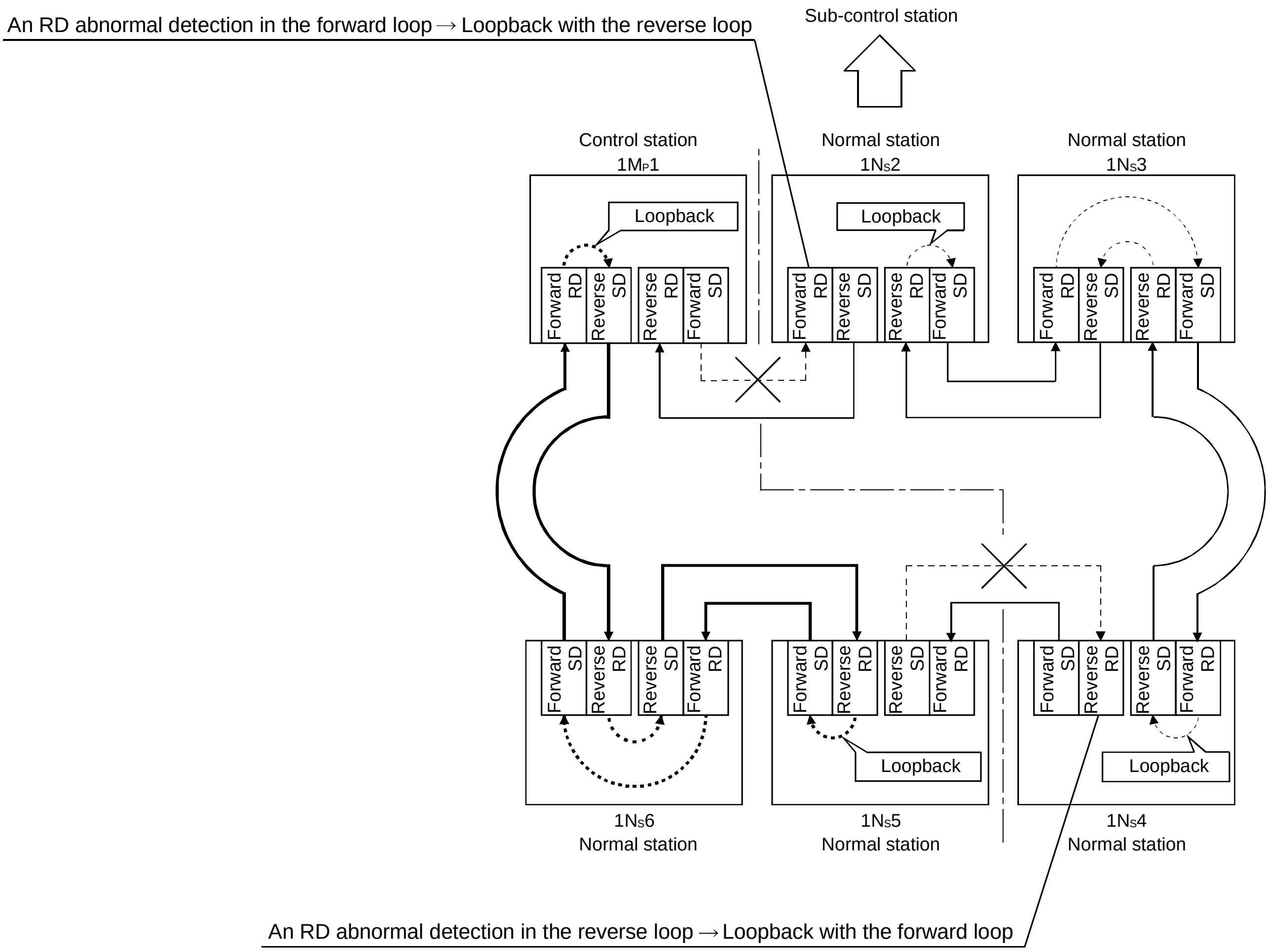
1) When the cable is inserted or removed, the line (forward loop/reverse loop) may be switched, but the data link will be performed normally.

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



REMARK

If the network module has become faulty, a loopback may not be made depending on the fault. In that case, the network may stop. 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.

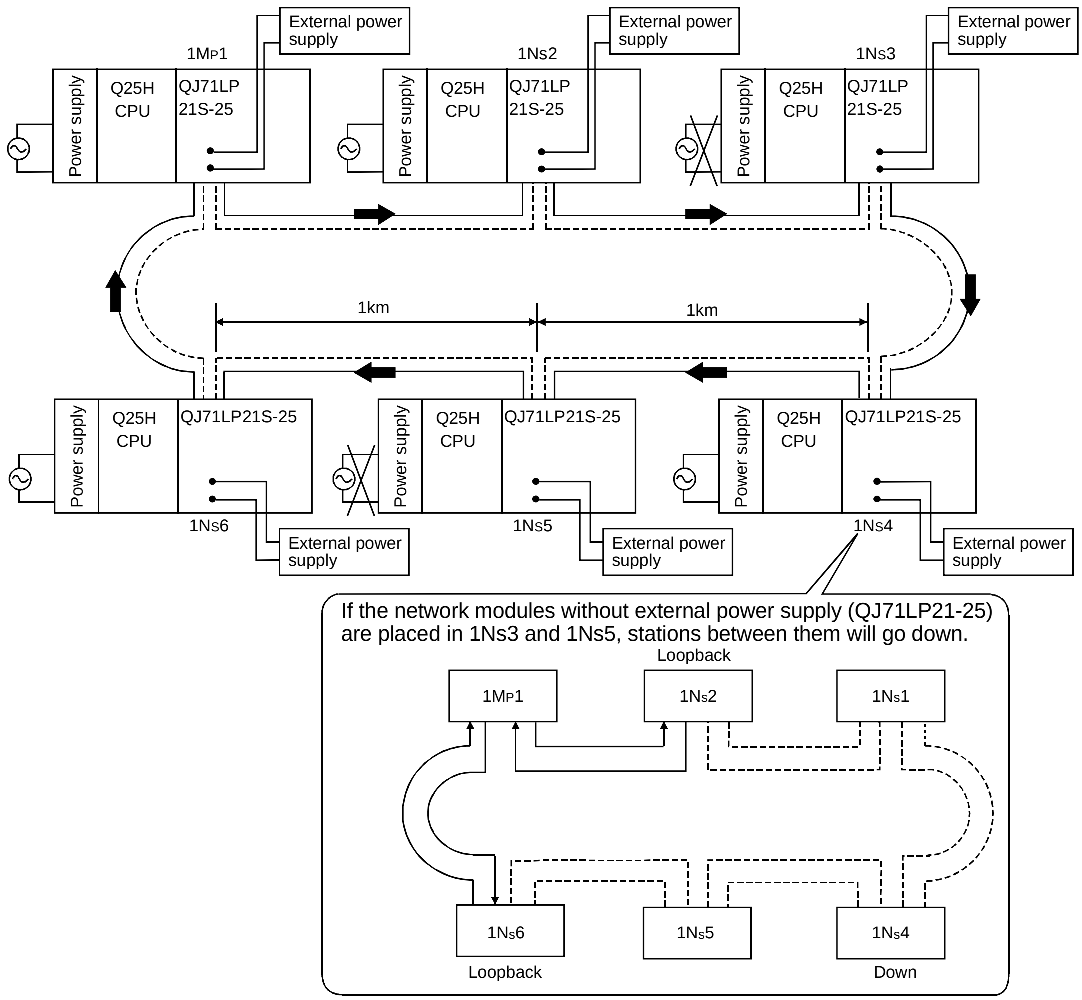
(2) Power off all stations and power them on in order, starting from the control station. At that time, check up to which station the network operates properly.

Change the network module where the fault has been detected, and confirm that the network is restored to normal.

(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



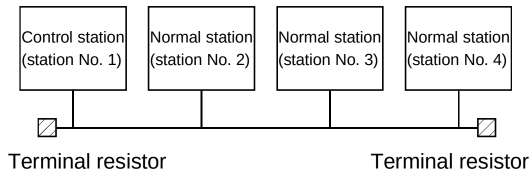
REMARK

Even if the Q25H CPU of the control station is powered OFF, the control station status will not shift to other station as long as the network module functions normally.

(6) Station detach function (coaxial bus system)

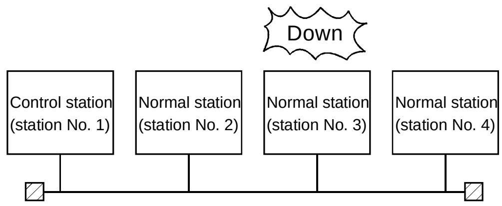
In the coaxial bus system, even if the power to a connected station is turned off, the data link continues between other stations which are still able to perform data communication.

(a) When normal



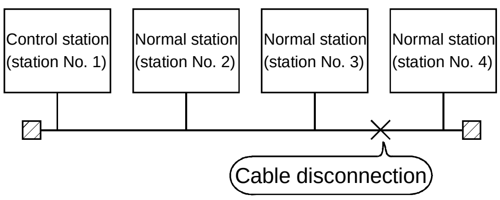
(b) When abnormal

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 terminal resistors.

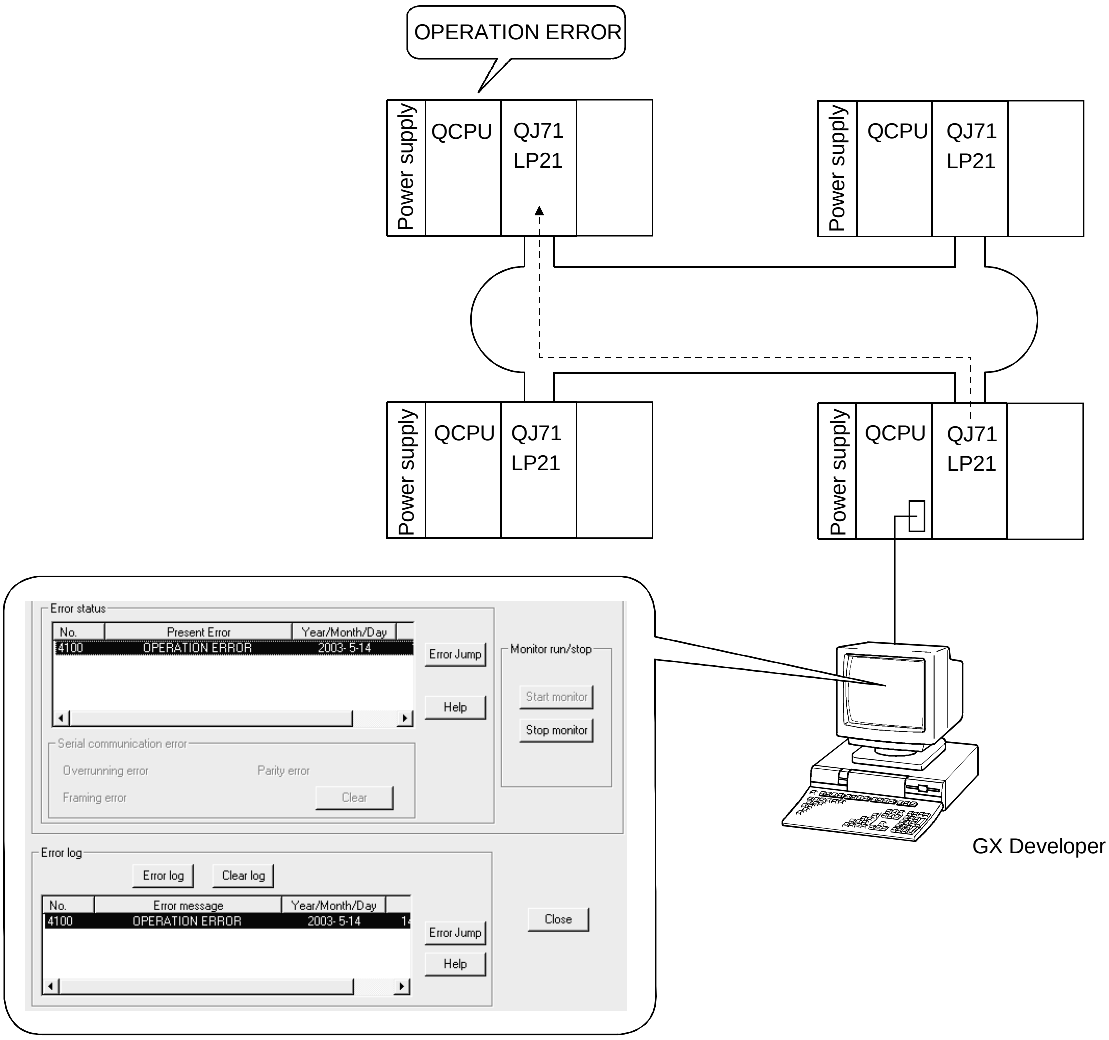


In addition, even if the cable is normal, the data link cannot be performed if a terminal resistor is detached from an F-type connector.

(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.



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

CPU module status	Rank	Cyclic transmission	Transient transmission
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*

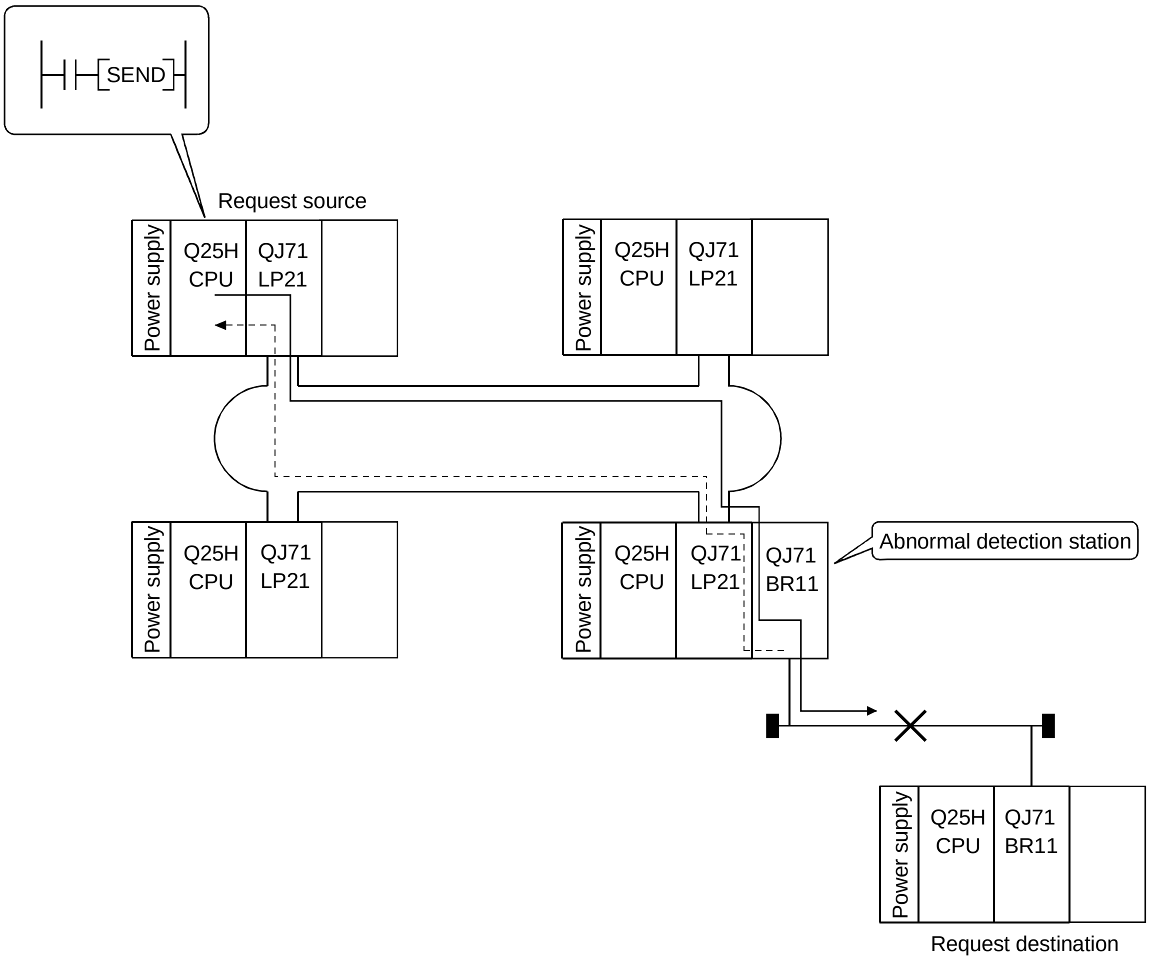
* When the CPU module of the target station is an ACPU.
In case of the QCPU and QnACPU, a MELSECNET/H, MELSECNET/10 error is returned.

(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.

The time log can be used to identify the network problems and to determine how the network can be improved.

For details on these instructions, see 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 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 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.	○	○	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

3.3 Specifications of the Link Data Sending/Receiving Processing Time

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

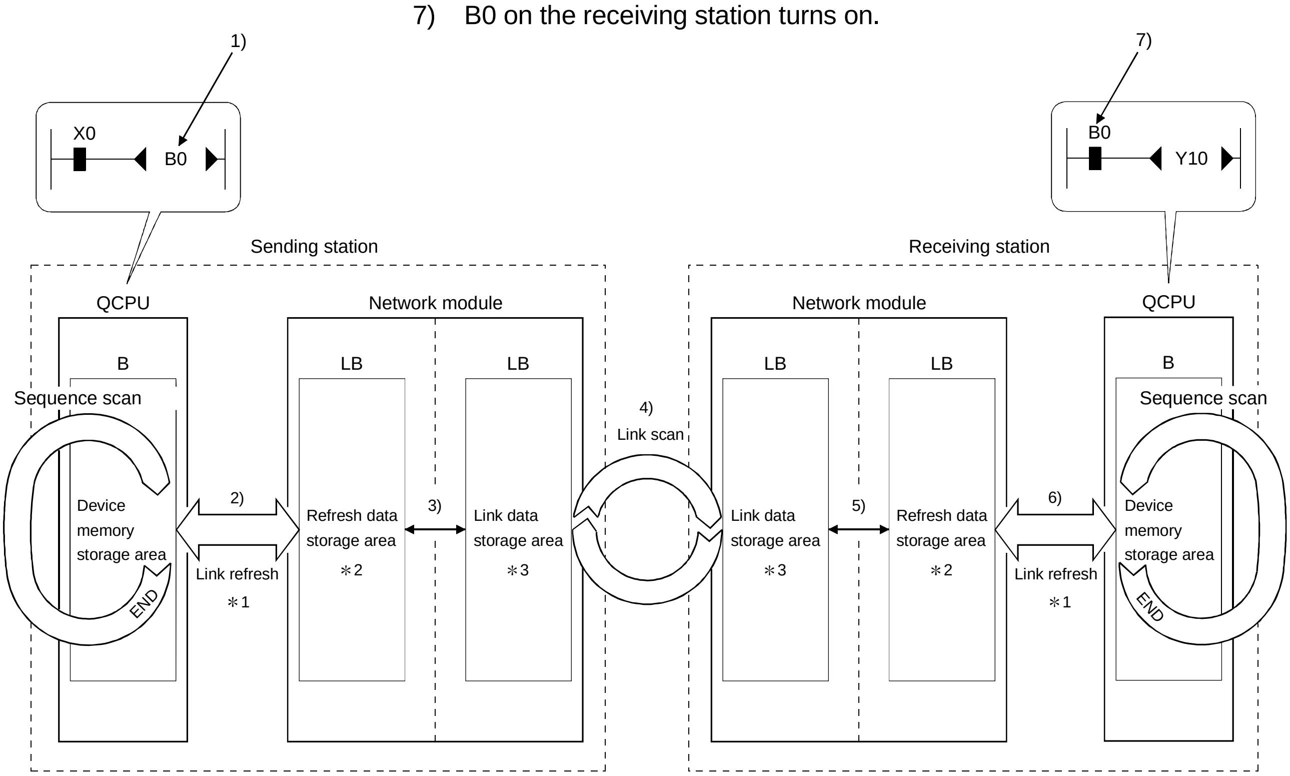
3.3.1 Link data sending/receiving processing

(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.

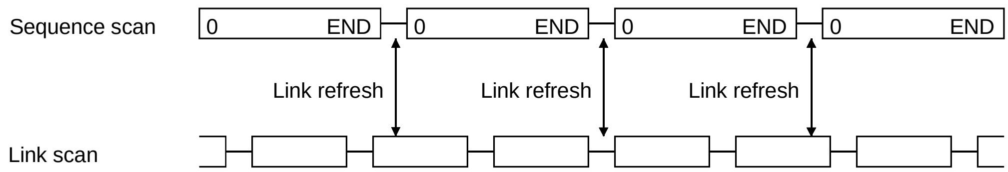


*1: Sets the values with the refresh parameters.
*2: Sets the values with the station inherent parameters. (If the settings are not made, the values of the common parameters are stored as is.)
*3: Sets the values with the common parameters of the control station.

(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.



(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.

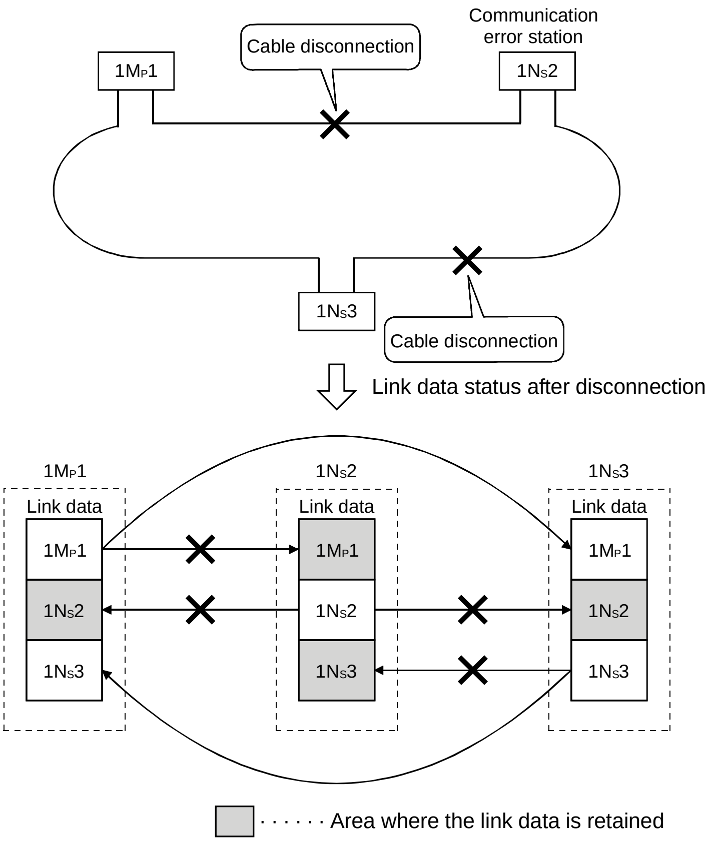
(A "communication stop station" refers to a station whose cyclic transmission has been stopped by a peripheral device.)

(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)

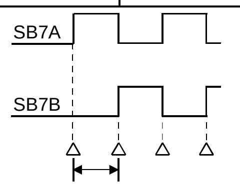
When a communication error has occurred to 1NS2 due to cable disconnection



(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.

Link special relays and registers

Link special relay/link special register	Description	Signal status	
		Off	On
SB20	Shows the status of the network module.	Normal	Abnormal
SB47	Shows the baton pass execution status of the host.	The baton pass is being executed	The baton pass is stopped
SB49	Shows the cyclic transmission status of the host.	Normal	Abnormal
SB70	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
SW70 to 73	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
SB74	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
SW74 to 77	Shows the cyclic transmission status of each station. Each bit corresponds to the status of each station.	Normal	Abnormal
SB7A, 7B	Shows the low-speed cyclic transmission status. The transmission completion is indicated by the on/off status of either bit SB7A or 7B.	 Low-speed cyclic interval	

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
- Link refresh
- Link scan time

[Transmission delay time in the B/W/Y communication (TD1)]

$$T_{D1} = S_T + \alpha_T + (LS \times 0) + (S_R \times 2) + \alpha_R \quad [ms]$$

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

S_T : Scan time of the sending station
S_R : Scan time of the receiving station
α_T : Link refresh time of the sending station *1
α_R : Link refresh time of the receiving station *1
LS : Link scan time

*1: Total of installed network modules

The equation above assumes the following conditions:

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

POINT

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.

(b) Communication of the SEND/RECV/RECVS/READ/WRITE/REQ/ZNRD/ZNWR instructions

The transmission delay time of the instruction communication is obtained by the equation below using the following variables:

- Scan time of the sequence programs for the sending and receiving stations
- Link refresh
- Link scan time

[Transmission delay time of the instruction communication]

1) SEND (with arrival confirmation)/READ/WRITE/REQ/ZNRD/ZNWR instructions

$T_{D2} = (S_T + \alpha_T + S_R + \alpha_R) \times 2 + (LS \times 4) + LS_U$ [ms]

(MAX : $T_{D2} = (S_T + \alpha_T + S_R + \alpha_R) \times 2 + (LS \times 6) + LS_U$)

2) SEND – RECV arrival time

$T_{D3} = S_T + \alpha_T + (LS \times 2) + (S_R \times 2) + \alpha_R + LS_U$ [ms]

(MAX : $T_{D3} = S_T + \alpha_T\ (LS \times 3) + (S_R \times 2) + \alpha_R + LS_U$)

3) SEND – RECVS arrival time

$T_{D4} = S_T + \alpha_T + (LS \times 2) + S_R + \alpha_R + LS_U$ [ms]

(MAX : $T_{D4} = S_T + \alpha_T + (LS \times 3) + S_R + \alpha_R + LS_U$)

S_T : Scan time of the sequence program of the sending station
S_R : Scan time of the sequence program of the receiving station
α_T : Link refresh time of the sending station ∗2
α_R : Link refresh time of the receiving station ∗2
LS : Link scan time

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

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

∗1: The fraction is rounded up to the nearest whole number.
∗2: Total of installed network modules

REMARK

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 × 6" 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 supplement settings of the common parameters of GX Developer.
Note, however, that the scan time of the CPU module increases by that time amount.

(c) Link refresh time

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) on the memory card
- Inter-link data transfer

[Link refresh time]

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

$$+ \alpha_E + \alpha_L + (\text{number of network modules} - 1)\ [\text{ms}]$$

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

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

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
(LB, LW, LX, LY: See 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) on the memory card ＊2
α_L : Inter-link data transfer time ＊2
KM1, KM2, KM3, KM4, KM5 : Constant

1) When network modules are installed on the main base unit

Constant / CPU type	KM1	KM5 ($\times 10^{-3}$)	KM5 ($\times 10^{-3}$)	KM4 2	KM4 3	KM4 4	KM5 ($\times 10^{-6}$)
Q00JCPU	1.30	0.67					
Q00CPU	1.10	0.66					
Q01CPU	0.90	0.61					
Q02CPU	0.30	0.48	0.60	0.60	0.89	1.18	0.14
Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q12PHCPU, Q25PHCPU	0.13	0.41	0.53	0.25	0.38	0.51	0.13

2) When network modules are installed on the extension base unit

Constant / CPU type	KM1	KM5 ($\times 10^{-3}$)	KM5 ($\times 10^{-3}$)	KM4 2	KM4 3	KM4 4	KM5 ($\times 10^{-6}$)
Q00JCPU	1.30	1.50					
Q00CPU	1.10	1.44					
Q01CPU	0.90	1.42					
Q02CPU	0.30	1.20	1.32	0.61	0.90	1.20	0.28
Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q12PHCPU, Q25PHCPU	0.13	0.97	1.09	0.27	0.40	0.53	0.26

＊1: Total points in the ranges for which the link refresh is actually executed (including unused areas in between).

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

(d) Link scan time

The link scan time is obtained by the equation below using the following variables:

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

1) With a communication speed of 10Mbps

[Link scan time]

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

2) With a communication speed of 25Mbps

[Link scan time]

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

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

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

See Section 3.3.3.

T : Maximum number of bytes sent by the transient transmission in one link scan. ∗2
F : Number of station returned to the network (Only if there are faulty stations.)

∗1: From the beginning to the end of the device assigned with a common parameter (free areas in between are also included in the number of points).
∗2: "0" when not used.

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

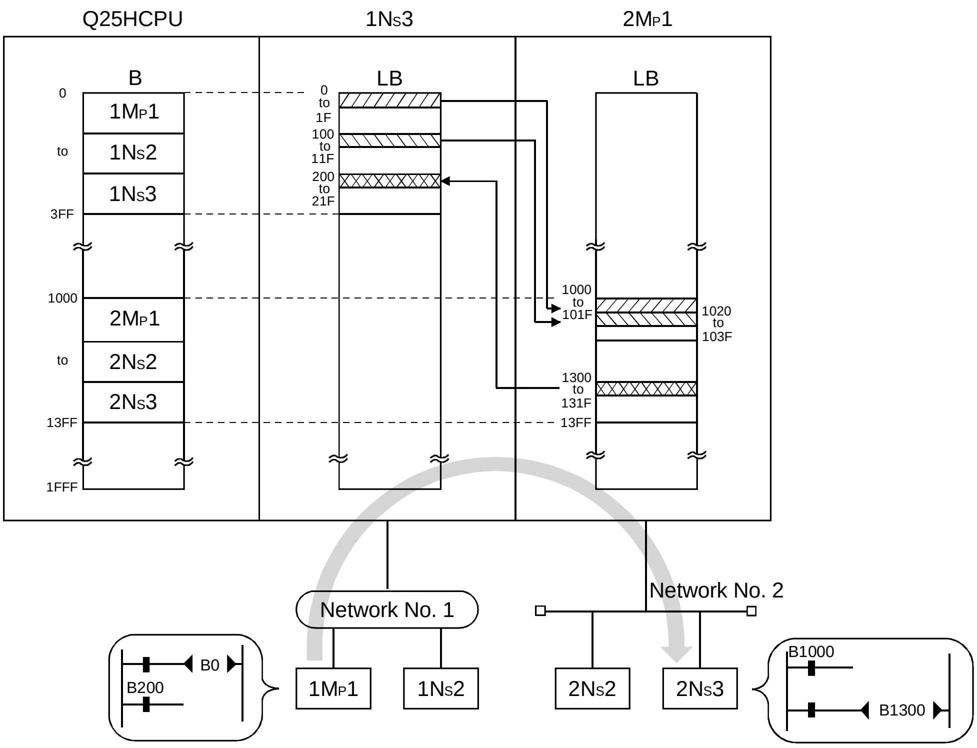
The transmission delay time until data is transmitted to another network using the inter-link data transfer function in multiple network systems is obtained by subtracting the scan time of the sequence program for the relay station from the sum of the transmission delay times in each network.

[Inter-link data transfer]

(Transmission delay time)

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

S_T : Scan time of the sending station
S_R : Scan time of the receiving station
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
K_M is normally 4.5 ms, but can be up to 60 ms in the worst case.
The time can be even longer if the monitor processing is executed from GX Developer or other station. ＊2



＊1: The total of installed network modules.
＊2: When the time fluctuation of K_M is a problem for the system, execute the inter-link data transfer using the MOV, BMOV or other instruction with the sequence program.

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

(a) Link refresh time

$$\text{Link refresh time} = KM1 + KM2 \times \left\{ \frac{LB + LX \times LY + SB + (LW \times 16) + (SW \times 16)}{16} \right\} + \alpha_E + \alpha_L + (\text{number of network modules} - 1)$$

The link refresh time on the sending station $\alpha_T = 0.13 + 0.97 \times 10^{-3}$

$$\times \frac{1024 + 0 + 0 + 512 + (1024 \times 16) + (512 \times 16)}{16} + 0 + 0 + (1 - 1)$$

$$\fallingdotseq 1.71 \text{ (ms)}$$

The link refresh time on the receiving station $\alpha_R \fallingdotseq 1.71$ (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

$$\text{Transmission delay time } T_{D1} = S_T + \alpha_T + (LS \times 0) + (S_R \times 2) + \alpha_R$$

$$= 1 + 1.71 + (9.776 \times 0) + (1 \times 2) + 1.71$$

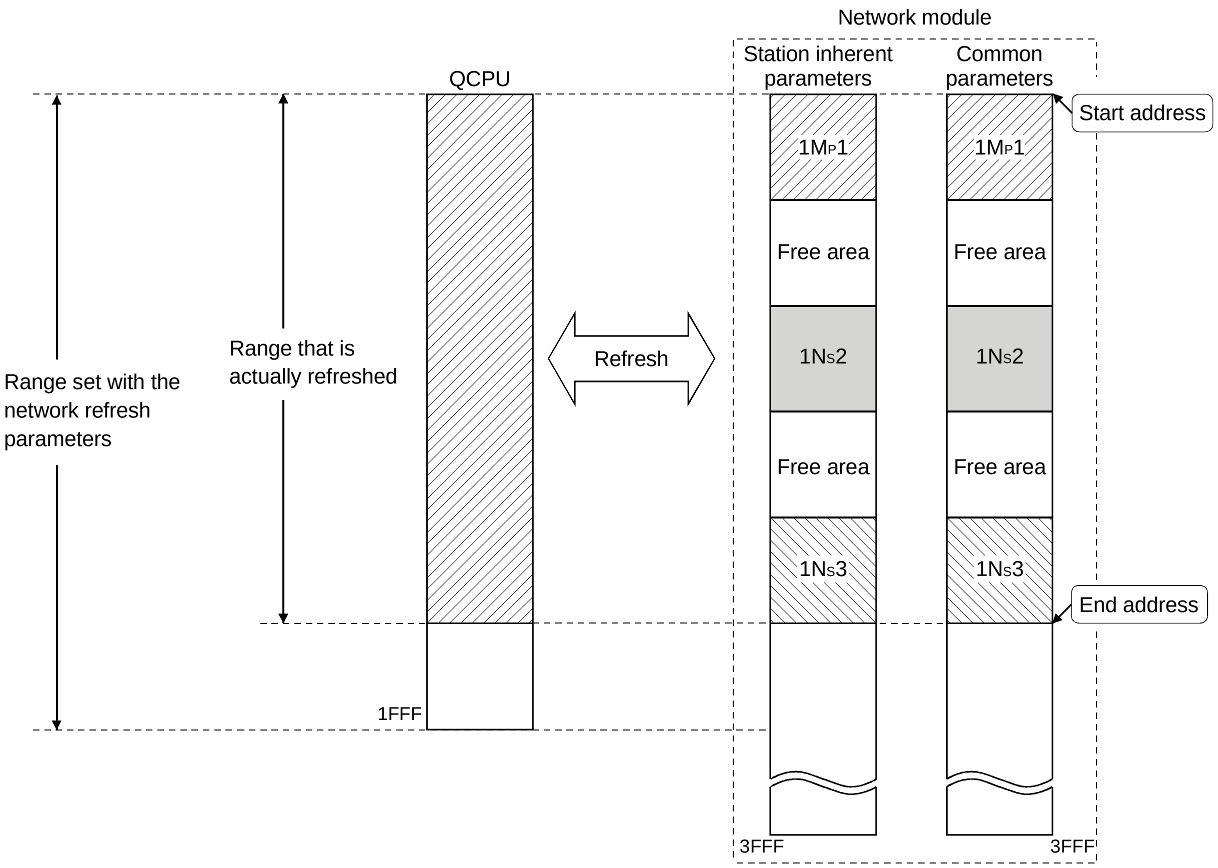
$$\fallingdotseq 6.42 \text{ (ms)}$$

3.3.3 Reducing the link refresh time

The link refresh time can be reduced by decreasing the number of refresh points of the CPU module using the refresh parameter/common parameter/station inherent parameter settings as well as direct access to the link device.

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

Addresses that fall in the range set with the refresh parameters as well as in the range of all the stations (1MP1 to 1NS3) set in the "Start address to end address" setting of the common parameters are refreshed.
The free areas are also refreshed.



POINT
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 diagram of the refresh parameters. 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

The Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU allows you to set 66 refresh ranges.

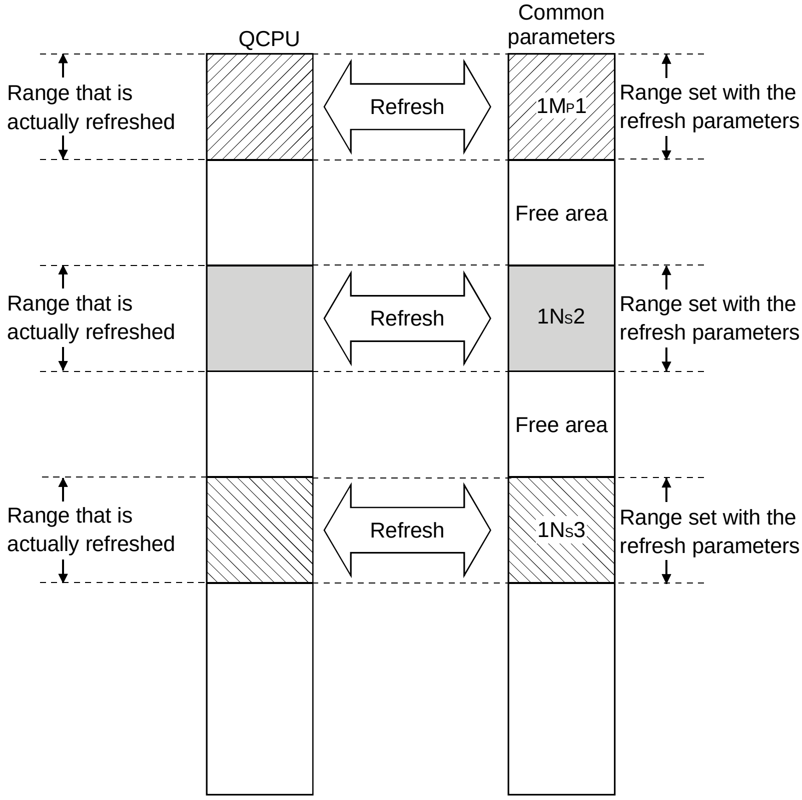
66 ranges (for 64 stations + for SB + for SW)

The Q00J/Q00/Q01CPU allows you to set 10 refresh ranges.

10 ranges (for 8 stations + for SB + for SW)

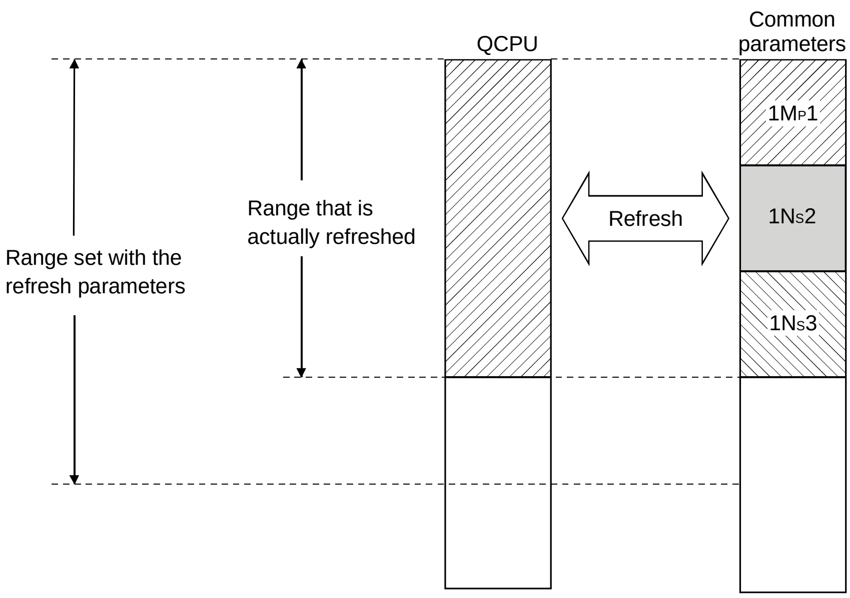
Set the values so that only the required parts are refreshed.

For more details, see Section 5.7.1.

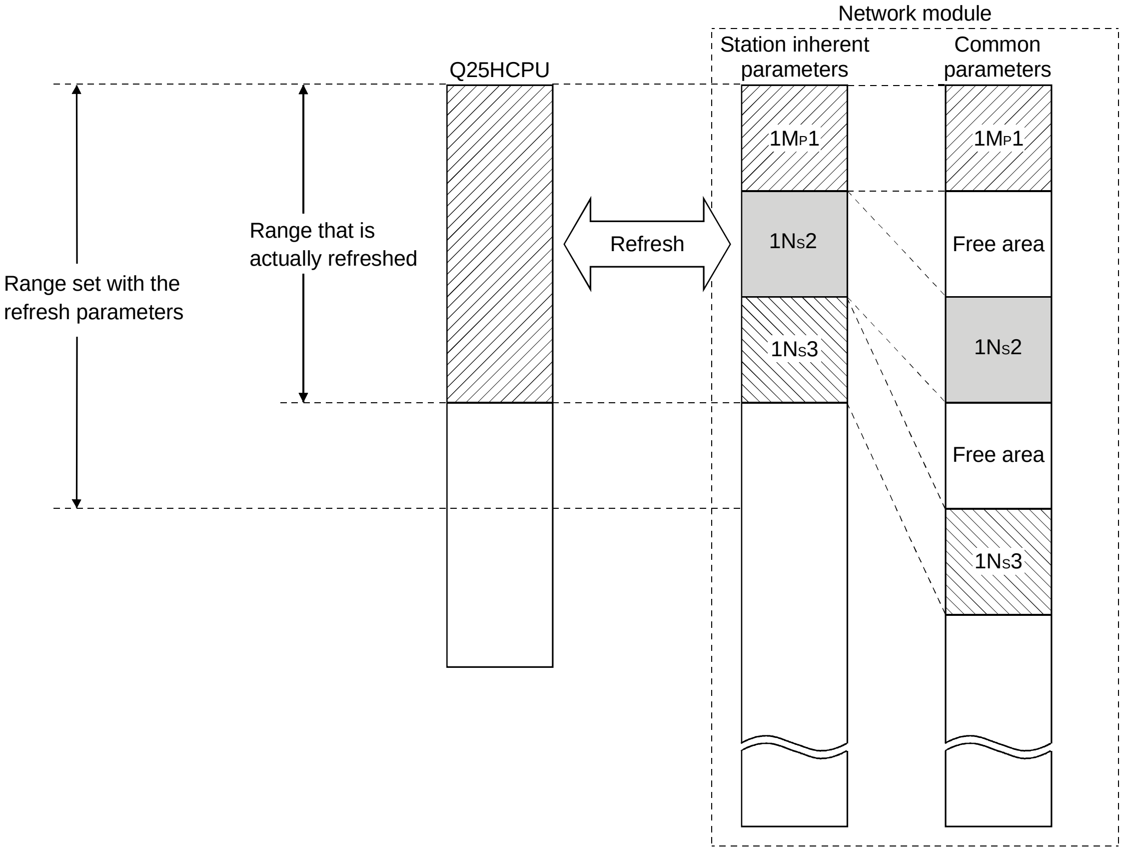


(b) Using the common parameters

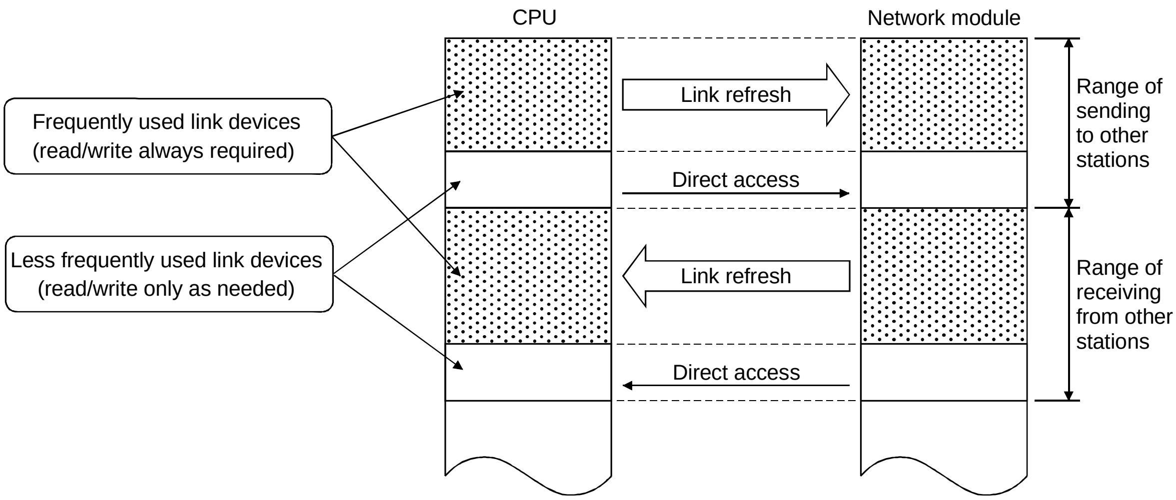
Set the values by designating the range of each station (1MP1 to 1NS3) close together so that there are no free areas.



(c) Using the station inherent parameters
(Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PH CPU only)
Set the values by designating the range of each station (1MP1 to 1NS3) close together so that there are no free areas using the station inherent parameters, without changing the settings of the common parameters.

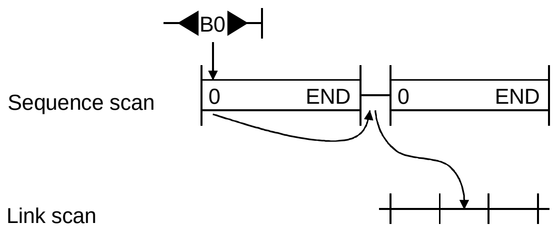


(d) Reduction of the link refresh time
The refresh time can be reduced by directly accessing link devices that are less frequently used by the host and excluding them from the link refresh range.

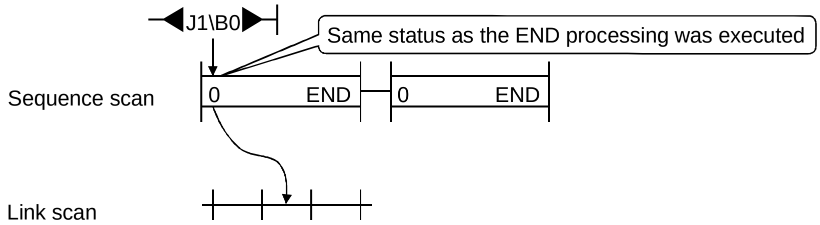


The link refresh is executed by the END processing of the CPU module, but reading from/writing to the network module is directly performed when an instruction is executed; thus the transmission delay time can be reduced.

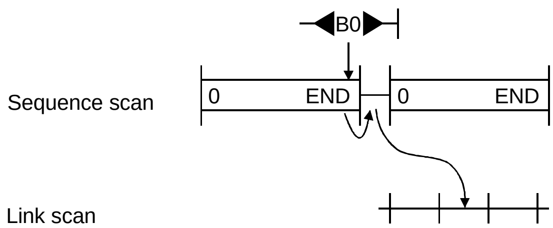
1) Direct access to the sending station
   a) When close to step 0
      The direct access is faster by a maximum of one scan of a sequence program when compared with the link refresh.
      (Link refresh)



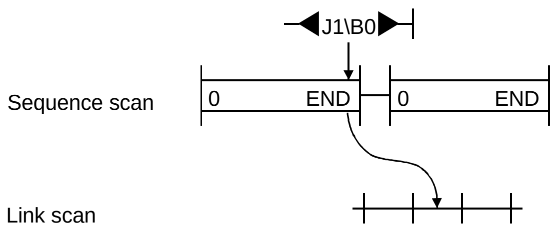
(Direct access)



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

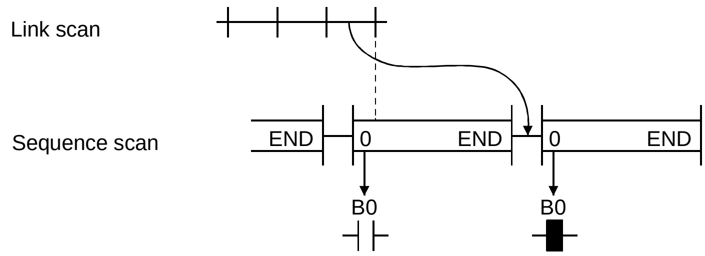


(Direct access)

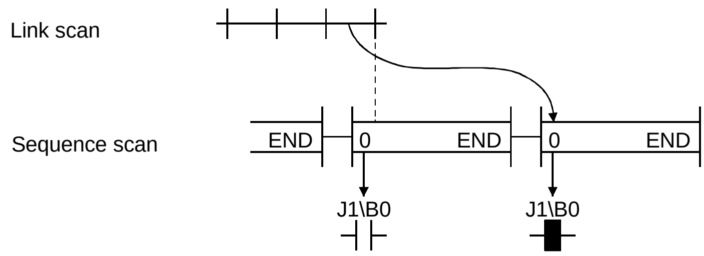


2) Direct access to the receiving station

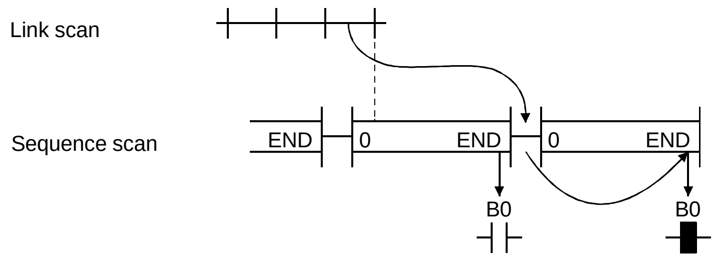
a) When close to step 0
The link refresh and the direct access occur at almost the same time.
(Link refresh)



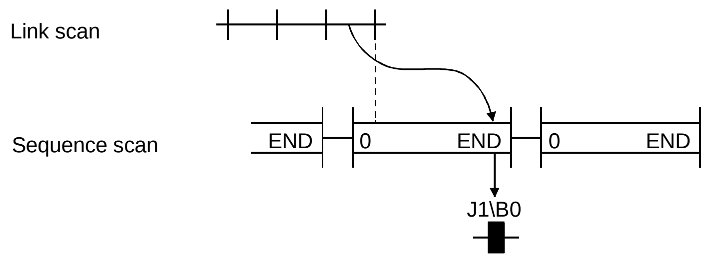
(Direct access)



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)

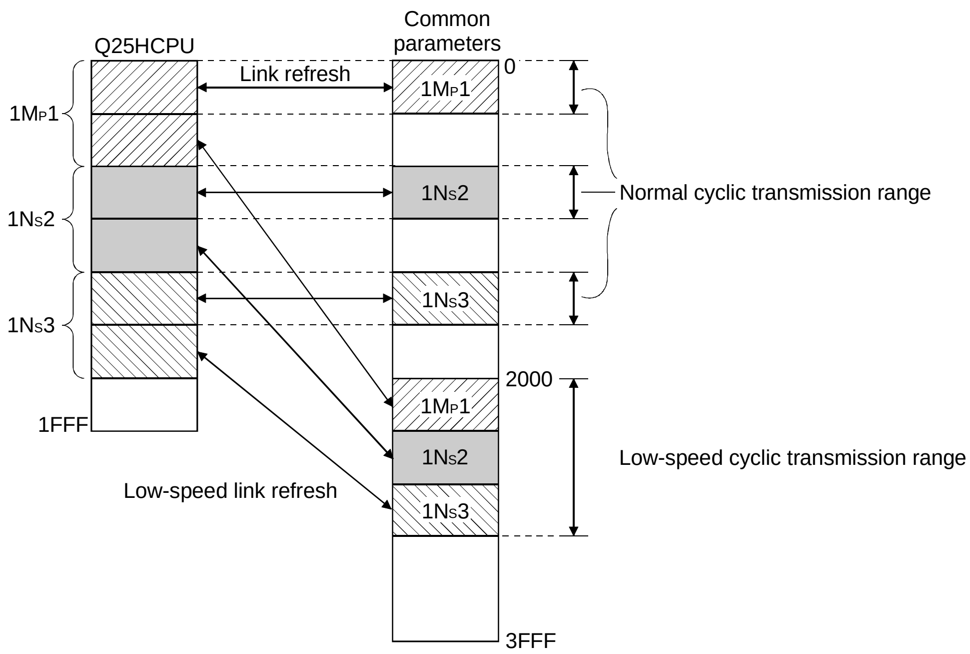


(Direct access)



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.
(Q02/Q02H/Q06H/Q25H/Q12PH/Q25PH CPU only)



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 procedures that are required to perform the data link operation:

Start

↓

Module switch settings ······ Section 4.3
- Set the operation conditions of the network module (STATION No., MODE)
- Install the network module.
- Stop the CPU module (to prevent unintentional outputs)
- Check the input power supply voltage.

↓

Power on ······ Section 4.4
- Turn on the power and check that the POWER LED of the power supply module and the RUN LED of the network module are turned on.

↓

Standalone check of the network module ······ Section 4.5
- Self-loopback test
- Internal self-loopback test
- Hardware test

↓

Parameter settings ······ Chapter 5
- Network type, start I/O No., network No., total number of (slave) stations
- Assign the send range of each station.
- Write the parameters to the CPU module, and perform other operations.

↓

Connect cables ······ Section 4.6

↓

Offline tests from GX Developer ······ Section 4.7
- Station-to-station test
- Forward loop/reverse loop test

↓

Network diagnostics from GX Developer ······ Section 4.8
- Loop test (optical loop test only)
- Setup confirmation test
- Communication test, and other tests

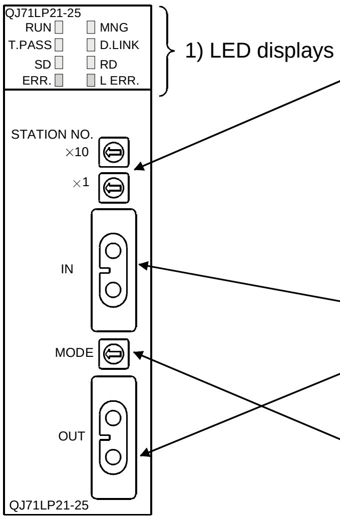
↓

Programming and debugging ······ Chapter 6

↓

End

4.2 Component Names and Settings of the Network Module (QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21G, QJ71LP21GE, QJ71BR11)



Optical loop module

2) STATION No. (factory default setting: 1):
Station number setting switch
This switch sets the station number on the same network.
The red ERR.LED lights up for a setting error.

Setting	Description
0	With PLC to PLC networks: Setting error. With remote I/O networks: Remote master station setting
1 to 64	Valid setting range
65 to 99	Setting error

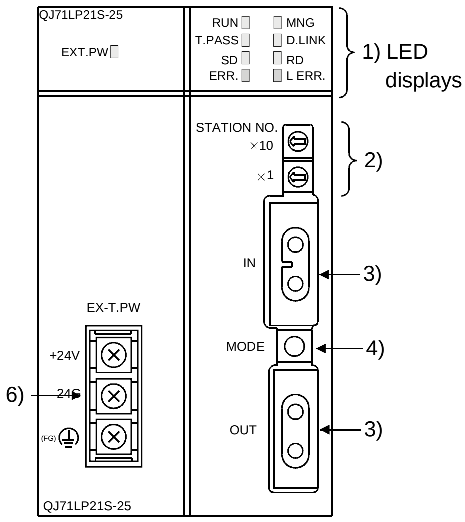
3) IN/OUT connectors
Connected with an optical fiber connector.
(IN connector)
For forward loop receiving/reverse loop sending
(OUT connector)
For forward loop sending/reverse loop receiving

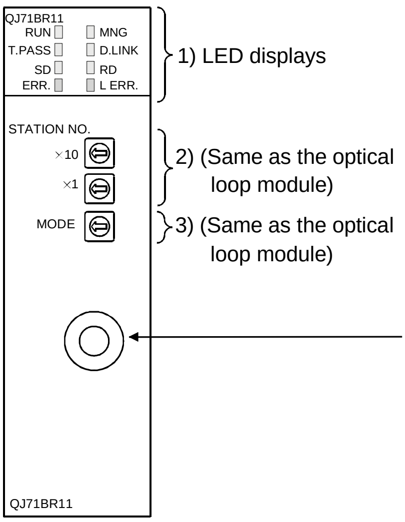
4) MODE (factory default setting: 0): Mode setting switch
This switch sets the operation mode.
a) QJ71LP21, QJ71LP21G, QJ71LP21GE, QJ71BR11

Setting	Description
0	Online (Mode selected with a parameter becomes valid.)
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 (Mode selected with a parameter becomes valid.)	When 10Mbps in use
1	Self-loopback test	
2	Internal self-loopback test	
3	Hardware test	
4	Online (Mode selected with a parameter becomes valid.)	When 25Mbps in use
5	Self-loopback test	
6	Internal self-loopback test	
7	Hardware test	
8 to F	Use prohibited	





Coaxial bus module

5) Coaxial connector
Connect an F-type connector for a coaxial cable

6) External power supply terminal block
Wire for external power supply.

POINT

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

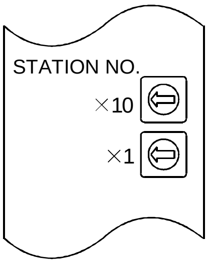
1) LED displays

No.	Name	LED status	Description
1	RUN	Green on	Module operating normally
		Off	WDT error occurred (hardware error)
2	MNG	Green on	Operating as a control station or sub-control station
		Off	Normal station (not operating as a control station or sub-control station)
3	T.PASS	Green on	Executing baton pass (being joined in a network)
		Green flash	Test is determined to have completed normally when this LED flashes 20 times (approximately 10 s) during the test.
		Off	Baton pass not yet executed (the host is disconnected from the network)
4	D.LINK	Green on	Data link being executed (cyclic transmission is being executed)
		Off	Data link not yet executed (parameter receiving not completed, host CPU error, data link stop instructed, etc.)
5	SD	Green on	Data being sent
		Off	Data not yet sent
6	RD	Green on	Data being received
		Off	Data not yet received
7	ERR.	Red on	• An error occurred, for instance a station number setting error (other than 1 to 64), mode setting error (set to use prohibited), operation condition setting error (parameters), or an installed CPU type error (settings outside the range used, CPU type). • A station with the same number already exists in the network. • The host is designated as the control station even though a control station already exists in the network. • Invalid parameter settings (contradicting settings). • The parameters received from the sub-control station and the parameters retained by the host (received from the control station) are different. • A fatal error occurred in the CPU module.
		Flashing	An error was detected while testing the network module.
		Off	Normal status
8	L ERR.	Red on	A communication error occurred (one of the following communication errors has occurred): CRC : Error generated by an abnormal cable, noise, etc. OVER : This error occurs when the next data is received before the last receive data is loaded into the module, and the data is overwritten. It is caused by a hardware error in the receive area of the network module. AB.IF : This error occurs when more than the specified number of bits are set to "1" among the receive data in the frame, 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 is caused 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 power to the adjacent station that sends to the host is off while the forward or reverse loop line is faulty, or when there is a hardware error in the sending station in the loop. <Corrective action> Check the cables and connectors (detached or loosened connectors, wrong IN/OUT connections, broken or damaged cables, improper cable routing, etc.) For more details, see the "Network Diagnostics" (Section 8.1).
		Off	No communication error
9	EXT. PW	Green on	External power being supplied
		off	External power not supplied

4.3 Module Switch Settings

This section explains the preparations that should be made prior to powering on the network module.

4.3.1 Setting the station number (STATION NO.)



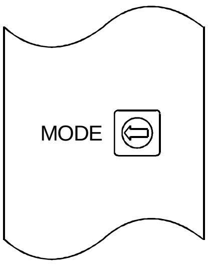
Set the station number of the network module in the network using the station number setting switches.
The upper switch is for setting a ten-digit number and the lower switch for setting a single digit number.

Setting	Description
0	With PLC to PLC networks: Setting error. With remote I/O networks: Valid setup range
1 to 64	Valid setting range
65 to 99	Setting error

POINT

1) Duplicate station numbers cannot be used in the same network.
2) Any station can be set as the control station as long as the station number is in the valid setting range.
3) The station number setting does not need to be consecutive. However, when no number is set to a station, it must be set as a reserved station.

4.3.2 Setting the mode (MODE)



Set the operation mode of the network module using the mode setting switch.
Set to Online (setting 0 or 4) after the standalone check (self-loopback test, internal self-loopback test, and hardware test) of the network module is completed.

(a) QJ71LP21, QJ71LP21G, QJ71LP21GE, QJ71BR11

Setting	Description
0	Online (Mode selected with a network parameter becomes valid.)
1	Self-loopback test
2	Internal self-loopback test
3	Hardware test
4 to F	Use prohibited

(b) QJ71LP21-25

Setting	Description	
0	Online (Mode selected with a network parameter becomes valid.)	When 10Mbps in use
1	Self-loopback test	
2	Internal self-loopback test	
3	Hardware test	
4	Online (Mode selected with a network parameter becomes valid.)	When 25Mbps in use
5	Self-loopback test	
6	Internal self-loopback test	
7	Hardware test	
8-F	Use prohibited	

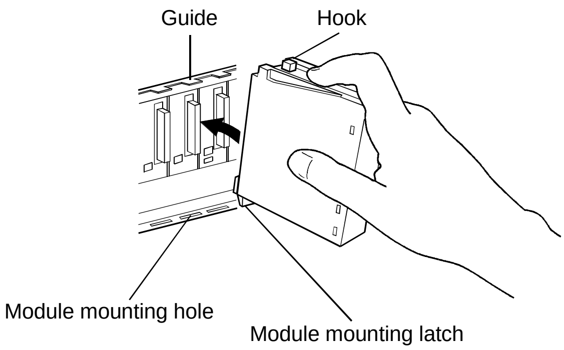
4.3.3 Installing and uninstalling the module

(1) Installing the module

1) Insert the module mounting latch on the bottom of the module properly into the module mounting hole of the base unit.
2) Push the module in the direction of the arrow until the module's hook is fixed to the guide of the base unit.

(2) Uninstalling the module

Detach the module mounting latch from the module mounting hole while holding down the hook on the module.



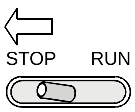
[Module handling precautions]

- Since the module case is made of resin, do not drop it or subject it to strong impacts.
- The module can easily be secured to the base unit using the hook located at the top of the module. If the module is to be used in an area that is subject to strong vibrations or impacts, it is strongly recommended to secure it with the module mounting screws. In this case, tighten the module mounting screws within the following clamping torque range:
  Module mounting screws (M3): Clamping torque ranging from 36 to 48 N•cm.

DANGER	• Do not touch the terminals and the connectors while the power to the module is on. Doing so may cause electric shocks or malfunctions. • If the module is not mounted properly and fastened with the screws, it may cause the module to malfunction, break down or fall off. If the screws are tightened excessively, it may damage the module and the screws, and cause the module to short-circuit, malfunction or fall off.

CAUTION	• Be careful not to let foreign particles such as chaff or wire chips enter the module. They may cause fire, breakdowns or malfunctions. • Never disassemble or modify the module. It may cause breakdowns, malfunctions, injuries or fire.

4.3.4 Stopping the CPU (unintentional output prevention)



Set the CPU module's RUN/STOP switch to the STOP side.

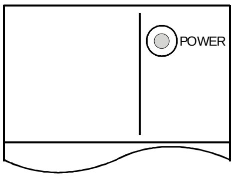
4.3.5 Checking the input power supply voltage

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

4.4 Powering On

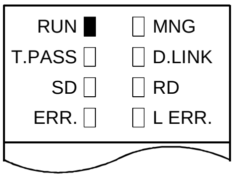
Check the power supply to the network module.

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



The POWER LED lights up at the same time when the PLC system is powered on.

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



The RUN LED lights up in green when the network module is operating normally.
If this LED does not light up, see 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.
Select a test using the mode setting switch on the front of the network module.
The following three test are available for the offline tests:

(1) Self-loopback test (mode setting switch: 1 or 5)

This test checks the hardware of the internal circuits, including the send/receive circuit of the network module, as well as the cables.

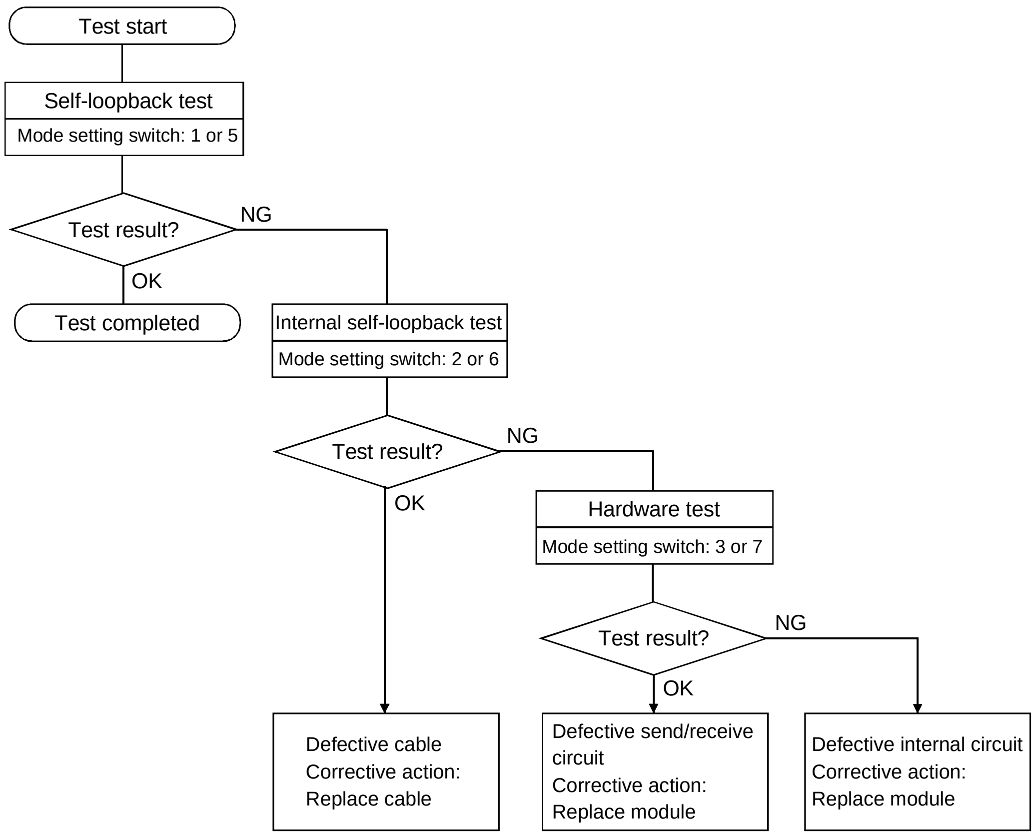
(2) Internal self-loopback test (mode setting switch: 2 or 6)

This test checks the hardware of the internal circuits, including the send/receive circuit of the network module.

(3) Hardware test (mode setting switch: 3 or 7)

This test checks the hardware inside the network module.

Flow of offline tests



REMARK

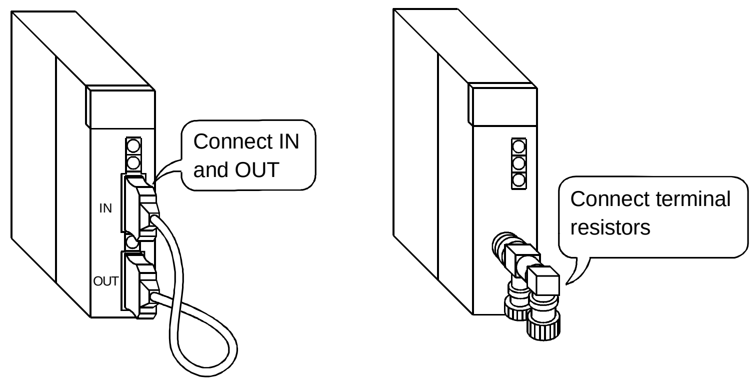
The data link operation cannot be executed normally if at least one station is placed in the test mode (offline, MODE switches 1 to 3 or 5 to 7) during data linking (online).

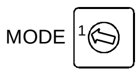
4.5.1 Self-loopback test

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

(1) Connect the OUT and IN terminals of the QJ71LP21 network module (for the optical loop system) with an optical fiber cable.
Connect a terminal resistor to both of the F-type connectors for the QJ71BR11 network module (for the coaxial bus system).

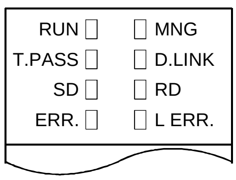
For QJ71LP21 (optical loop system) For QJ71BR11 (coaxial bus system)





(2) Set the mode setting switch of the network module to "1". Set it to "5" when using the QJ71LP21-25 at 25Mbps.
The self-loopback test is selected.

(3) Switch power on.
The self-loopback test is executed; check the execution status on the network module display.
During the test, the T.PASS LED flashes and the test is determined to have completed normally when it flashes 20 times.
If the test is abnormally completed, the ERR. LED flashes.



Before test		During test		Normal completion of test
T.PASS☐: Off	⇒	◨: Flashing	⇒	◨: Normal completion of test after 20 flashes (approximately 10 s)
				Abnormal completion of test
			ERR.	◨: Flashing

When an error occurs, the contents of the error should be checked with GX Developer. The faulty area can be examined by replacing the cable.

REMARK

In the MELSECNET/H, a link refresh is executed even when the module is offline. Thus, the user can check the testing status and the result with GX Developer or a sequence program using the special link registers.

Host communication status	SW0047	→ 1F	: Offline test
Cause of communication interruption	SW0048	→ 2	: Offline test
Offline test status on requesting side	SW00AC	→ 7	: Self-loopback test
Offline test results on requesting side	SW00AD	→ 0	: Normal
		1 or larger	: Error code

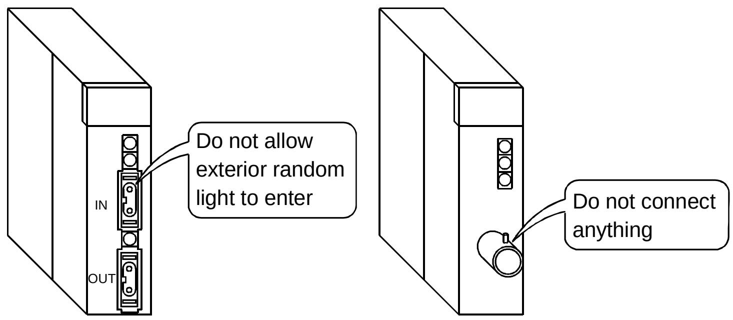
For details on how to check the error contents, see Chapter 8.
If two or more modules are installed, the testing status and the result of each module can be checked by adding 200H to the corresponding device number.

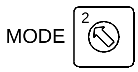
4.5.2 Internal self-loopback test

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

(1) Do not connect the optical fiber cable with the QJ71LP21 network module (for the optical loop system). However, make sure that the exterior random light does not enter from the connector.
Do not connect cables or terminal resistors if the QJ71BR11 network module (for the coaxial bus system) is used.

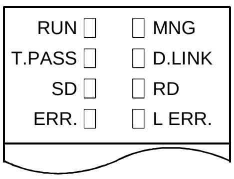
For QJ71LP21 (optical loop system) / For QJ71BR11 (coaxial bus system)





(2) Set the mode setting switch of the network module to "2". Set it to "6" when using the QJ71LP21-25 at 25Mbps.
The internal self-loopback test is selected.

(3) Switch power on.
The internal self-loopback test is executed; check the execution status on the network module display.
During the test, the T.PASS LED flashes and the test is determined to have completed normally when it flashes 20 times.
If the test is abnormally completed, the ERR. LED flashes.



Before test: T.PASS□: Off ⇒ During test: ◨: Flashing ⇒ Normal completion of test: ◨: Normal completion of test after 20 flashes (approximately 10 s)

Abnormal completion of test: ERR. ◨: Flashing

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

REMARK

In the MELSECNET/H, a link refresh is executed even when the module is offline. Thus, the user can check the testing status and the result with GX Developer or a sequence program using the special link registers.

Host communication status	SW0047	→ 1F	: Offline test
Cause of communication interruption	SW0048	→ 2	: Offline test
Offline test status on requesting side	SW00AC	→ 8	: Internal self-loopback test
Offline test results on requesting side	SW00AD	→ 0	: Normal
		1 or larger	: Error code

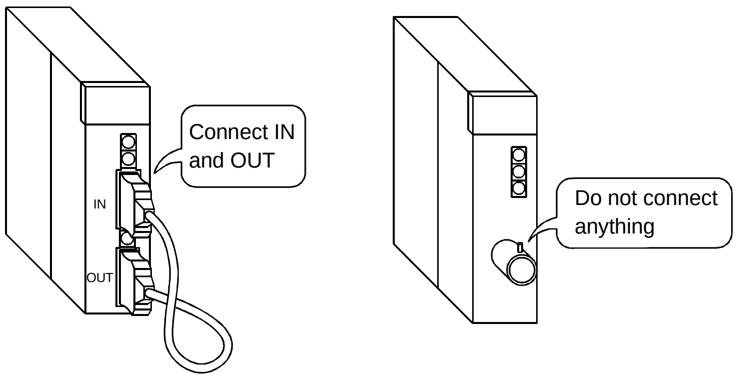
For details on how to check the error contents, see Chapter 8.
If two or more modules are installed, the testing status and the result of each module can be checked by adding 200_H to the corresponding device number.

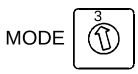
4.5.3 Hardware test

This test checks the hardware inside the network module.

(1) Connect the IN and OUT terminals of the QJ71LP21 network module (for the optical loop system) with an optical fiber cable.
Do not connect cables or terminal resistors if the QJ71BR11 network module (for the coaxial bus system) is used.

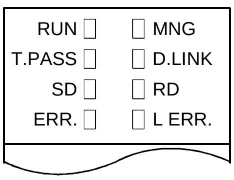
For QJ71LP21 (optical loop system) | For QJ71BR11 (coaxial bus system)





(2) Set the model setting switch of the network module to "3". Set it to "7" when using the QJ71LP21-25 at 25Mbps.
The hardware test is selected.

(3) Switch power on.
The hardware test is executed; check the execution status on the network module display.
During the test, the T.PASS LED flashes and the test is determined to have completed normally when it flashes 20 times.
If the test is abnormally completed, the ERR. LED flashes.



Before test		During test		Normal completion of test
T.PASS□: Off	⇒	◨: Flashing	⇒	◨: Normal completion of test after 20 flashes (approximately 10 s)
				Abnormal completion of test
			ERR.	◨: Flashing

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

REMARK

In the MELSECNET/H, a link refresh is executed even when the module is offline. Thus, the user can check the testing status and the result with GX Developer or a sequence program using the special link registers.

Host communication status	SW0047	→ 1F	: Offline test
Cause of communication interruption	SW0048	→ 2	: Offline test
Offline test status on requesting side	SW00AC	→ 9	: Hardware test
Offline test results on requesting side	SW00AD	→ 0	: Normal
		1 or larger	: Error code

For details on how to check the error contents, see Chapter 8.
If two or more modules are installed, the testing status and the result of each module can be checked by adding 200H to the corresponding device number.

4.6 Cable Connection

4.6.1 Optical loop system

(1) Precautions in connecting

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

<table>
<tr><th colspan="2" rowspan="2">Type</th><th colspan="4">Distance between stations (m (ft.))</th></tr>
<tr><th>QJ71LP21,
QJ71LP21-25: 10Mbps</th><th>QJ71LP21-25: 25Mbps</th><th>QJ71LP21G</th><th>QJ71LP21GE</th></tr>
<tr><td rowspan="2">SI fiber-optic cable
(Old type: A-2P-□)</td><td>L type</td><td>500 (1641)</td><td>200 (656)</td><td rowspan="6">Must not be used</td><td rowspan="6">Must not be used</td></tr>
<tr><td>H type</td><td>300 (984)</td><td>100 (328)</td></tr>
<tr><td colspan="2">SI fiber-optic cable</td><td>500 (1641)</td><td>200 (656)</td></tr>
<tr><td colspan="2">H-PCF fiber-optic cable</td><td>1000 (3281)</td><td>400 (1312)</td></tr>
<tr><td colspan="2">Broad-band H-PCF fiber-optic cable</td><td>1000 (3281)</td><td>1000 (3281)</td></tr>
<tr><td colspan="2">QSI fiber-optic cable</td><td>1000 (3281)</td><td>1000 (3281)</td></tr>
<tr><td colspan="2">GI-50/125 fiber-optic cable</td><td>Must not be used</td><td>Must not be used</td><td>2000 (6562)</td><td>Must not be used</td></tr>
<tr><td colspan="2">GI-62.5/125 fiber-optic cable</td><td>Must not be used</td><td>Must not be used</td><td>Must not be used</td><td>2000 (6562)</td></tr>
</table>

(b) When connecting an optical fiber cable, the following restrictions on the bending radius should be observed.

(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.
This tool may be purchased from Mitsubishi Electric System Service, Inc, or your nearest dealer. Please inquire for more information.

(d) When laying the optical-fiber cables, do not touch the fiber cores of the cable and module connectors, and do not let dust or particles collect on them.
If oil from hands, dust or particles adhere to the cores, the accumulated transmission loss may cause malfunctions in the data link.

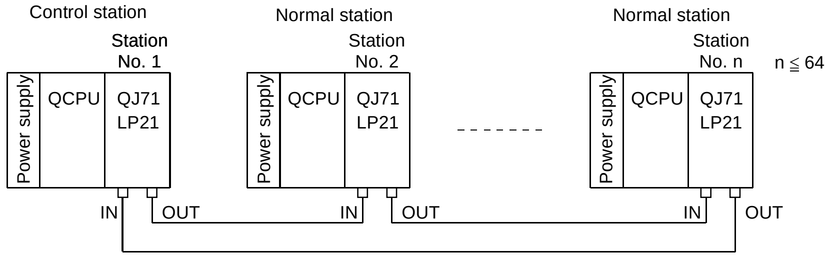
(e) When attaching or detaching the optical fiber cable to/from the module, pull or insert the cable by holding the cable connector securely with your hand.

(f) Connect the cable and module connectors securely until you hear a "click" sound.

(2) Cable connection

(a) How to connect the cable

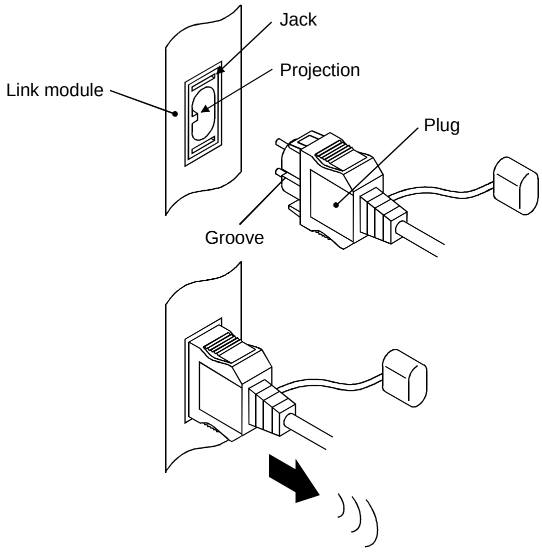
Connect the OUT and IN terminals with optical fiber cables as shown below.
Stations do not have to be connected in the order of station numbers.
Any station number can be assigned as the control station.



(b) Installing the optical fiber cable

The following shows how to install the optical fiber cable:

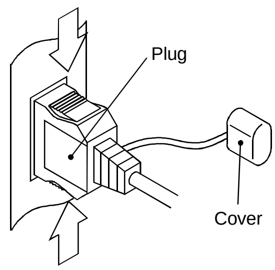
Start (Installation)
↓
Insert the plug by aligning the groove of the plug with the projection of the jack.
↓
Push the plug in until the plug fixing hole catches the hook of the jack.
↓
Pull the plug lightly in the direction of the arrow to make sure that it is securely connected.
↓
Complete



(c) Removing the optical fiber cable

The following shows how to remove the optical fiber cable:

Start (Removal)
↓
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 even if IN and IN or OUT and OUT are connected with an optical fiber cable. However, the loopback function, the network diagnostic function and some of other functions do not operate normally. So, make sure to connect OUT and IN.

4.6.2 Coaxial bus system

(1) Precautions in 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 should be used according to the number of stations connected.
A communication error may occur if a cable length other than the lengths indicated in the table is used.

Station-to-station cable length \ Number of stations connected	2 to 9 stations		10 to 33 stations	
Cable type	3C – 2V	5C – 2V	3C – 2V	5C – 2V
0 to 1 m (3.28 ft.)	× (cable less than 1m (3.28 in.) in length cannot be used.)			
1 (3.28 ft.) to 5 m (16.4 ft.)	○	○	○	○
5 (16.4 ft.) to 13 m (42.65 ft.)	○	○	×	×
13 (42.65 ft.) to 17 m (55.78 ft.)	○	○	○	○
17 (55.78 ft.) to 25 m (175.63 ft.)	○	○	×	×
25 (175.63 ft.) to 300 m (98.43 ft.)	○	○	○	○
300 (98.43 ft.) to 500 m (1640.5 ft.)	×	○	×	○

○: Allowed ×: Not allowed

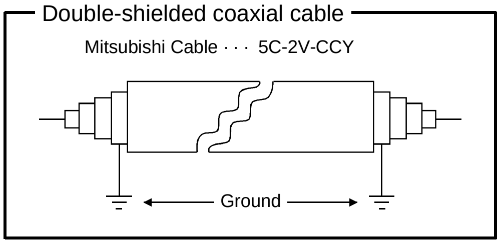
2) If there is a possibility of adding more stations to expand the existing system, the cables should be installed by considering restriction 1) mentioned above in advance.

3) When using a repeater module (models A6BR10 or A6BR10-DC), use the station-to-station cable length for "10 to 33" stations, regardless of the number of stations connected or the number of repeater modules.

(b) Cable installation precautions

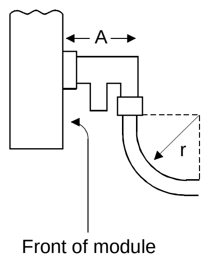
1) Install the coaxial cables at least 100 mm (3.94 in.) away from other power cables and control cables.

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



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

Cable type	Allowable bending radius r [mm (in.)]	Connector A (mm (in.))
3C – 2V	23 (0.91)	55 (2.17)
5C – 2V	30 (1.18)	



(d) Do not pull any of the connected coaxial cables.
This may cause a faulty contact and cable disconnection, or damage the module.

(e) Make sure to connect a terminal resistor to both terminal stations of the coaxial bus type network system.

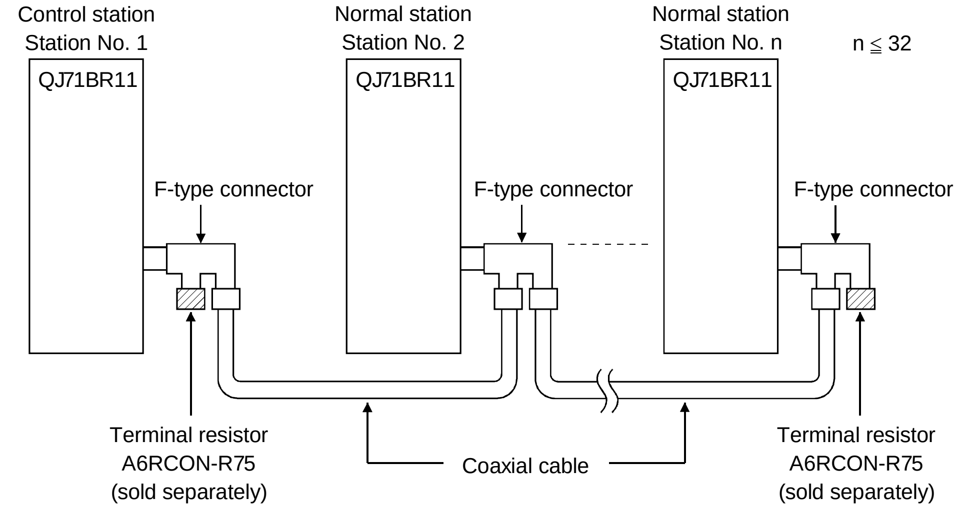
(f) Depending on the usage environment, some white oxidation deposits may be seen on the F type connector. However, oxidation will not occur on the connection area, so there will be no problems with the function of the unit.

(2) Cable connection

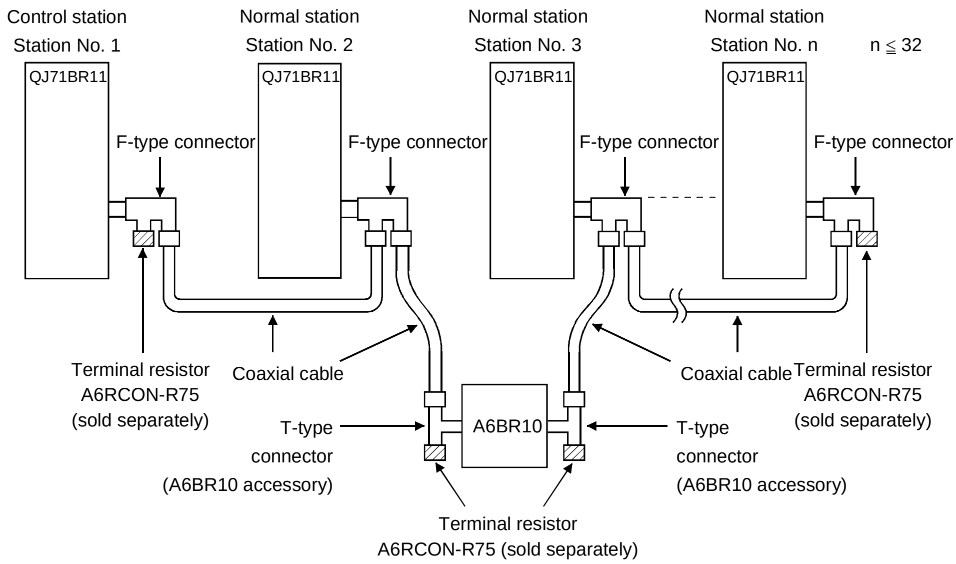
(a) Connection method

Connect the coaxial cable as shown below.
Always install a terminal resistor (sold separately: A6RCON-R75) to the stations connected at both ends.
The F-type connector comes with the module.

1) Without a repeater module



2) With a repeater module (series connection)

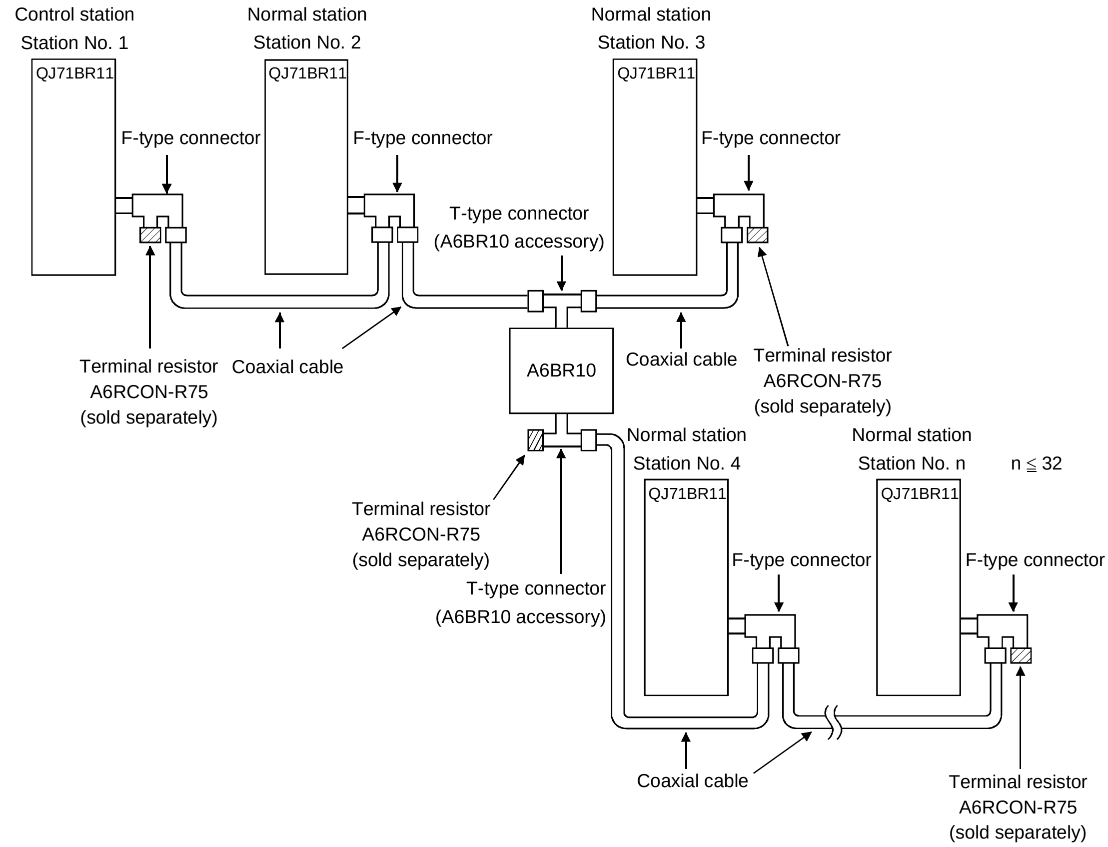


REMARK

For details about the repeater module (A6BR10), see 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)

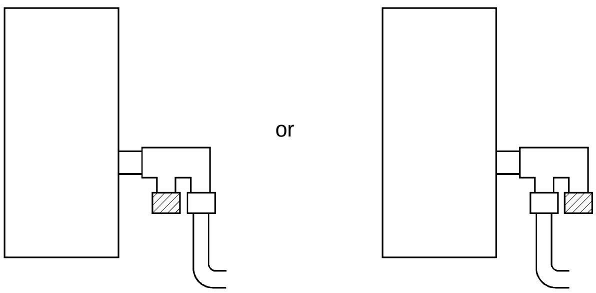


POINT

(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 terminal 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)

↓

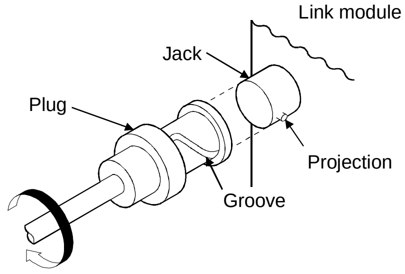
Insert the plug by aligning the groove of the plug with the projection of the jack.

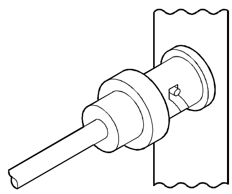
↓

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)

↓

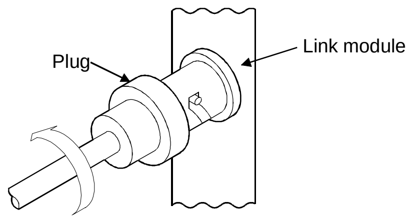
Rotate the plug in the direction of the arrow and unhook it.

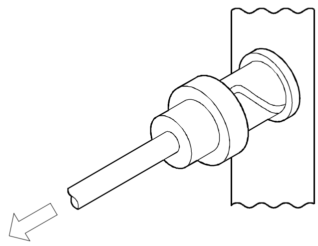
↓

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

↓

Complete





4.7 Offline Tests from GX Developer

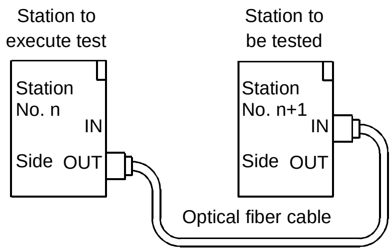
The offline tests check the cable connection status using the network parameters of GX Developer.

4.7.1 Station-to-station test

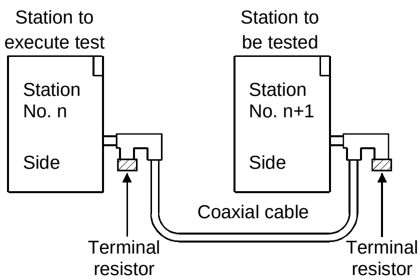
In the station-to-station test, the hardware of the network modules and cables between two adjacent stations can be checked.
The following explains how to conduct the station-to-station test:

(1) Connecting the cable

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

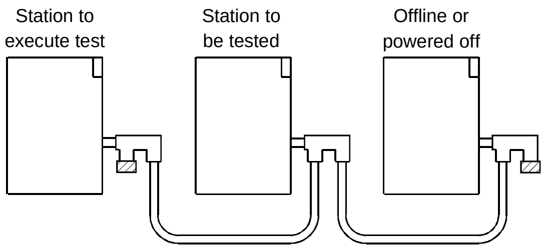


[Coaxial bus system]
Connect two network modules with a coaxial cable.



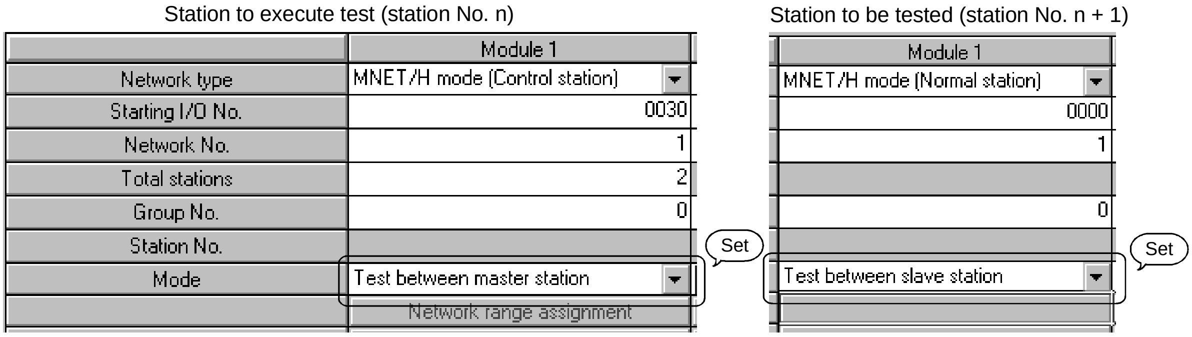
REMARK

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



(2) Setting the test mode

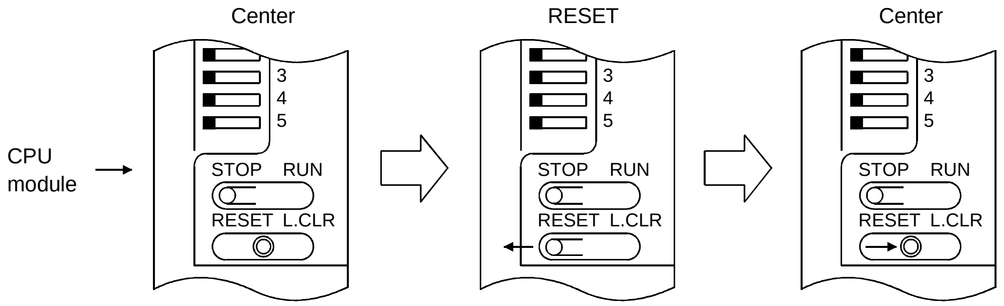
Set the mode network parameters for station number n and station number n + 1 to "Test between master station" and "Test between slave station" respectively, and write the parameter settings to the CPU module.



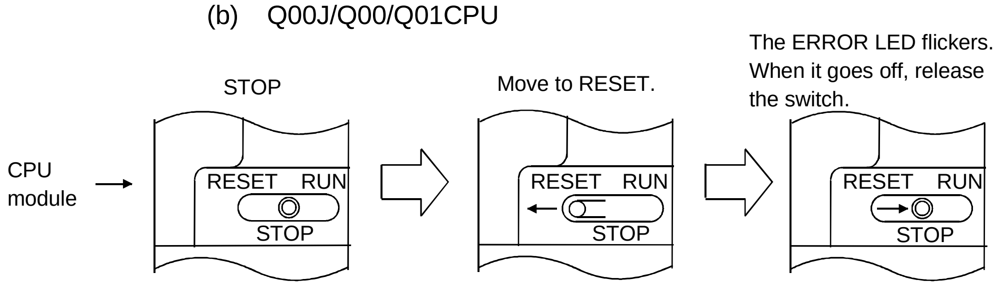
(3) Starting the station-to-station test

On the Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU, set the STOP/RUN switch to the STOP position and reset the CPU with the RESET/L. CLR switch.
On the Q00J/Q00/Q01CPU, reset the CPU with the RESET/STOP/RUN switch.
(When resetting the CPU, move the switch to the RESET position until the ERROR LED flickers, and release it after the LED has gone off.)
Perform this operation on the station to be tested first, then on the station to execute the test.

(a) Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU



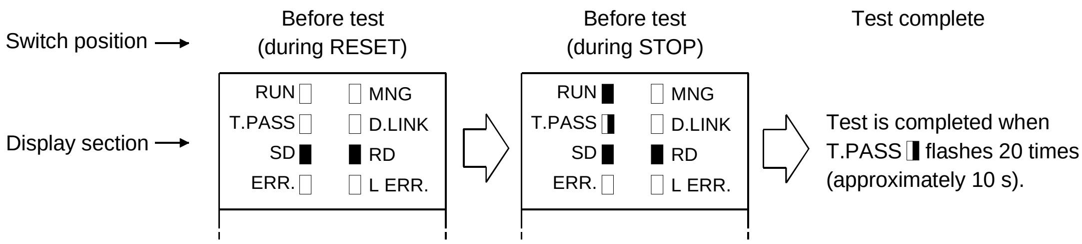
(b) Q00J/Q00/Q01CPU



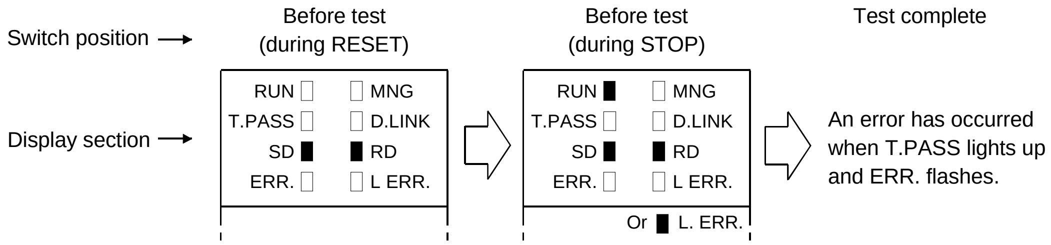
(4) Checking the test result

The T.PASS LED of the network module flashes at approximately 0.5 s intervals. The T.PASS LED flashes when the test is normal, and the ERR. LED flashes when an error occurs.

[Normal test result]



[Abnormal test result]



(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 detached or broken during the test.

5) Hardware error

(b) Possible causes of errors in the coaxial bus system

1) The cable is broken or defective.

2) The cable was detached or broken during the test.

3) A terminal resistor was detached.

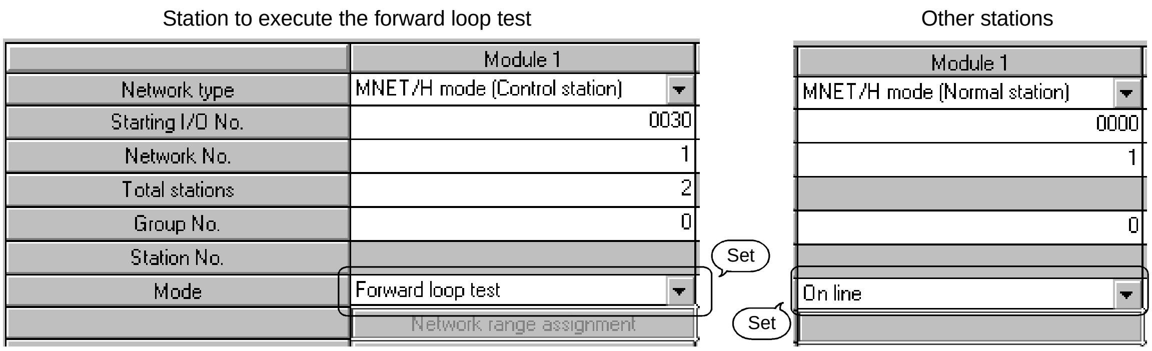
4) Hardware error

4.7.2 Forward loop/reverse loop test

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

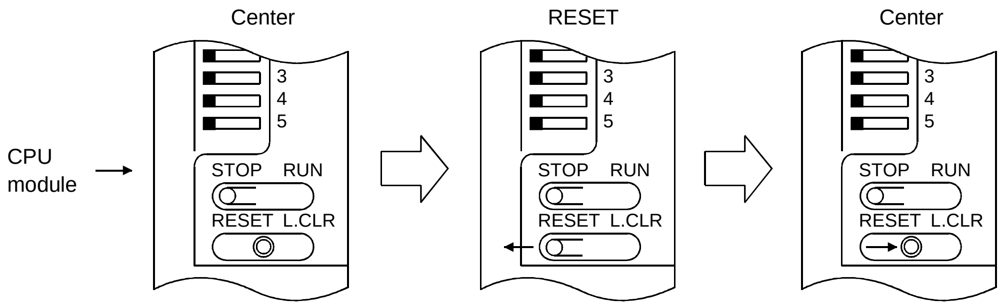
When conducting the forward loop test, set the mode network parameter of the station that will be executing the forward loop test to "Forward loop test" with GX Developer and write the parameter setting to the CPU module.
Set the mode for all other stations than the testing station to "Online."
When 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.



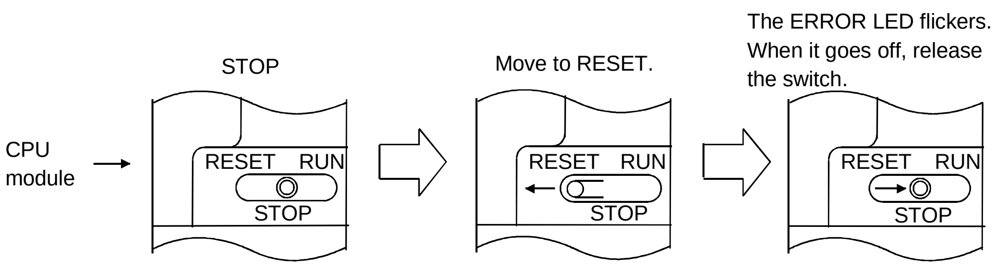
(2) Starting the test

On the Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU, set the STOP/RUN switch to the STOP position and reset the CPU with the RESET/L. CLR switch.
On the Q00J/Q00/Q01CPU, reset the CPU with the RESET/STOP/RUN switch.
(When resetting the CPU, move the switch to the RESET position until the ERROR LED flickers, and release it after the LED has gone off.)
Perform this operation on the station to be tested first, then on the station to execute the test.

(a) Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU



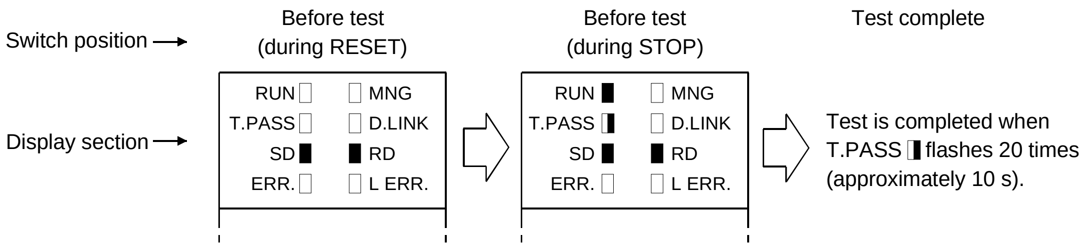
(b) Q00J/Q00/Q01CPU



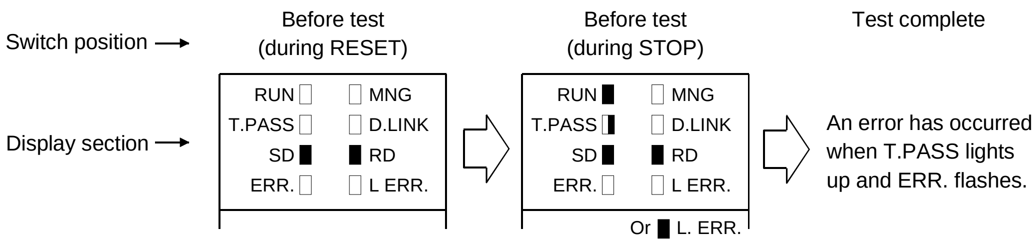
(3) Checking the test result

The T.PASS LED of the network module flashes at approximately 0.5 s intervals. The T.PASS LED flashes when the test is normal, and the ERR. LED flashes when an error occurs.

[Normal test result]



[Abnormal test result]



<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.

4.8 Network Diagnostics from GX Developer (Online Tests)

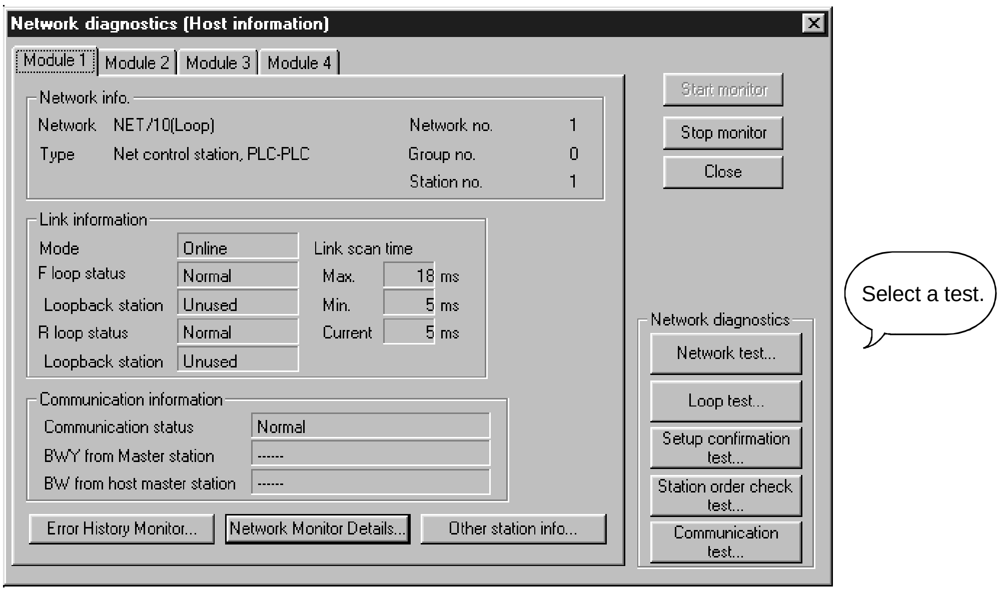
With the network diagnostic function of GX Developer, the line status can easily be checked and diagnosed.
To conduct the network diagnostics, the network parameters (station number switch, mode switch, number of module cards, network settings, and common parameters) must be set.
However, even if not 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 loop system	Data link status of cyclic and transient transmissions	Reference section
Network test	○	○	Continue	Section 7.8
Loop test	○	×	Pause	Section 4.9.1
Setup confirmation test	○	○	Pause	Section 4.9.2
Station order check test	○	×	Pause	Section 4.9.3
Communication test	○	○	Continue	Section 4.9.4

○: Execution allowed ×: Execution not allowed

For details on the operations of each function, see the GX Developer Operating Manual.

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

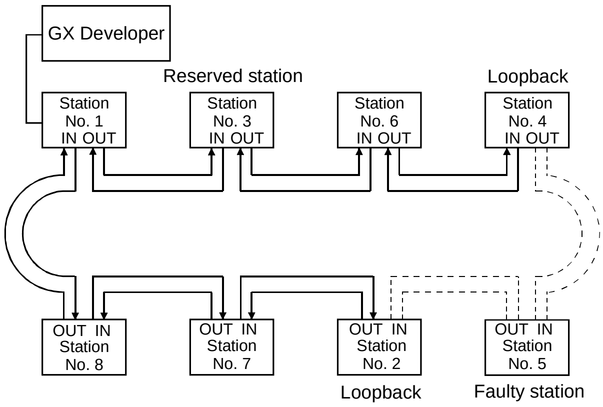


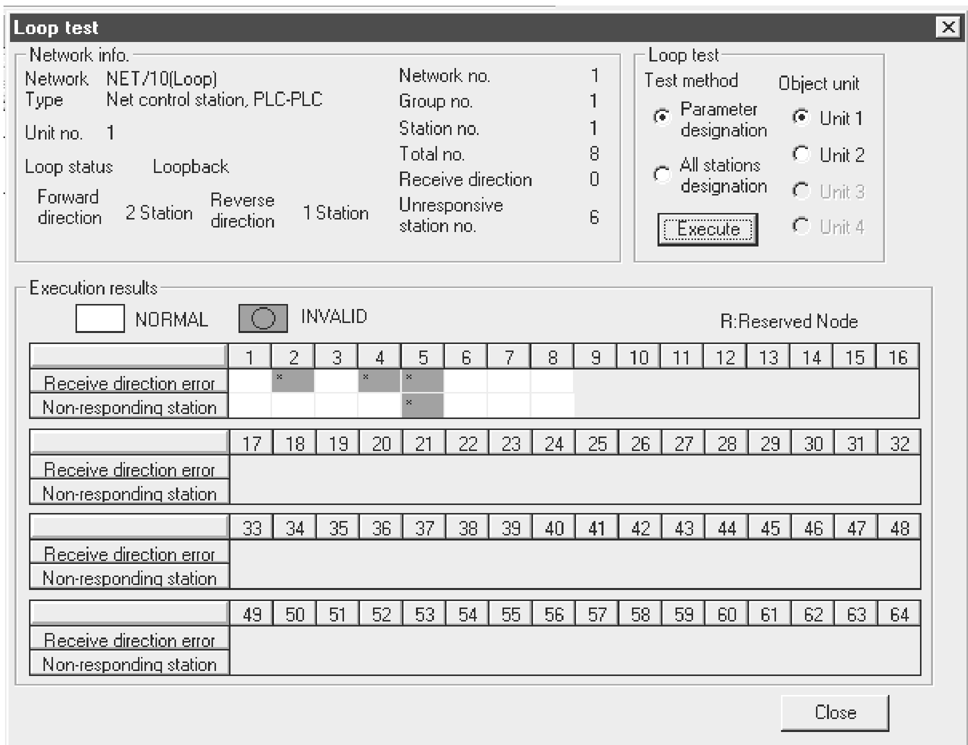
4.8.1 Loop test (optical loop system only)

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 the GX Developer connected to station number 1.

The monitor screen shown below is displayed to verify that a loopback is being executed at station numbers 4 and 2 because station number 5 is faulty.



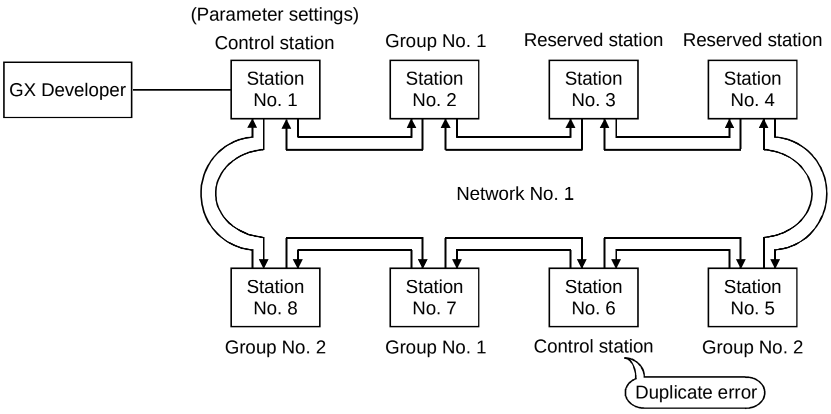


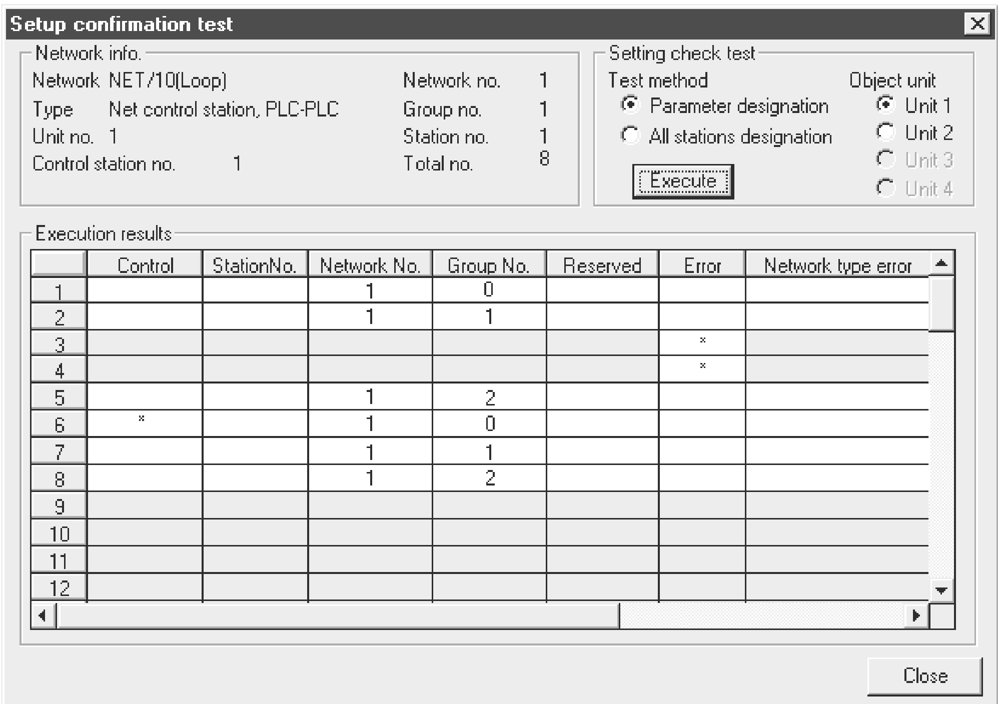
4.8.2 Setup confirmation test

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 duplicate check
2) Station number duplicate 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 the 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.





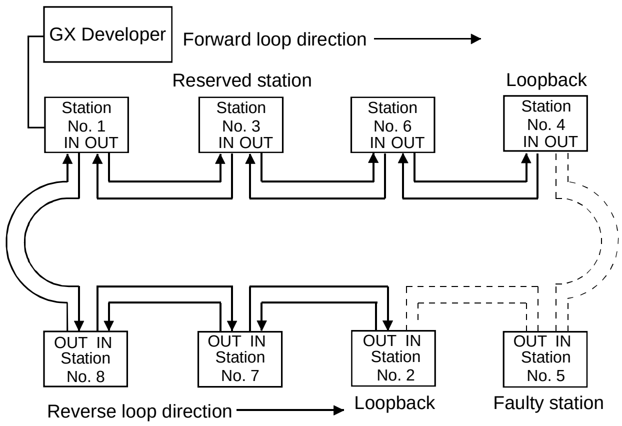
	Control	StationNo.	Network No.	Group No.	Reserved	Error	Network type error
1			1	0			
2			1	1			
3						*	
4						*	
5			1	2			
6	*		1	0			
7			1	1			
8			1	2			
9							
10							
11							
12							

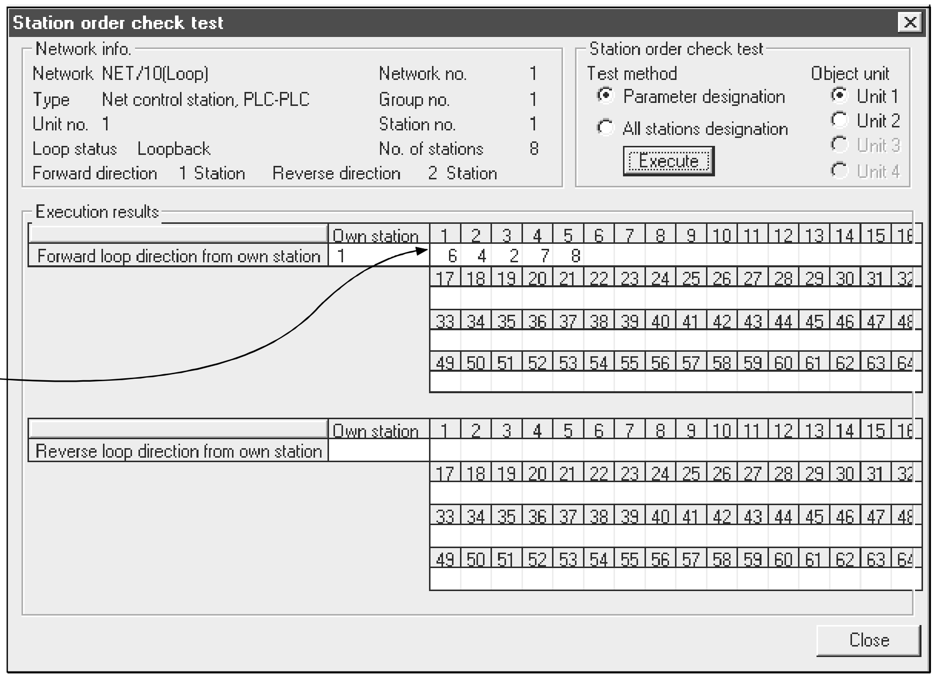
4.8.3 Station order check test (optical loop system only)

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. See 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 the 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.

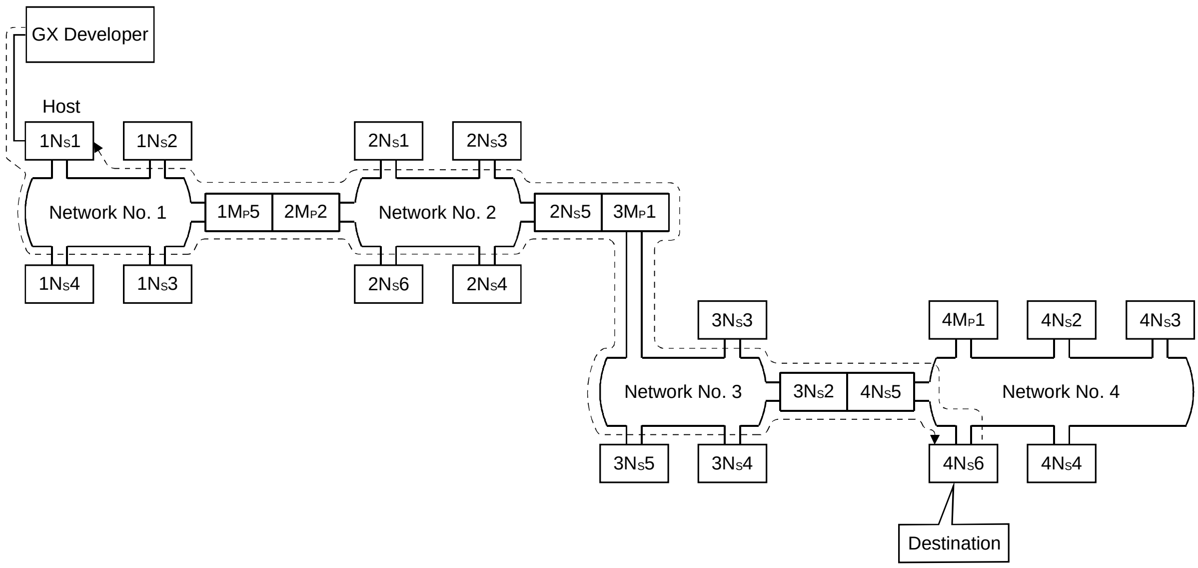


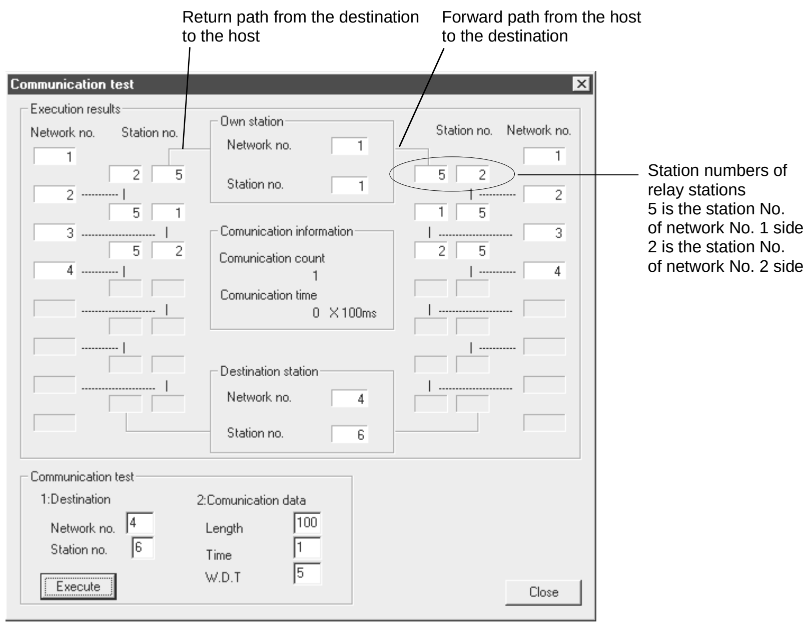


Station No. 3 is not displayed because it is a reserved station.

4.8.4 Communication test

This test checks whether or not data communication can normally be performed between the host and a destination station (designated 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 the 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.



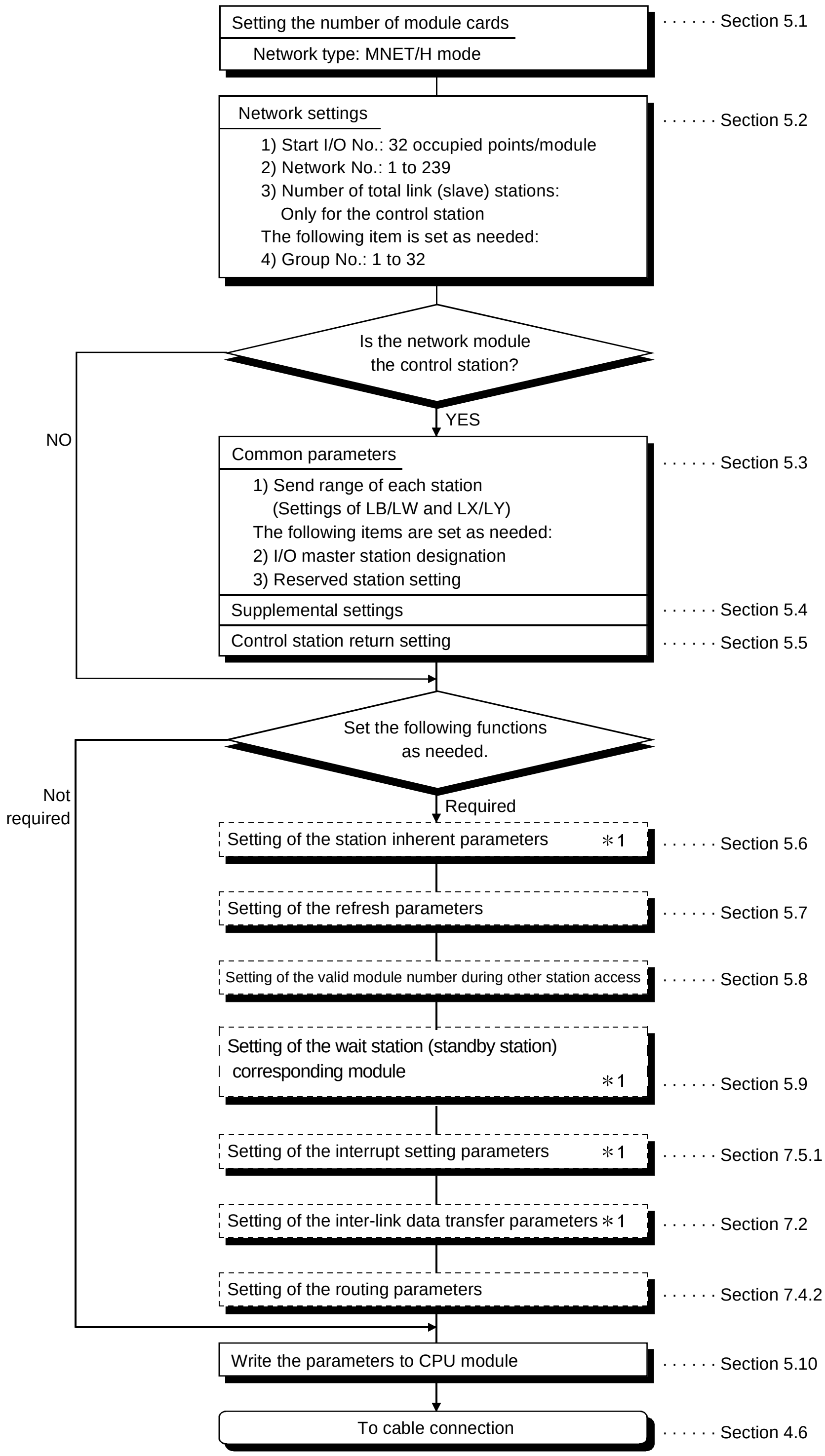


REMARK

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 loaded to the PLC CPU must be set with GX Developer.
Various parameter settings, from the selection of MELSECNET/H network systems to the specifications of the application functions, can be performed.
The following flowchart shows how the network module parameters are set:



*1: Setting cannot be made for the Q00J/Q00/Q01CPU.

Table 5.1 Differences of the parameter setting items by the station type

Parameter setting item \ Network station type	Control station	Normal station	Standby station	Reference section
Settings with the network module				Section 4.3
Station number (STATION No.)	●			Section 4.3.1
Mode (MODE)	●			Section 4.3.2
Settings with GX Developer				—
Setting the number of module cards (network type)	●			Section 5.1
Network settings				Section 5.2
Starting I/O No.	●			Section 5.2.1
Network No.	●			Section 5.2.2
Total stations	●	×	×	Section 5.2.3
Group No.	△			Section 5.2.4
Mode	●			Section 5.2.5
Common parameters				Section 5.3
Send range of each station (LB/LW settings)	●	×	×	Section 5.3.1
Send range of each station (LX/LY settings)	△	×	×	Section 5.3.2
I/O master station	△	×	×	Section 5.3.3
Reserved station settings	△	×	×	Section 5.3.4
Supplemental settings				Section 5.4
Monitoring time	■	×	×	—
Constant link scan	△	×	×	—
Maximum number of return stations per scan	■	×	×	—
Multiplex transmission	△	×	×	—
Communication error settings	■	×	×	—
Instruction to guarantee send data per station	△	×	×	—
Instruction to guarantee receive data per station	△	×	×	—
Transient settings	■	×	×	—
Low-speed cyclic transmission designation ＊2	■	×	×	—
Control station return setting	●	×	×	Section 5.5
Station inherent parameters ＊2	△	△	×	Section 5.6
Refresh parameters	■	■	×	Section 5.7
Valid module number during other station access	△			Section 5.8
Interrupt setting parameters	△	△	×	Section 7.5.1
Standby station corresponding module ＊2	×	×	●	Section 5.9
Inter-link data transfer parameters ＊2	△			Section 7.2
Routing parameters	△			Section 7.4.2

●: Always set ■: Default setting exists △: Set as needed ×: Setting not required

＊2: Setting can be made for only the Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU.

5

REMARK

The network module can execute a data link operation even if the parameters are not set. In this case, the network module operates in the following manner:

(1) It operates as a normal station.
(2) The station number and the mode vary depending on the switch settings of the network module.
(3) The network number is 1 (always 1 including when multiple network modules are loaded), and there is no group number.

The refresh processing performed on the CPU will allocate the following equally to each device in accordance with the number of mounted network modules in this case.

The devices and number of points allocated to each network module

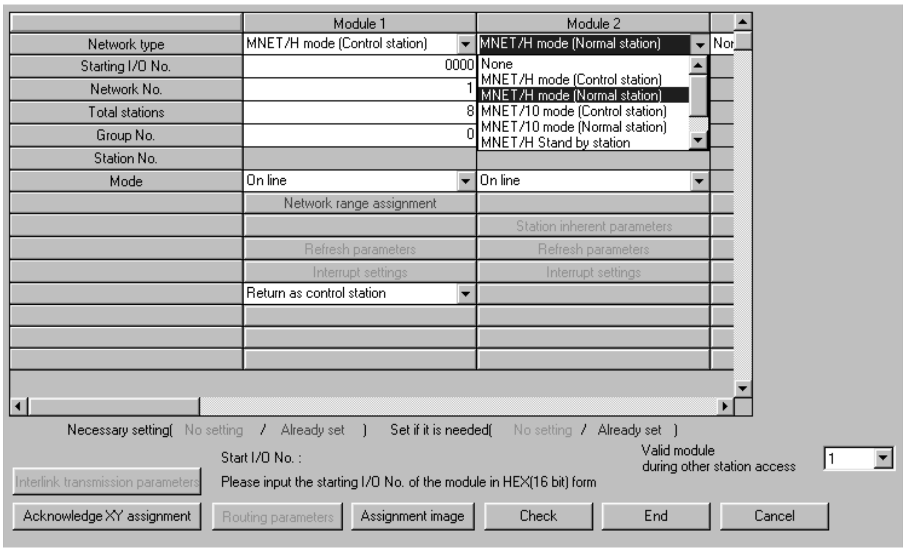
Network module device		LB	LW	SB	SW
CPU refreshing device		B	W	SB	SW
Number of mounted network modules	One	8192(2048)	8192(2048)	512(512)	512(512)
	Two	4096	4096	512	512
	Three ＊1	2048	2048	512	512
	Four	2048	2048	512	512

＊1 : The same allocations are made when the number of mounted network modules is three and four.
＊2 : The value within the parentheses is the number of points when the module is installed on the Q00J/Q00/Q01CPU.

However, if the parameters are set for at least one module when multiple network modules are loaded, the parameters must also be set for all other network modules.

5.1 Setting the Number of Module Cards (Network Type)

Set the network type and the station type for each module.
For the Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU, you can set a total of eight cards, up to four on MELSECNET/H and up to four on Ethernet.
For the Q00J/Q00/Q01CPU, you can set one card on MELSECNET/H and one on Ethernet.
For the MELSECNET/H network system, select whether the station type should be the control station, normal station or standby station.



(1) Selection type

Select from the following items:
- MNET/H mode (control station)
- MNET/H mode (normal station)
- MNET/H standby station

(2) Precautions

(a) If the MELSECNET/10 mode was selected by mistake instead of the MELSECNET/H mode, and as a result both modes coexist on the network, the network module operates in the following manner.
- The network operates normally.
- The available functions and the capacity of the link devices (LB/LW) are limited to those of the MELSECNET/10 mode.

(b) If a QnA/A MELSECNET/10 network module is connected to a network system in the MELSECNET/H mode by mistake, the network system operates in the following manner.
- If the control station is a network module in the MELSECNET/H mode, the MELSECNET/10 network module of the normal station is disconnected.
- If the control station is the MELSECNET/10 network module, the network module in the MELSECNET/H mode of a normal station operates within the range of the MELSECNET/10 mode.

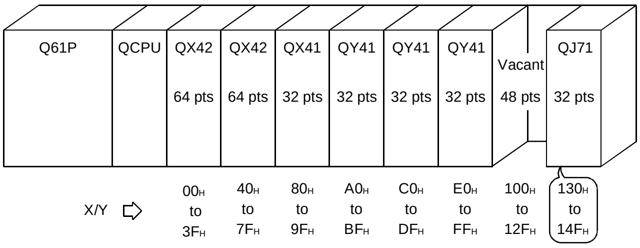
The network system in the MELSECNET/10 mode operates normally even if the MELSECNET/10 network module is connected.3

5.2 Network Settings

These parameters are used to configure the MELSECNET/H network.
Set the start I/O No., network No., total number of (slave) stations, group No. and mode for each of the module model names set in the number of module cards settings.

5.2.1 Start I/O No.

Set the starting input/output number to which the module is loaded in 16-point units in hexadecimal for each applicable network module.
For example, set 130 when the network module is loaded 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 (where the higher two digits of the 3-digit value should be set), here all three digits should be set as is.

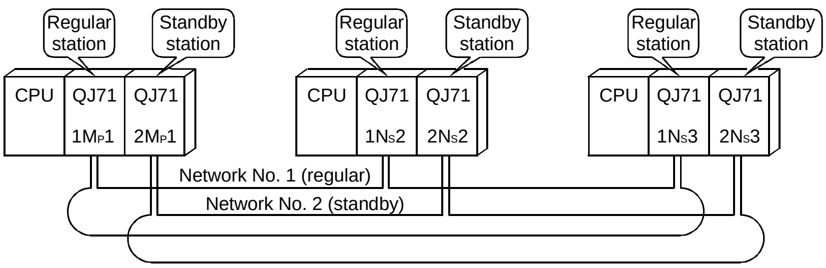
5.2.2 Network No.

Set the network number to which the applicable network module is connected.

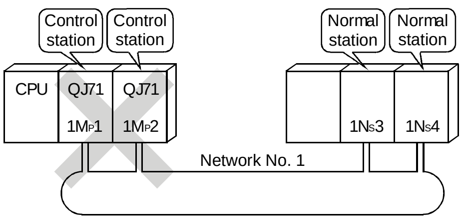
(1) Valid setting range
1 to 239

(2) Precautions

(a) For standby stations, set the network numbers that are differently from regular stations.

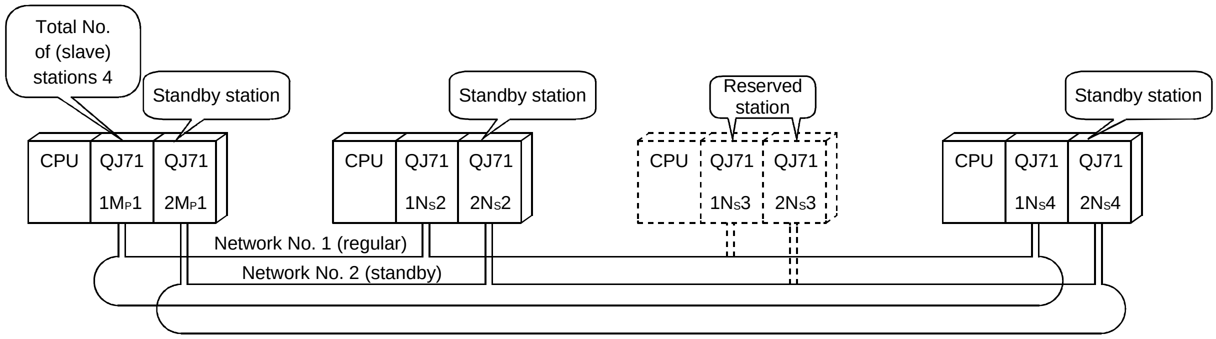


(b) The same network number cannot be set except for normal stations.



5.2.3 Total number of (slave) 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.

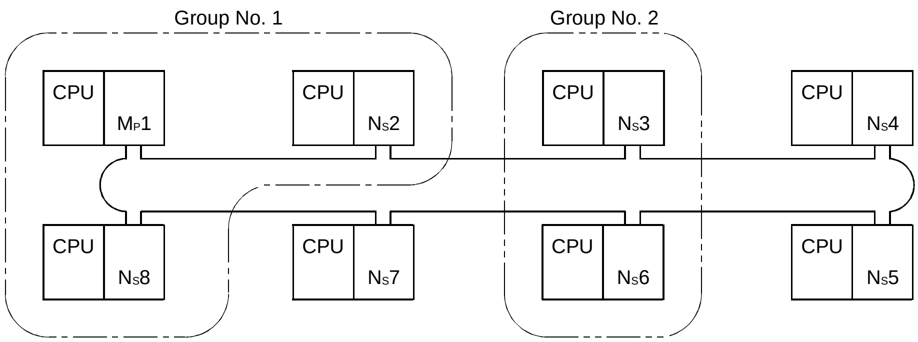


(1) Valid setting range
2 to 64

(2) Precaution
Do not include wait stations (standby stations) in the total number because their network Nos. are different.

5.2.4 Group No.

In the group number designation, set the group number for sending data to multiple stations at the same time in transient transmission.
For more details, see Section 7.4.3.

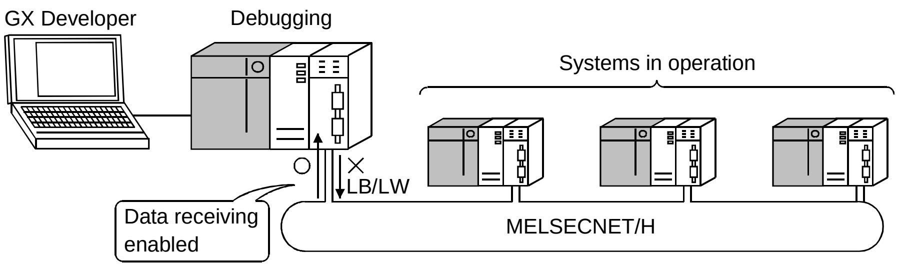


(1) Valid setting range
0 : No group setting (default)
1 to 32 : Group number

(2) Precaution
The difference from the message sending function using logical channel numbers (see Section 7.4.4) is that the groups can be changed by modifying the parameters from GX Developer. However, only one group number can be set per station.

5.2.5 Mode

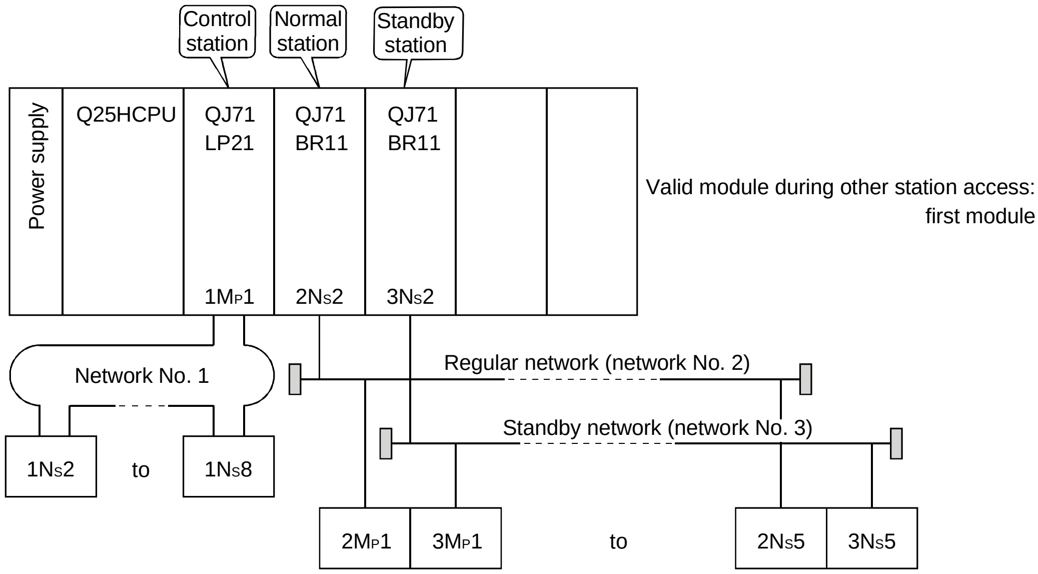
Set the operation mode of the network module.
The mode selection with this parameter becomes valid when the mode setting switch of the network module is set to 0 or 4.

<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 in the following manner: ○: 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 PLC is being added to the existing system as shown in the figure below, the debugging can be executed without stopping the network system in 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</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 on how to conduct the hardware test, see Section 4.7.2.</td></tr>
<tr><td>Reserve loop test</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 on how to conduct the hardware test, see 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 on how to conduct the station-to-station test See 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 on how to conduct the station-to-station test See Section 4.7.1.</td></tr>
</table>

5.2.6 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	
Network type	MNET/H mode (Control station)	MNET/H mode (Normal station)	MN
Starting I/O No.	0000	0020	
Network No.	1	2	
Total stations	8		
Group No.	1	10	
Station No.			
Mode	On line	On line	On
	Network range assignment		S
		Station inherent parameters	
	Refresh parameters	Refresh parameters	
	Interrupt settings	Interrupt settings	
	Return as control station		

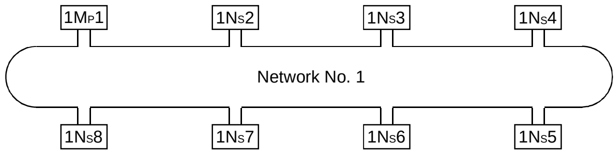
	Module 3
Network type	MNET/H Stand by station
Starting I/O No.	0040
Network No.	3
Total stations	
Group No.	10
Station No.	
Mode	On line
	Stand by station compatible module

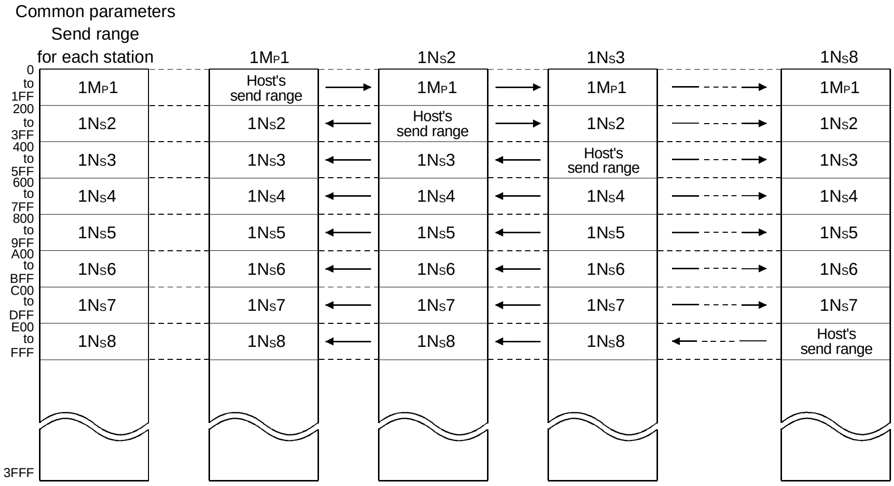
5.3 Common Parameters (Network Range Assignment Screen)

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]

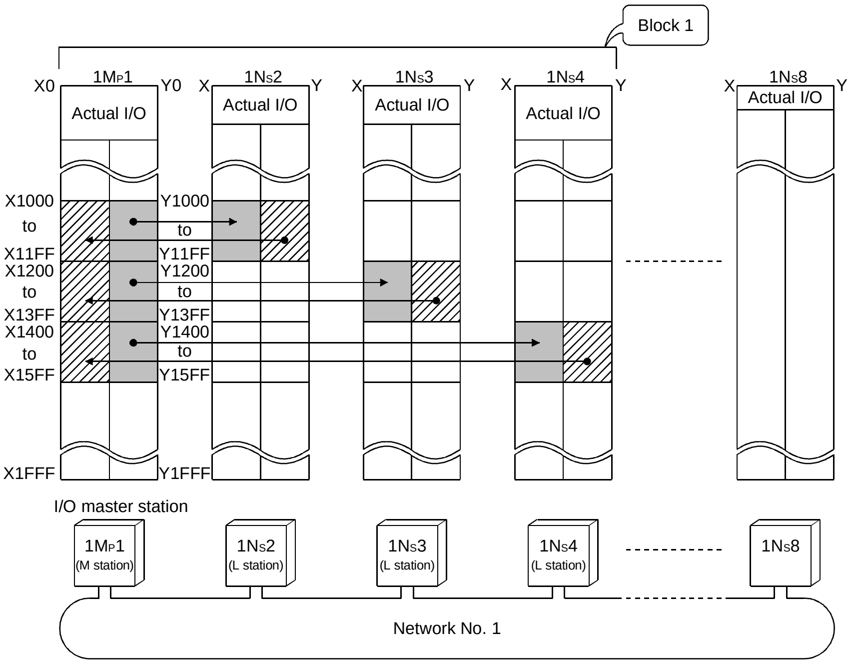
Station No.	Send range for each station LB			Send range for each station LW		
	Points	Start	End	Points	Start	End
1	512	0000	01FF	512	0000	01FF
2	512	0200	03FF	512	0200	03FF
3	512	0400	05FF	512	0400	05FF
4	512	0600	07FF	512	0600	07FF
5	512	0800	09FF	512	0800	09FF
6	512	0A00	0BFF	512	0A00	0BFF
7	512	0C00	0DFF	512	0C00	0DFF
8	512	0E00	0FFF	512	0E00	0FFF

POINT

In order to enable 32-bit data guarantee, 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 20H 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 20H and LW is a multiple of 2. (For details about the 32-bit data guarantee, see Section 6.2.1.)

5.3.2 Send range for each station (LX/LY settings)

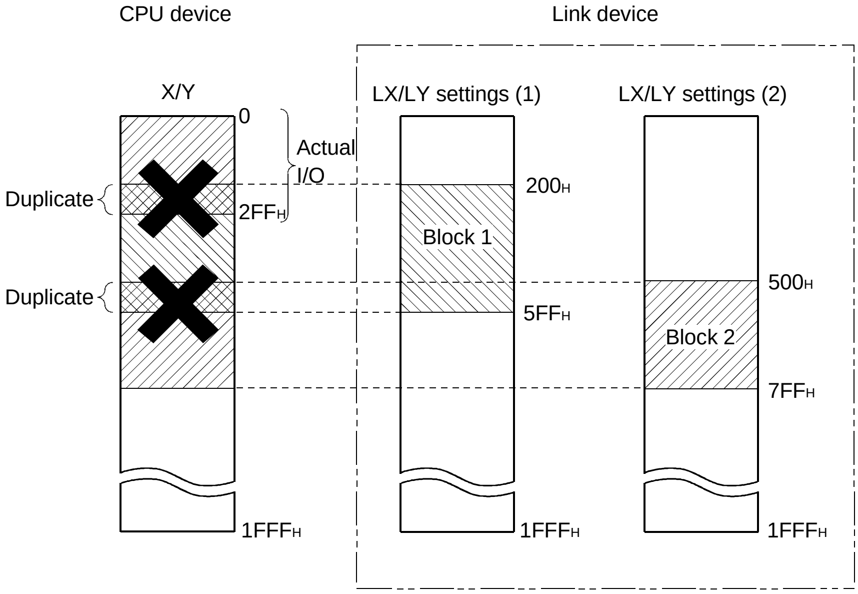
Set send ranges for each station of LX/LY, which represent the amount of data that can be sent by each station in a single network in one (two) block units.
The link devices (LX/LY) between the I/O master station (M station) and other station (L station) are assigned 1:1.
The following example shows 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
Master 1 1												
2	512	1000	11FF	512	1000	11FF	512	1000	11FF	512	1000	11FF
3	512	1200	13FF	512	1200	13FF	512	1200	13FF	512	1200	13FF
4	512	1400	15FF	512	1400	15FF	512	1400	15FF	512	1400	15FF
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 Designation of the I/O master station

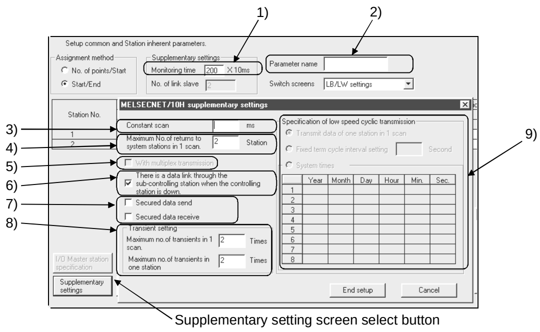
The master station (the control station) can be set in each block for 1:1 communication using LX/LY regardless of the station type (either the control station or the normal station).
Each of block 1 and block 2 has one I/O master station, which is set by the send range (LX/LY) of each station in each block.

5.3.4 Designation of the reserved station

The reserved station designation function is used to prevent stations to be connected in future (stations that are not actually connected but included in the total number of (slave) 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.

5.4 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.



[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 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 (see 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 (see 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 (see Section 3.2.2)
Set this item to use the control station switch function that allows the station having the youngest station number in the network to continue the communication as a substitute station (sub-control station) when the designated control station is disconnected due to an error, etc.
- Default: Control station switch function enabled

7) Secured data send/Secured data receive (see 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.
- Default: No setting for both send and receive

8) Transient setting (see 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

＊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.

9) Specification of low speed cyclic transmission (see 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.

(Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

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 h, 12 min and 15 s)
- 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 : 8 combinations of (year/month/date/hour/minute/second)
- Default : Disabled

POINT

On the Q00J/Q00/Q01CPU, you cannot set low-speed cyclic transmission designation.

Hence, you cannot make low-speed cyclic transmission.

5.5 Control Station Return Setting

This parameter is used to designate the type of station used by the control station when returning to the network in the control station return control (see 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.

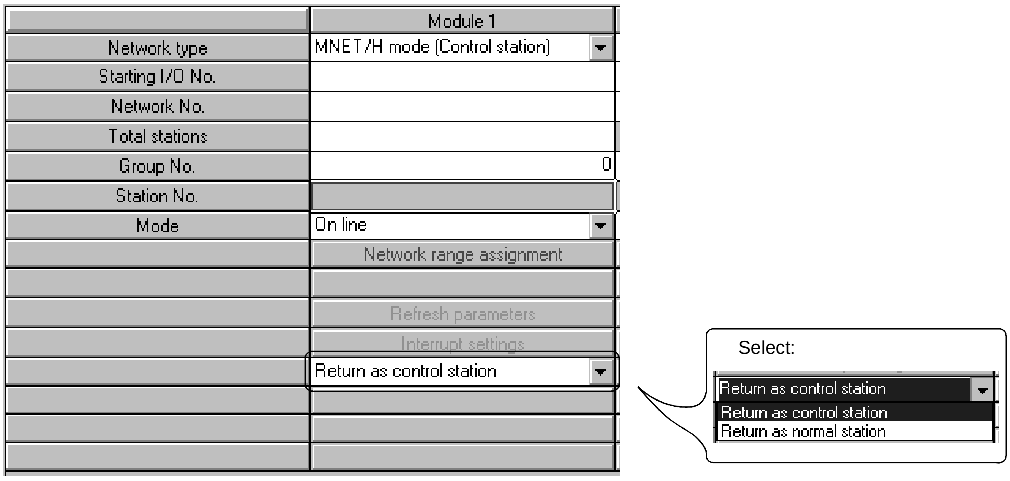
(1) When "Return as control station" is selected (default)

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]



REMARK

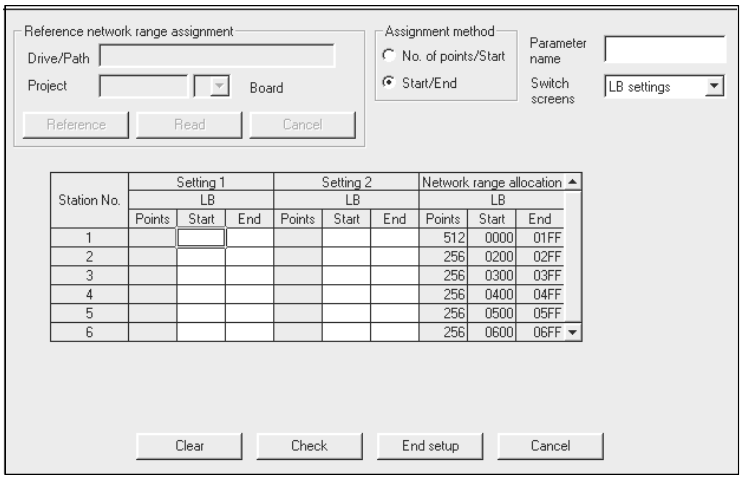
- When "Return as control station" is selected, the network stop time becomes longer because the baton pass is stopped, but the common parameters can easily be changed only by resetting the CPU of the control station.
- If "Return as normal station" is selected, the network does not stop because the 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 (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

The station inherent parameters are used to change the storage position of the link devices (LB, LW) in the network module. The link devices are assigned to each station with the common parameters.
Use this parameter to sort each station's transmission ranges (LB, LW) and to limit each station's transmission ranges to only the required transmission ranges by eliminating unused ones for each station.
Also, changes in the programs become unnecessary by setting the station inherent parameters, even after the link devices are expanded during operation.

(1) Setting items

(For the control station)
The setting items are displayed in the same way as for the common parameters; click the [Station inherent parameters] button on the [Network assignment] screen.
The values currently assigned with the common parameters are displayed in the network range assignment fields.



(For the normal station)
Since there is no need to set the common parameters, the setting items are displayed by clicking the [Station inherent parameters] button.
The common parameters of the corresponding control station can also be read using the Reference network range assignment function ([Reference] → [Select project] → [Read]).
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.

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

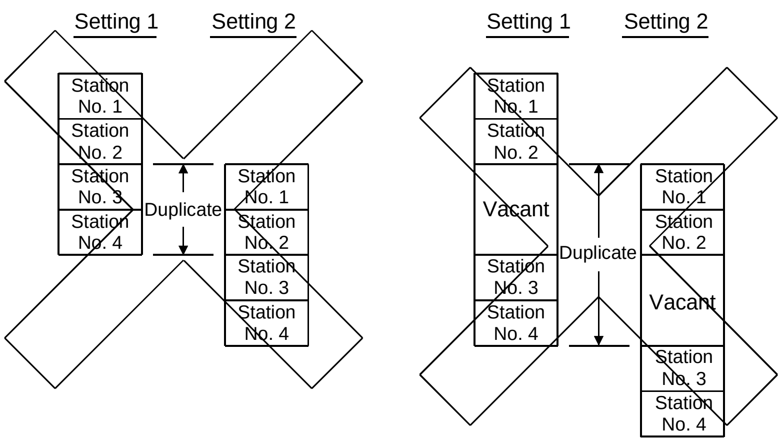
2) Switch screens
   The windows can be switched using the selection dialogue box (LB settings, LW settings).

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
   It is possible to browse the network assignment ranges of the common parameters by selecting the project name and the mounting position (Card □) of the control station module to be browsed.

POINT

(1) Set values for Setting 1 and Setting 2 within the device range designated 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) For low-speed cyclic transmission, station inherent parameters cannot be set.
(3) On the Q00J/Q00/Q01CPU, you cannot set the station inherent parameters.

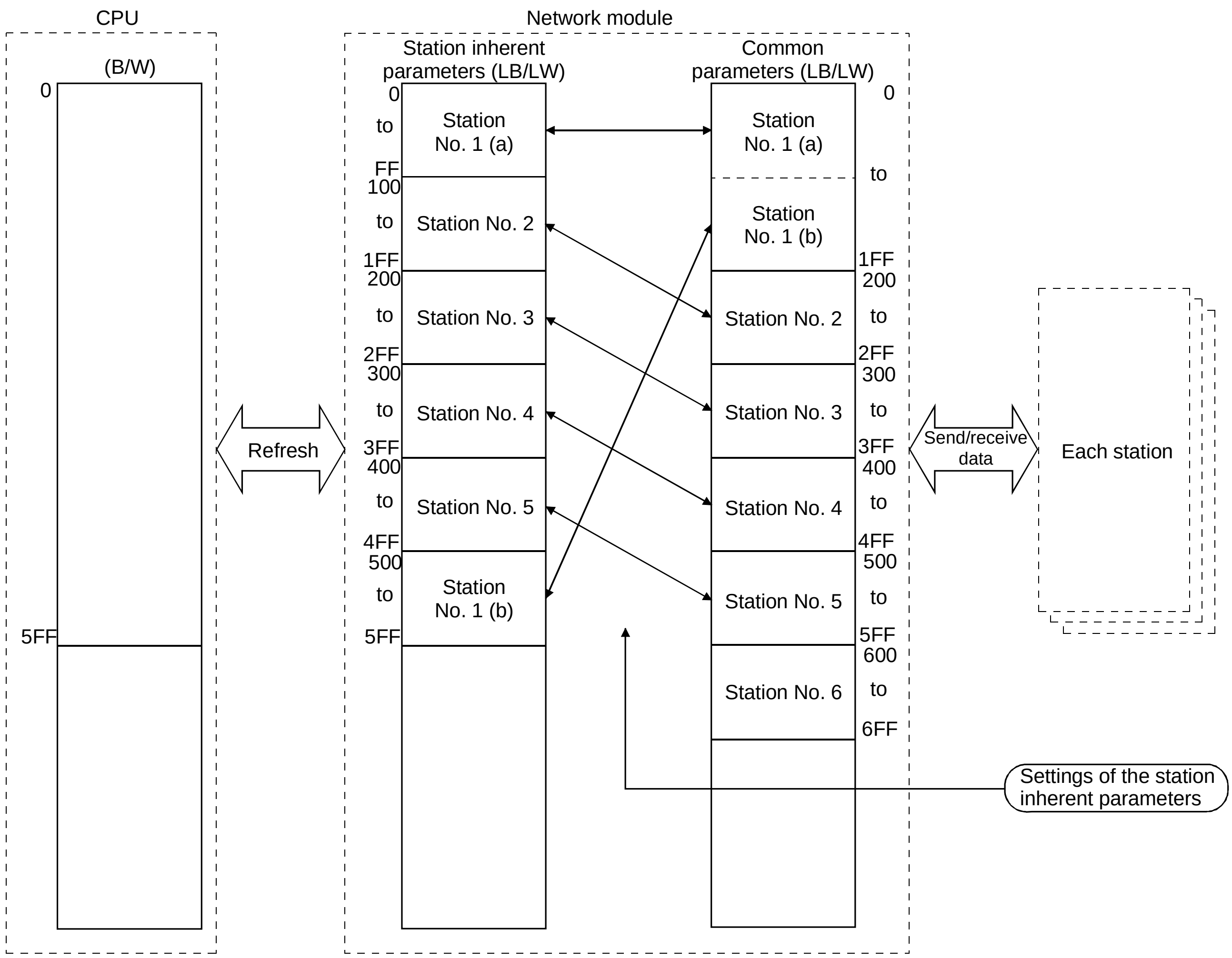
(2) Example of settings

The settings shown below are displayed on the screen when the common parameters (network assignment ranges) 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 allocation		
	LB			LB			LB		
	Points	Start	End	Points	Start	End	Points	Start	End
1	256	0000	00FF	256	0500	05FF	512	0000	01FF
2	256	0100	01FF				256	0200	02FF
3	256	0200	02FF				256	0300	03FF
4	256	0300	03FF				256	0400	04FF
5	256	0400	04FF				256	0500	05FF
6							256	0600	06FF



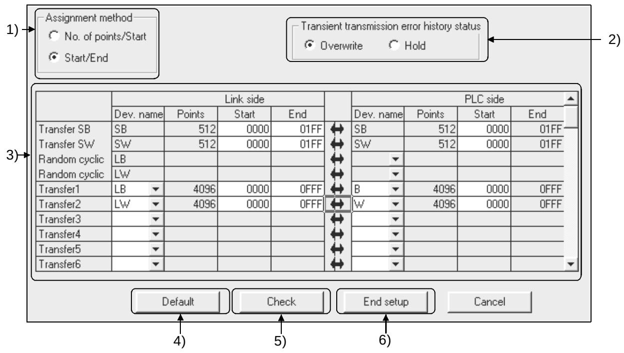
5.7 Refresh Parameters

The refresh parameters are used to transfer the link device data (LB, LW, LX, LY) of the network link 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.

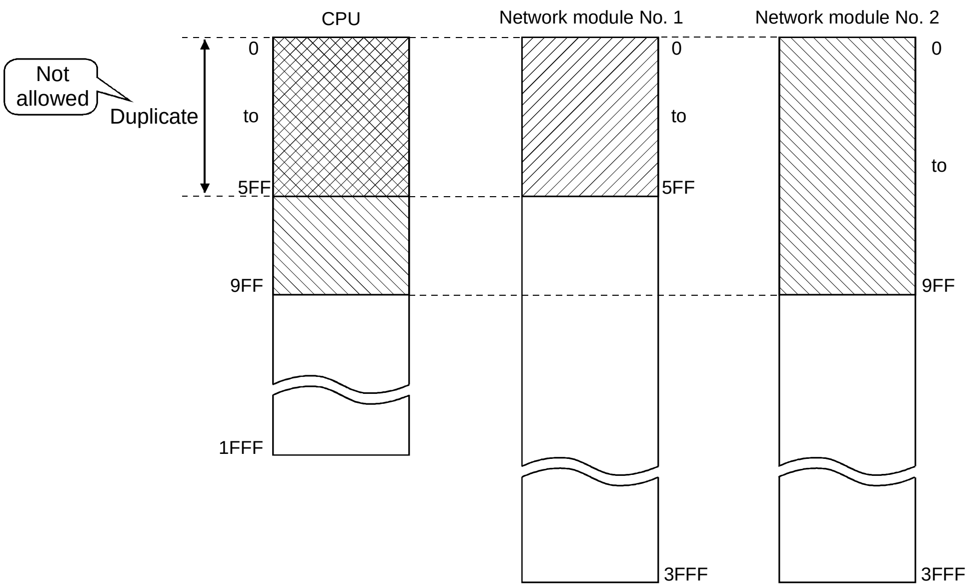
Refresh parameter

↓

[Refresh parameter setting screen]



The assignment status of the above refresh parameters can be checked with the assignment image diagram.
The assignment image diagram displays the device assignment status of the CPU module as well as between the MELSECNET/H modules (module 1 to 4).
The refresh parameters cannot be duplicated in the CPU's device settings.

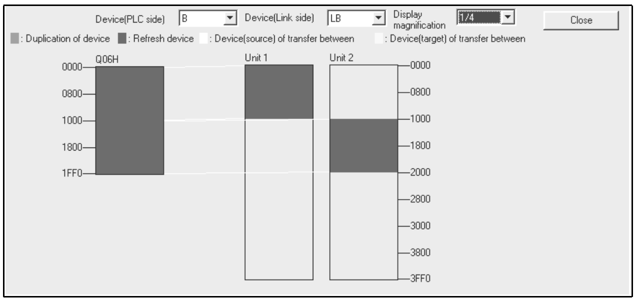


Using the assignment image diagram, assignment errors and duplicate settings between the modules can also be checked.
It is a convenient tool to view the assignment status when setting or changing the network refresh parameters.
It also displays the inter-link data transfer parameters; thus, complicated settings among the network modules can be verified.

Assignment image

↓

[Network refresh assignment image]



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 cards.

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.

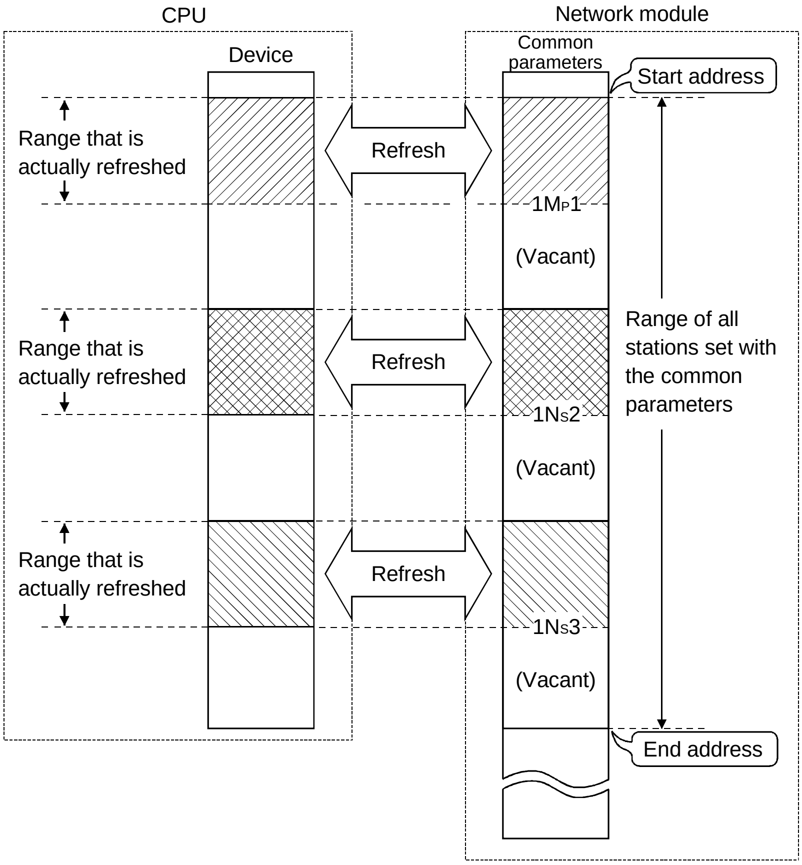
REMARK

[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 network refreshing

(1) Network refresh ranges

The devices that fall into both the range of all the stations set with the common parameters ("start address to end address" of 1MP1 to 1NS3) and the ranges set with the refresh parameters are refreshed.



(2) Devices for which network refreshing can be executed

The Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU allows you to make 64 transfer settings (LX, LY, LB, LW), one SB transfer setting and one SW transfer setting for each network module.
The Q00J/Q00/Q01CPU allows you to make eight transfer settings (LX, LY, LB, LW), one SB transfer setting and one SW transfer setting for each network module.
It is possible to transfer to different devices.
SB, LB, B, LX, LY, X, Y, M, L, T, C and ST can be set in 16-point units, and SW, LW, W, D, R and ZR can be set in one-point units.

[List of devices for which the refresh combination transfer 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∗1
:	:	⇔	:
Transfer 64	LX, LY, LB, LW	⇔	X, Y, M, L, B, T, C, ST, D, W, R, ZR∗1

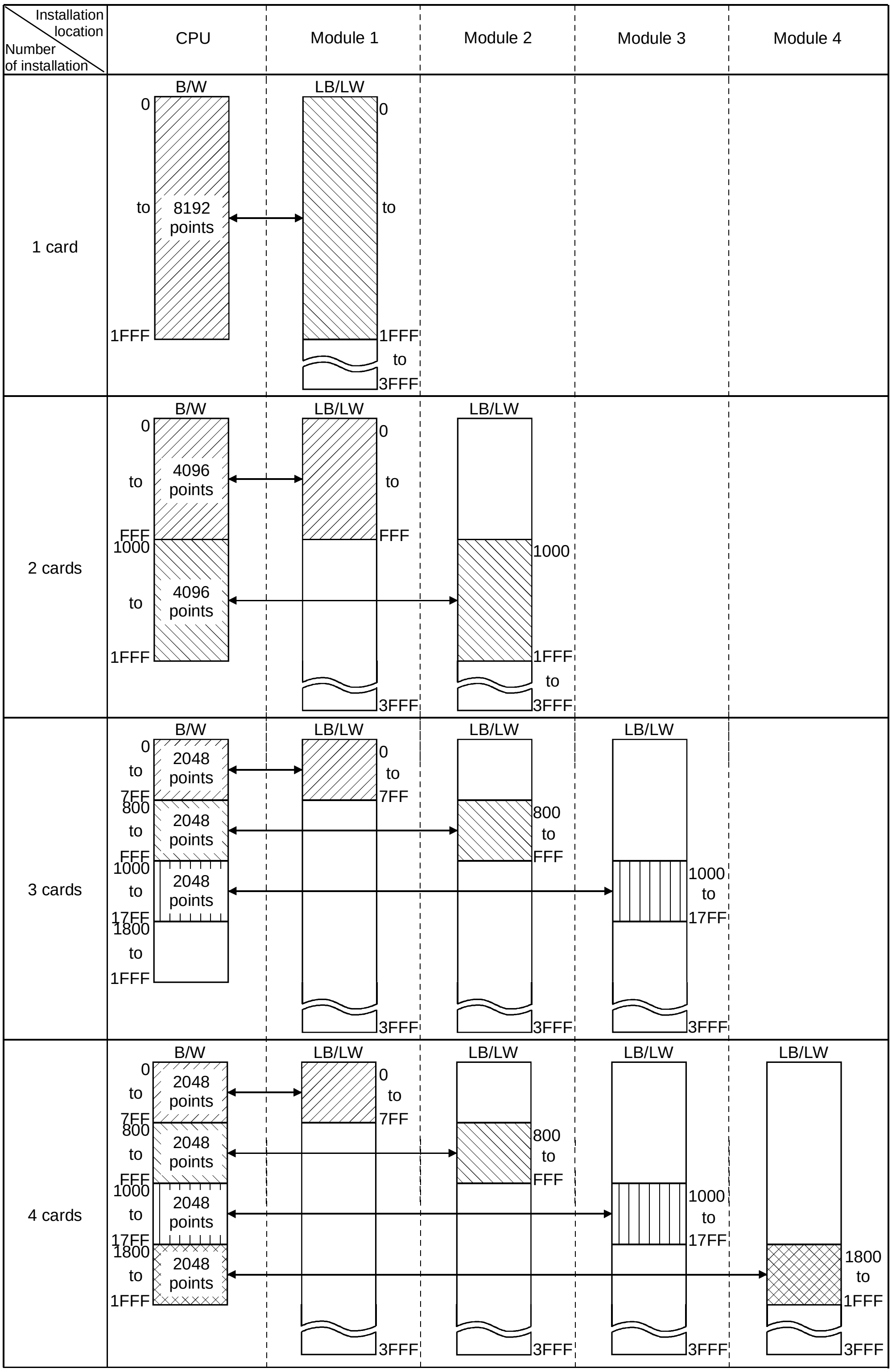
∗1: C, T or ST cannot be selected as the refresh destination of LX.

5.7.2 How to set the refresh parameters

(1) Automatic setting with the Default button

The refresh parameters can be set as follows based on the number of installed modules and the installation locations using the Default button.

(a) Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU



(b) Q00J/Q00/Q01CPU

The Q00J/Q00/Q01CPU does not have default values.

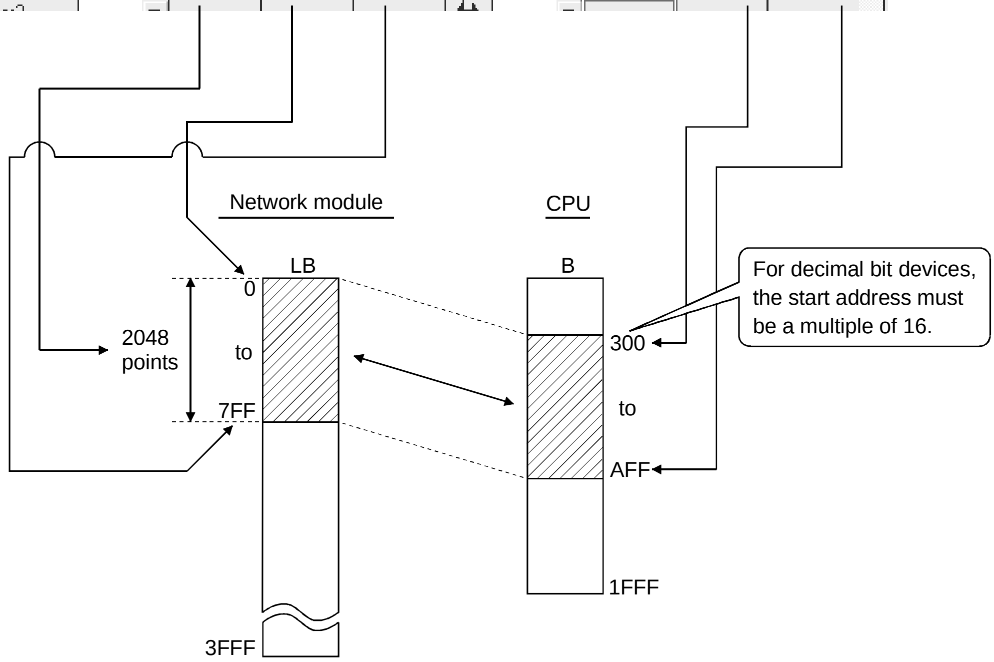
POINT

In the default setting of GX Developer, the link relay/link register (B, W) has 2k points.
Hence, pressing the [Default] button does not display, the link relay/link register (B, W) on the refresh parameter screen.
When the link relay/link register (B, W) is set to 8k points or more in the device setting of GX Developer, the link relay/register (LB, LW) is displayed.

(2) Setting method

When using the assignment method of Start/End, set the start and end addresses of the network module and the start address of the PLC side.

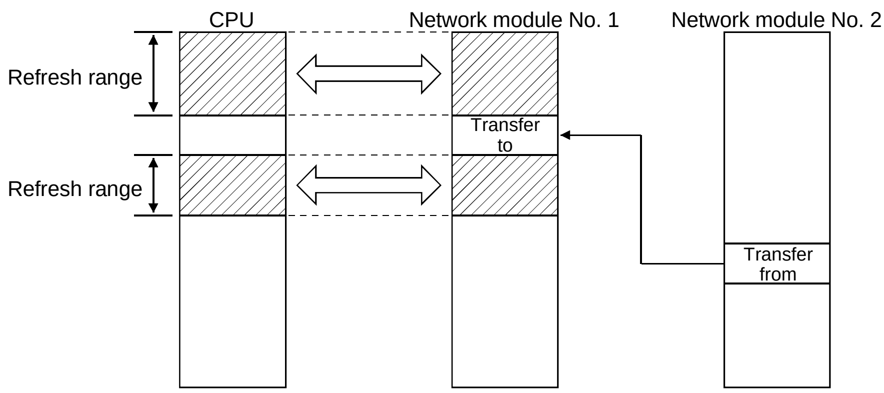
	Link side					PLC side			
	Dev. name	Points	Start	End		Dev. name	Points	Start	End
Transfer SB	SB	512	0000	01FF	↔	SB	512	0200	03FF
Transfer SW	SW	512	0000	01FF	↔	SW	512	0200	03FF
Random cyclic	LB				↔				
Random cyclic	LW				↔				
Transfer1	LB	2048	0000	07FF	↔	B	2048	0300	0AFF



POINT

(1) Make sure that the refresh range does not duplicate with other ranges used (actual I/O, etc.) when setting the device range of the CPU side.

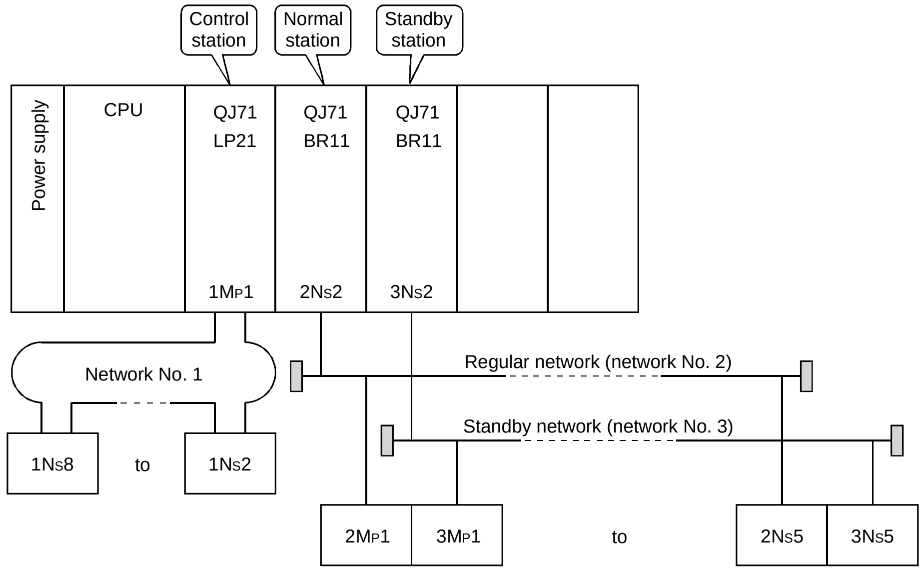
(2) When the inter-link data transfer parameters are set, do not set the device range of the transfer destination in a refresh range. Otherwise, the correct data cannot be sent to other stations.



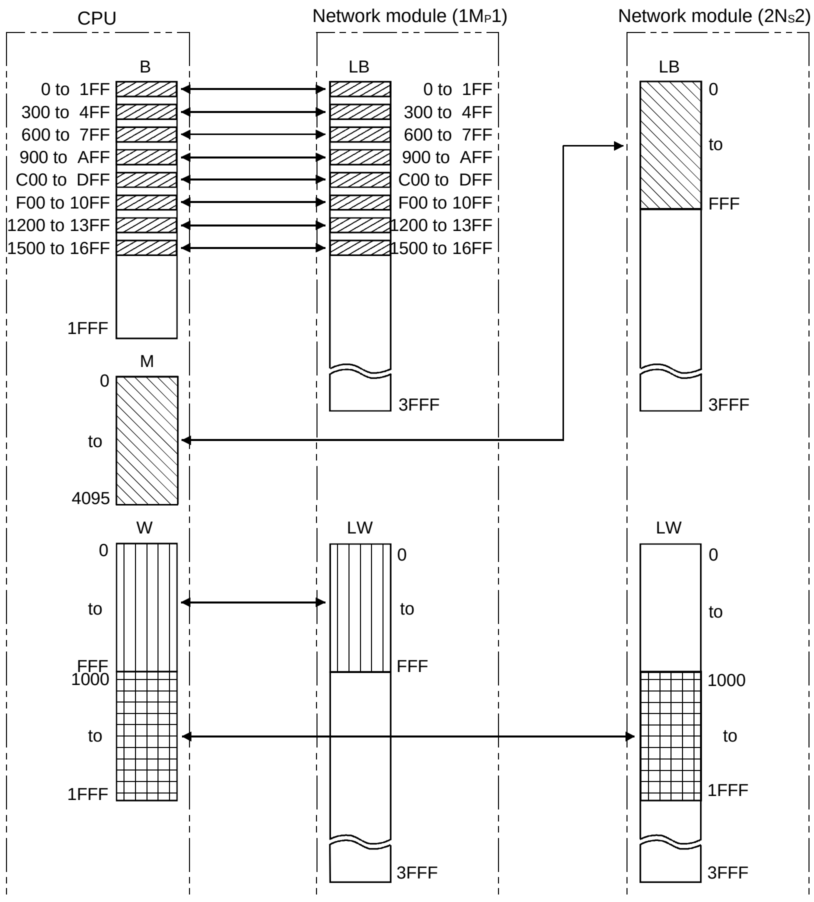
(3) Setting example

The following shows an example of the refresh parameters 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	LB	4096	1000	1FFF	↔	B	4096	1000	1FFF
Transfer3					↔				
Transfer4					↔				
Transfer5					↔				
Transfer6					↔				

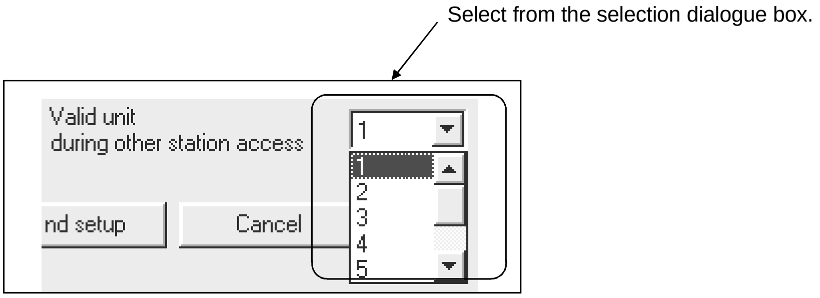
5.8 Valid Module During Other Station Access

This parameter is used to specify any of the following modules to be relayed when a data communication request for which the network No. of the access target PLC station cannot be specified from the host (access from the QJ71C24 (A compatible 1C frame), QJ71E71 (A compatible 1E frame), etc. to other stations) is issued.

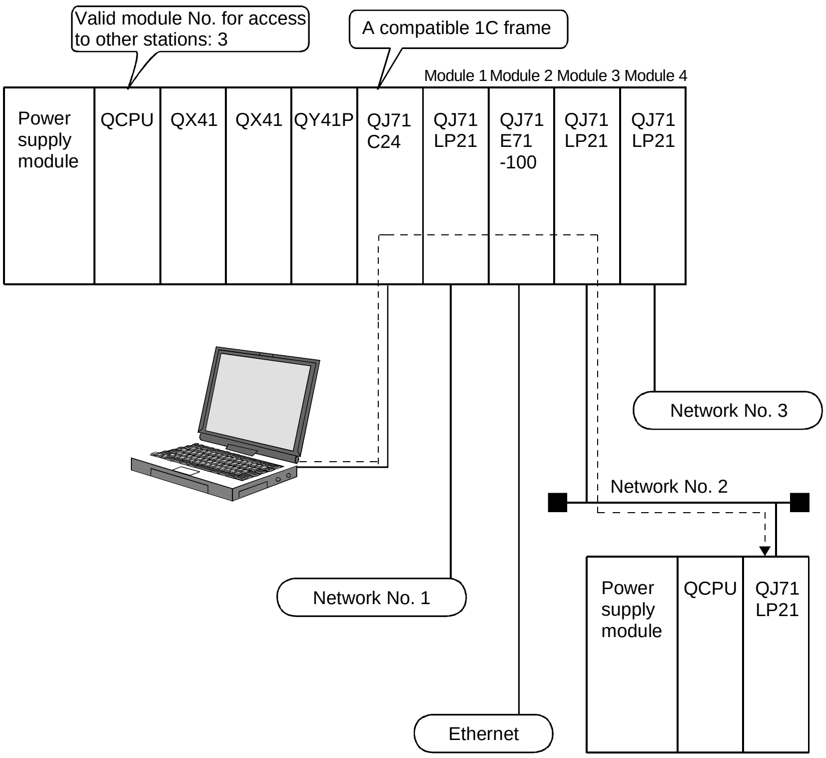
- MELSECNET/H, MELSECNET/10 module
- Ethernet module

This setting is not required when a data communication request for which the network No. can be specified, such as the QJ71C24 (QnA compatible 3C frame, QnA compatible 4C frame) or QJ71E71 (QnA compatible 3E frame), is used. Leave it as the default (1) setting.
For details of the QJ71C24 or QJ71E71 protocol, refer to the Q Corresponding MELSEC Communication Protocol Reference Manual.

[Screen settings]



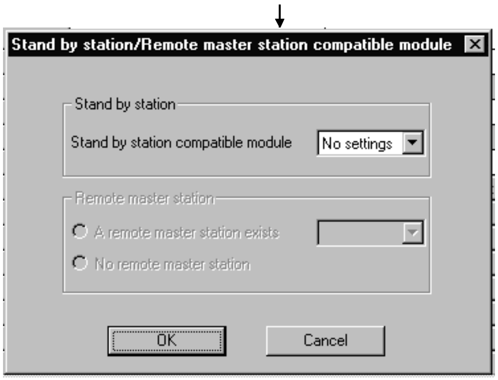
(Example)
In the example below, the personal computer connected to the QJ71C24 can communicate with the station on network No. 2 where the network module 3 is connected.



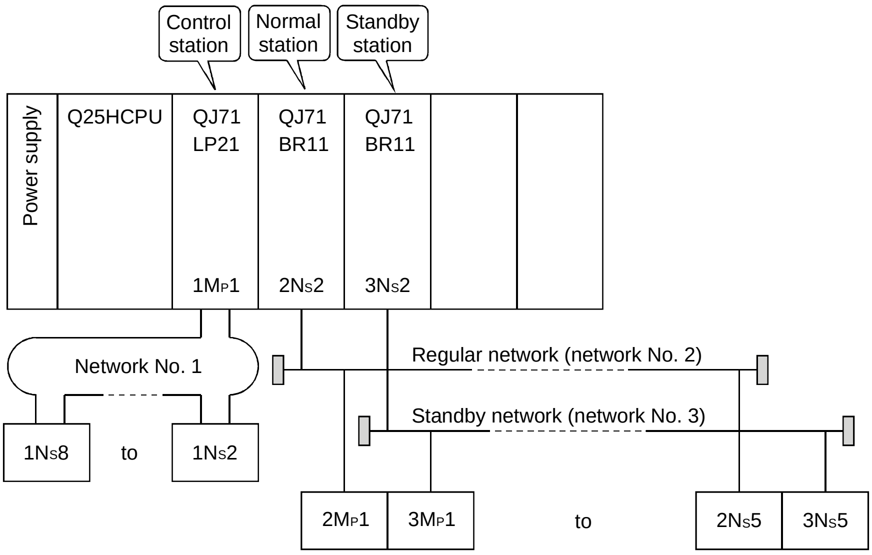
5.9 Standby Station Compatible Module (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

This parameter designates the module for the regular network.
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 "Standby station compatible module" window, and select the corresponding module.
• Default: No setting

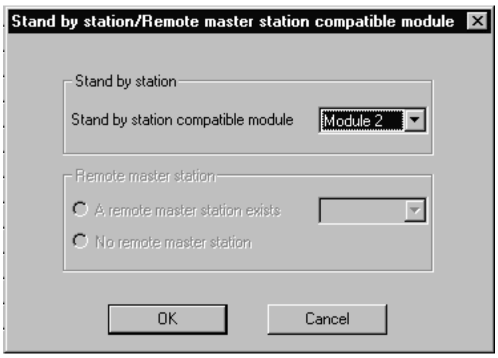
Click the Stand by station compatible modulet button.



[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.



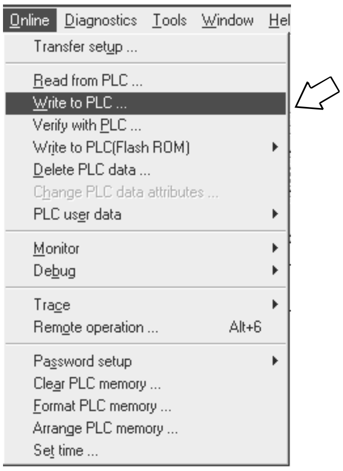
POINT

The Q00J/Q00/Q01CPU accepts only one network module.
Hence, you cannot make standby station module setting.

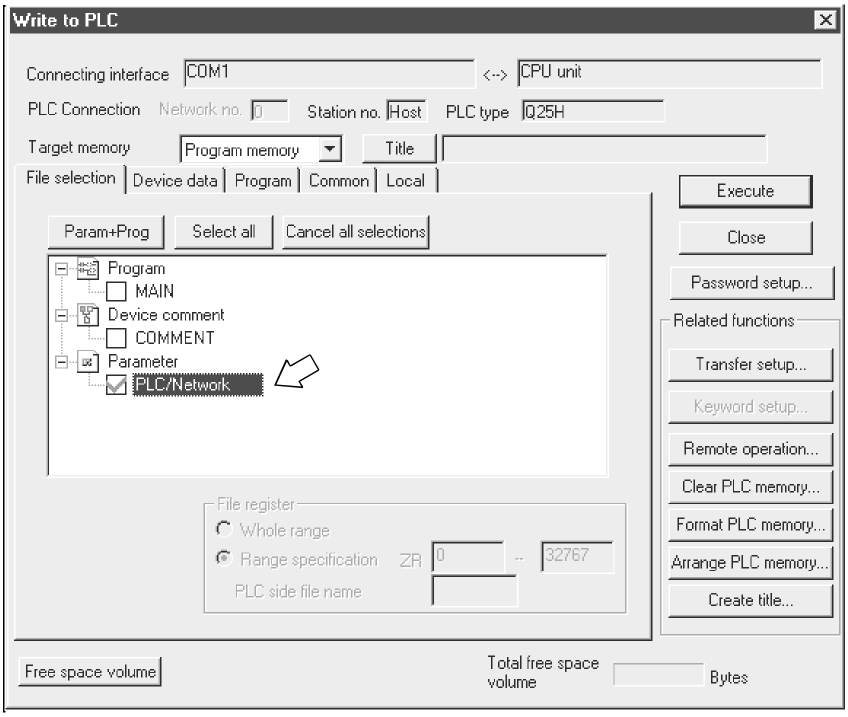
5.10 Writing the Parameters to the CPU

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 PLC of other station than the one that connects GX Developer via the MELSECNET/H, change the designation of the connection destination of GX Developer.
For more information on how to use this function, see the GX Developer Operating Manual.

(1) Select the Write to PLC function



(2) Select the PLC/network parameters as a file to be written, and then execute.



6 PROGRAMMING

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. See Appendix 3, "List of the Link Special Relays (SB)" and Appendix 4, "List of the Link Special Registers (SW)" for other explanations, such as the operation status and setting status of the host and other stations.
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. Because of this, 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 cards are installed

Device \ Mounting position	1st card	2nd card	3rd card	4th card
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 $7FF_H$

6

List of Interlock Devices

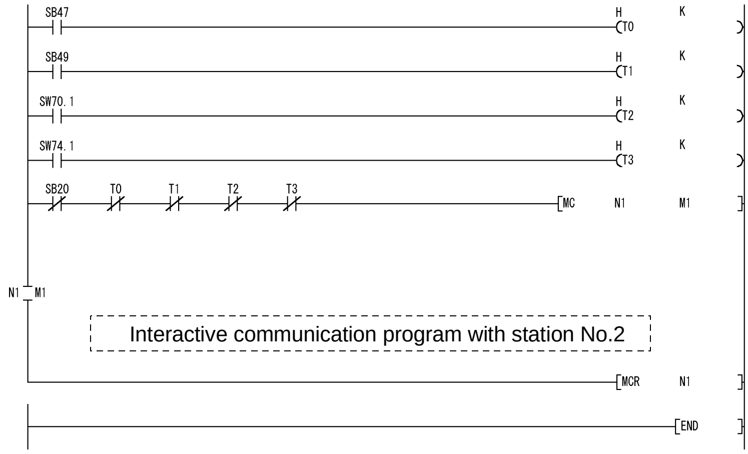
<table>
<tr><th rowspan="2">Device</th><th rowspan="2">Name</th><th rowspan="2">Description</th><th colspan="2">Device status</th></tr>
<tr><th>Off (0)</th><th>On (1)</th></tr>
<tr><td>SB20</td><td>Module status</td><td>Indicates the operation status of the network module and the communication status with the CPU.</td><td>Normal</td><td>Abnormal</td></tr>
<tr><td>SB47</td><td>Baton pass status of host</td><td>Indicates the baton pass status of the host.
It is in a status that the cyclic transmission and transient transmission can be performed when it is normal.</td><td>Normal
(Data link enabled)</td><td>Abnormal
(Host disconnected)</td></tr>
<tr><td>SB49</td><td>Data link status of host</td><td>Indicates the data link status (cyclic transmission status) of the host.</td><td>Data link being executed
(Executing cyclic transmission)</td><td>Data link being stopped
(Set after refresh completion)</td></tr>
<tr><td>SB70</td><td>Baton pass status of each station</td><td>Indicates the baton pass status of each station (including the host).
Reserved stations and stations having numbers higher than the maximum station number are not included.
This device turns off when SW70 to 73 are all "0".</td><td>All stations normal</td><td>One or more stations are abnormal</td></tr>
<tr><td>SB74</td><td>Data link status of each station</td><td>Indicates the data link (cyclic transmission) status of each station (including the host).
Reserved stations and stations having numbers higher than the maximum stations number are not included.
This device turns off when SW74 to 77 are all "0".</td><td>All stations executing data link
(All stations executing cyclic transmission)</td><td>One or more stations are not executing data link</td></tr>
<tr><td>SW70
to
74</td><td>Baton pass status of each station
(per station number)</td><td>Stores the baton pass status of each station (including the host).
<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>SW70</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>SW71</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>SW72</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>SW73</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 table denote station numbers.</td><td>Baton pass normal
(including reserved stations during online and stations having numbers higher than the maximum station number)</td><td>Baton pass abnormal
(including reserved stations during offline test and stations having numbers higher than the maximum station number)</td></tr>
<tr><td>SW74
to
77</td><td>Data link status of each station
(per station number)</td><td>Stores the data link (cyclic transmission) status of each station. (Including the host)
<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>SW74</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>SW75</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>SW76</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>SW77</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 table denote station numbers.</td><td>Executing data link
(including reserved stations and stations having numbers higher than the maximum station number)</td><td>Station not executing data link</td></tr>
</table>

6

6.1.2 Program example

Interlocks should be applied to the 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 (SB47, SB49) and the link status of station number 2 (SW70 bit 1, SW74 bit 1).

(Example)



SB47 :Baton pass status of host
SB49 :Data link status of host
SW70 :Baton pass status of each station
SW74 :Data link status of each station
SB20 :Network 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 should only be considered as a guideline.

6.2 Cyclic Transmission

The link scan of MELSECNET/H and the sequence scan of the PLC 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 guarantee execution conditions) are not met, the program should be interlocked by seeing the example in Section 6.2.3.

- 32-bit data guarantee : Section 6.2.1
- Block guarantee of cyclic data per station : Section 6.2.2

6.2.1 32-bit data guarantee

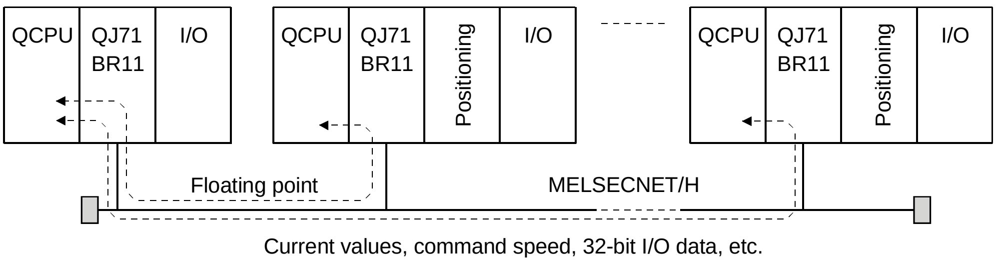
32-bit data precision is guaranteed automatically by setting parameters so that the following conditions 1) to 4) are satisfied.
If conditions 1) to 4) are not satisfied, a warning for 32-bit data separation is displayed during setting with GX Developer.

1) The start device number of LB is a multiple of 20H.
2) The number of assigned LB points per station is a multiple of 20H.
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 assignment ranges

Station No.	Send range for each station			Send range for each station			Send range for each station			Send range for each station		
	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
2	64	0020	005F	4	0002	0005	64	2020	205F	4	2002	2005
3	96	0060	00BF	6	0006	000B	96	2060	20BF	6	2006	200B
	2)	1)		4)	3)		2)	1)		4)	3)	

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 block guarantee per station 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 guarantee is valid only stations with QCPU. For those with ACPU/QnACPU, set interlock referring to interlock program example in Section 6.2.3.

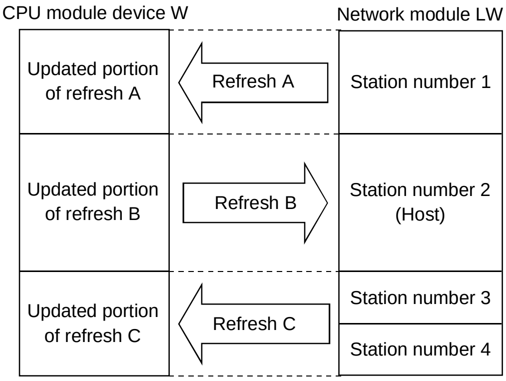
6.2.2 Block guarantee of cyclic data per station

By enabling the parameter settings shown below, handshaking for the cyclic data is performed between the CPU module and the network module and then the network is refreshed.
Through the cyclic data handshaking, the link data block is guaranteed for each station (to prevent link data separation 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.

- Default: Disabled

Network range assignments　Supplementary settings

By selecting both [Secured data send] and [Secured data receive], an interlock for the link data between the stations to be set becomes unnecessary.



<Precautions>

(1) In order to enable the block guarantee per station, it is necessary to set the refresh parameters. (See Section 5.7.)

(2) It is not necessary to set the block guarantee of cyclic data per station for normal stations.

POINT

(1) The block guarantee per station applies only to the refresh processing. To use the direct access (J□\□ designation) of the link devices, the programs should be interlocked.

(2) When the block guarantee per station is enabled, the following delay time is added to the normal transmission delay time if the sequence scan time > link scan time.

At cyclic data receiving	:	TYP + 1/2 sequence scan added
		Max + 1 sequence scan added
At cyclic data sending	:	TYP + 1/2 link scan added
		Max + 1 link scan added

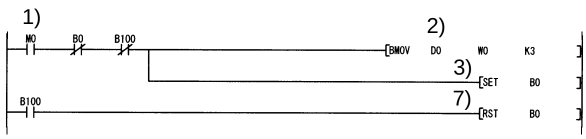
(3) When the network is set up in the MELSECNET/10 mode, block guarantee per station is valid only for stations with QCPU. For those with ACPU/QnACPU, set interlock referring to interlock program example in Section 6.2.3.

＊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.

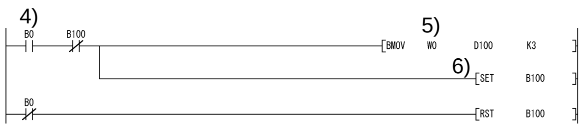
6.2.3 Interlock program example

When handling data larger than two words (32 bits) at one time without using the 32-bit data guarantee function or the block guarantee per station function, the data may split into new and old data coexisting in one word (16 bits) units.
As in the example below, the program should be interlocked using the oldest number of either the link relay (B).

Sending station



Receiving station



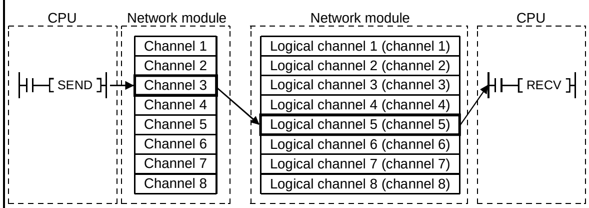
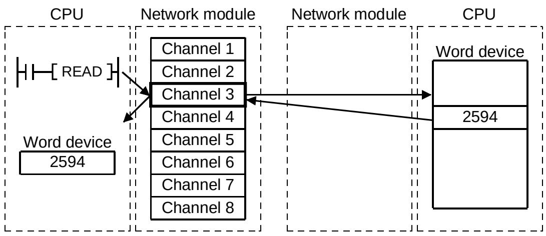
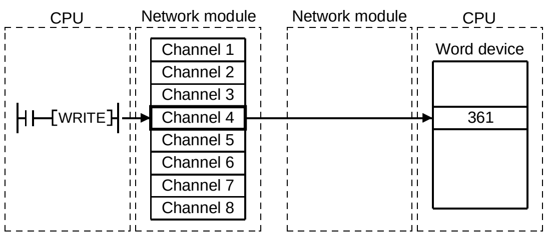
1) The send command turns on.
2) The contents of D0 to D2 are stored in W0 to W2.
3) Upon completion of storage in W0 to W2, B0 for handshaking turns on.
4) By cyclic transmission, the link relay (B) is sent after the link register (W), which turns on B0 of the receiving station.
5) The contents of W0 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.

6.3 Dedicated Link Instruction List

The following table outlines the instructions that can be used for the MELSECNET/H. For details on the format and program examples of each instruction, see the applicable section listed in the Reference section column.

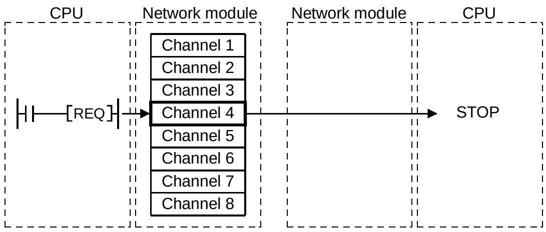
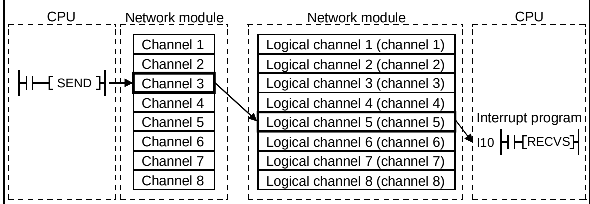
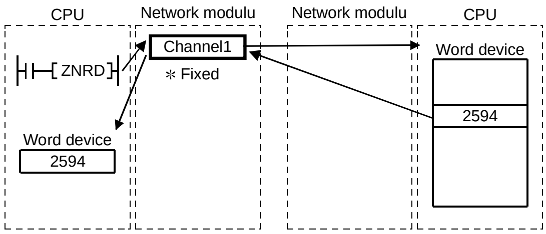
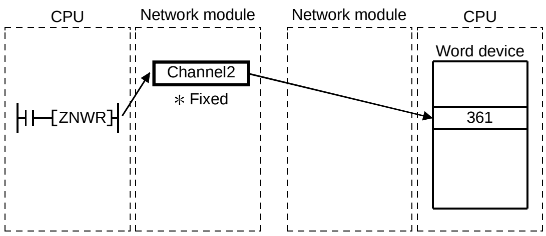
Dedicated Link Instruction List

○: Can be used by both the control and normal stations ×: Cannot be used

Instruction	Name	Executing station QCPU	Description	Target station QCPU	Target station QnACPU	Target station AnUCPU	Reference section
SEND	Send data	○	SEND : Writes data to the target station (network module) having the target network number. RECV : Reads data sent with SEND to the CPU device. 	○	○	×	Section 7.4.5 (1)
RECV	Receive data	○					
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. 	○	○	×	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. (SWRITE can turn on the device of the target station.) 	○	○	×	Section 7.4.5 (2)

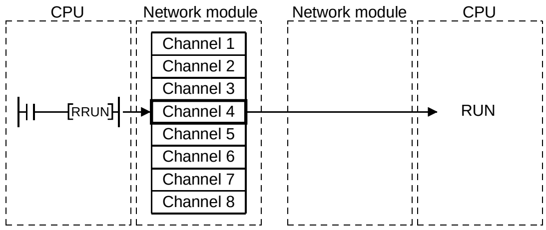
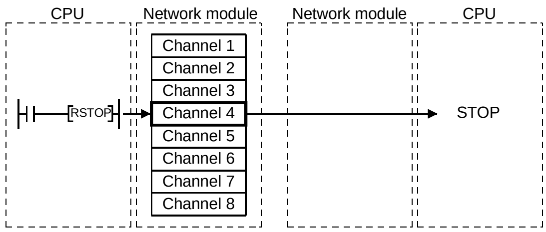
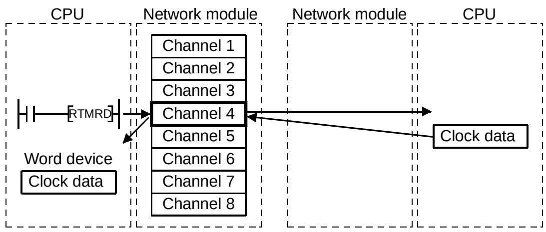
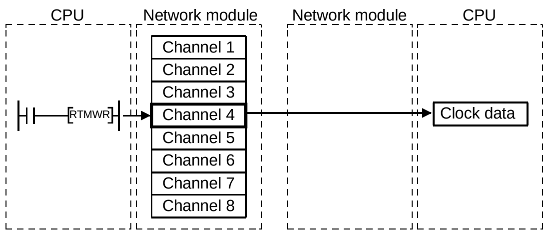
Dedicated Link Instruction List

○: Can be used by both the control and normal stations ×: Cannot be used

Instruction	Name	Executing station QCPU	Description	Target station QCPU	 QnACPU	 AnUCPU	Reference section
REQ	Transient request to other station	○	Issues "remote RUN" and "clock data read/write" requests to other stations. 	○	○	×	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. 	○	○	×	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. 	○	○	○	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. 	○	○	○	Section 7.4.5 (4)

Dedicated Link Instruction List

○: Can be used by both the control and normal stations ×: Cannot be used

Instruction	Name	Executing station	Description	Target station			Reference section
		QCPU		QCPU	QnACPU	AnUCPU	
RRUN	Remote RUN	○	"Remote RUN" performed for other stations' CPU modules 	○	×	×	Section 7.4.5 (5)
RSTOP	Remote STOP	○	"Remote STOP" performed for other stations' CPU modules 	○	×	×	Section 7.4.5 (5)
RTMRD	Other station clock data read	○	"Read Clock Data" performed for other stations' CPU modules 	○	×	×	Section 7.4.5 (6)
RTMWR	Other station clock data written	○	"Write Clock Data" performed for other stations' CPU modules 	○	×	×	Section 7.4.5 (6)

POINT

(1) Execute the dedicated link instructions during data link.
If it is executed in the offline mode, an error will not occur but the dedicated link instruction will not be completed.

(2) Turn off the executing link instruction after the completion device turns on.

(3) When the dedicated link instruction is used to access the other station PLC during network diagnosis, the execution of the dedicated link instruction may be delayed.
After taking the following measures, perform network diagnosis processing and execute the dedicated link instruction.
- Execute the COM instruction.
- Using special register SD315, secure 2 to 3ms as the communication processing time.

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.
The following table shows which SB and SW can be used to check which information.
For more details, see Appendixes 3 and 4.

(1) The following SB and SW provide the information about the host

Item	SB	SW
CPU status of the host	SB004A$_H$ to 4B$_H$	SW004B$_H$
Execution status of the dedicated link instruction	—	SW0031$_H$, SW0033$_H$, SW0035$_H$, SW0037$_H$, SW0039$_H$, SW003B$_H$, SW003D$_H$, SW003F$_H$
Operation status of the network module	SB0020$_H$	SW0020$_H$
Setting status of the network module	SB0040$_H$, SB0042$_H$ to 44$_H$, SB0058$_H$ to 59$_H$, SB0064$_H$, SB0068$_H$ to 69$_H$	W0040$_H$ to 44$_H$, SW0046$_H$, SW0054$_H$ to 57$_H$, SW0059$_H$ to 5D$_H$, SW0064$_H$ to 68$_H$
Running status of the network module	SB0047$_H$ to 49$_H$	SW0047$_H$ to 4A$_H$

(2) The following SB and SW provide the information about the entire network

Item	SB	SW
CPU status of each station (normal/abnormal)	SB0080$_H$, SB0088$_H$	SW0080$_H$ to 83$_H$ SW0088$_H$ to 8B$_H$
CPU operation status of each station (RUN/STOP)	SB0084$_H$	SW0084$_H$ to 87$_H$
Cyclic transmission status of each station	SB0074$_H$	SW0074$_H$ to 77$_H$
Link scan, communication mode	SB0068$_H$ to 69$_H$	SW0068$_H$ SW006B$_H$ to 6D$_H$
Setting information of the network	SB0054$_H$ to 59$_H$, SB0064$_H$, SB0068$_H$ to 69$_H$	SW0054$_H$ to 57$_H$, SW0059$_H$ to 5D$_H$, SW0064$_H$ to 68$_H$
Running information of the network	SB0070$_H$	SW0070$_H$ to 73$_H$
Line status	SB0090$_H$ to 92$_H$, SB0095$_H$ to 96$_H$, SB0099$_H$ to 9A$_H$,	SW0090$_H$ to 9A$_H$ SW009C$_H$ to 9F$_H$

7 APPLICATION FUNCTIONS

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) ······· 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
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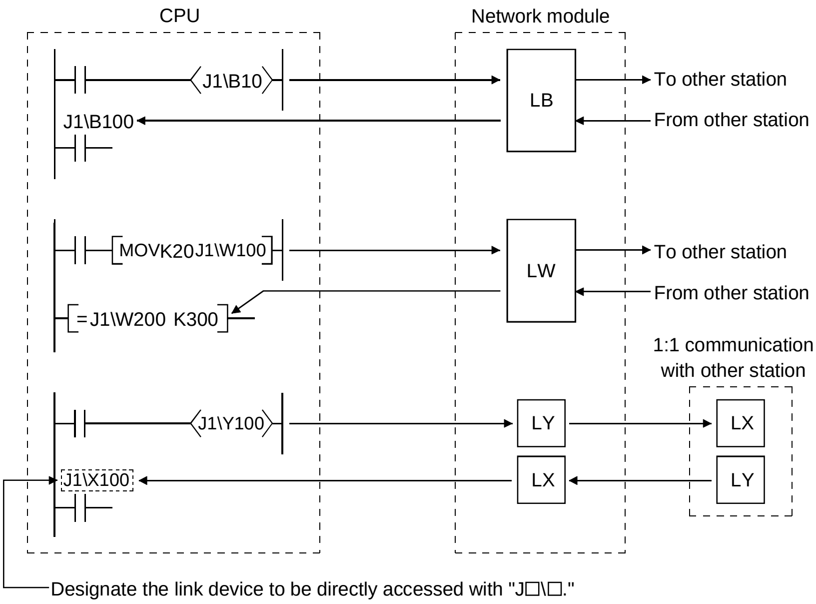
    - Group function ······························ Section 7.4.3
    - Message sending function using logical channel numbers ······ Section 7.4.4
    - Data sending/receiving (SEND/RECV) ················ Section 7.4.5 (1)
    - Other station word device read/write (READ/SREAD/WRITE/SWRITE) ········ Section 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)
  - Time 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
  - Network diagnostic (line monitor) ······················ Section 8.1

7.1 Direct Access to the Link Devices

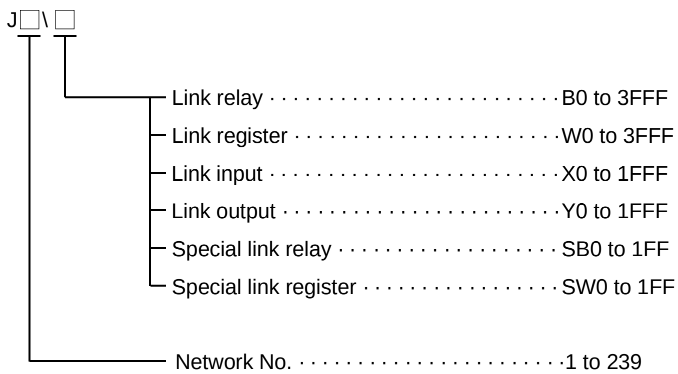
The link devices (LB, LW, LX, LY, SB, SW) of the network module can be directly read or written by sequence programs regardless of the link refresh of the CPU module.
With direct access, link devices that are not set within the range of the link refresh (reading/writing link devices between the CPU module and network modules) with the refresh parameters can also be read or written.
By directly accessing the link devices, the link refresh time and the transmission delay time can be shortened.



POINT
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.

(1) How to designate J□\□

Designate the network number and link device to be read or written.



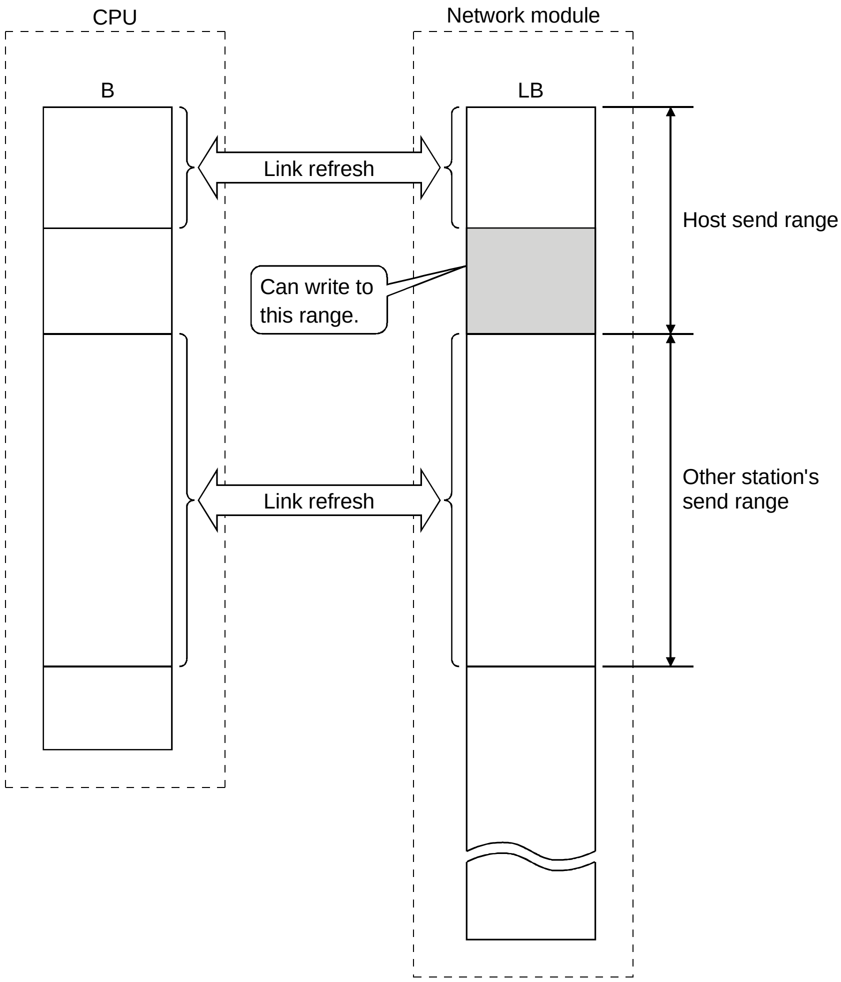
(2) Address designation range of the link devices

(a) When reading

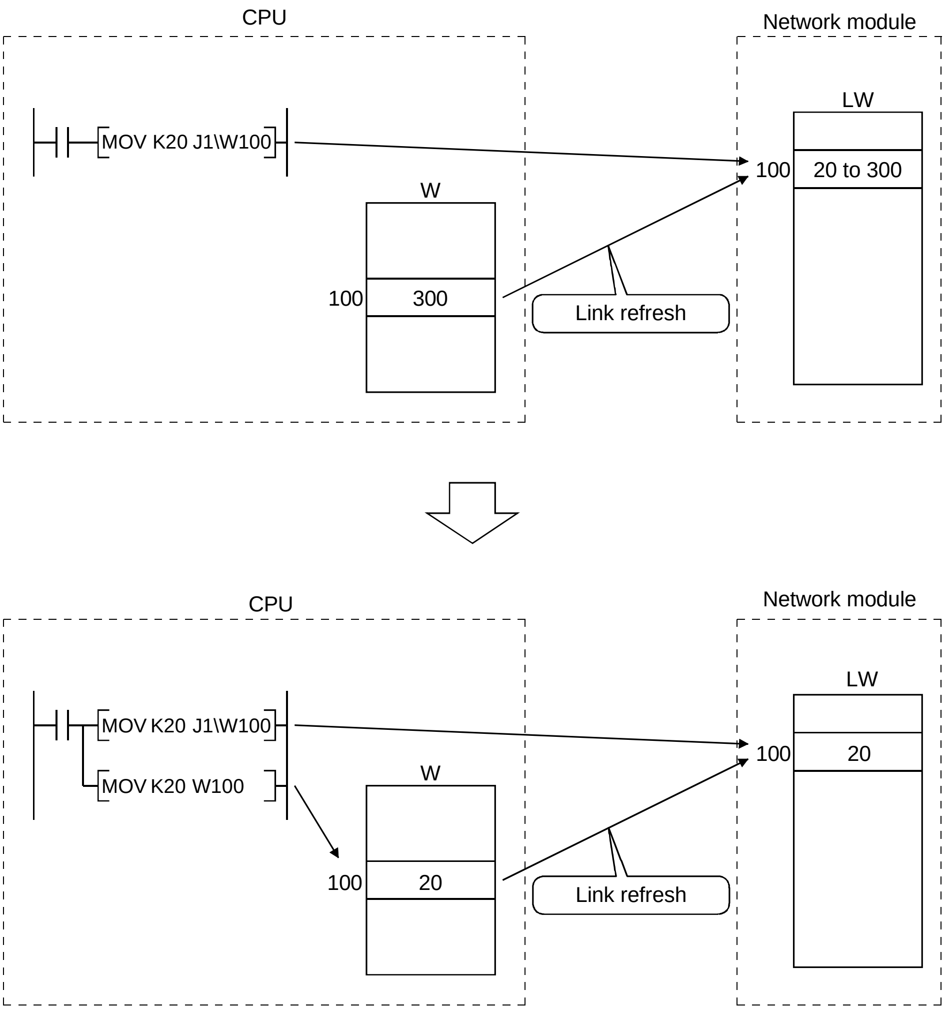
Read the entire range of link device addresses of the network module.

(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 designated, 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).



(4) Differences from the link refresh

The following table shows how the direct access to link devices is different from the link refresh.
For further details, see the QCPU User's Manual (Function Explanation/ Program Fundamentals).

Item \ Access method	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 block guarantee per station is enabled.
∗3: When the 32-bit data guarantee conditions are satisfied.

7.2 Inter-Link Data Transfer Function (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

This function transfers link data to different networks in a batch mode using parameters when multiple networks are connected to one PLC.

POINT
The Q00J/Q00/Q01CPU accepts only one network module. Hence, you cannot use the inter-link data transfer function.

(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.

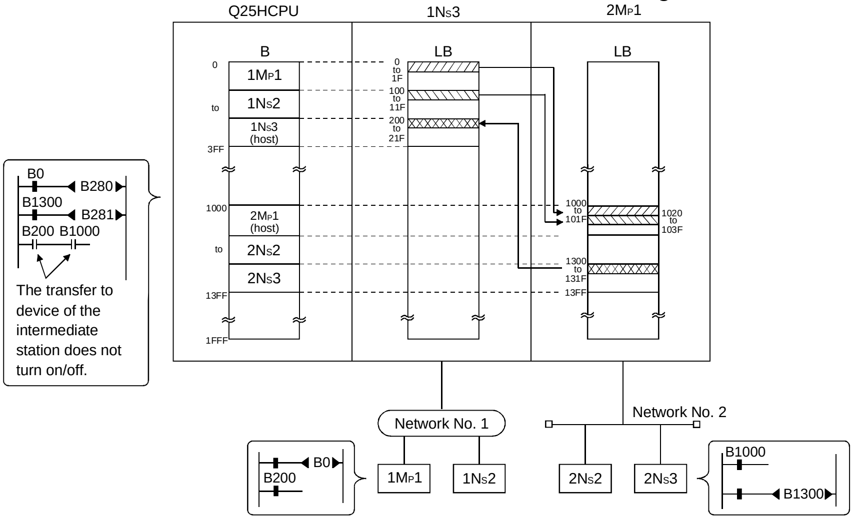
(b) It is necessary to set the "Inter-link data transfer parameters" in order to execute the inter-link data transfer function.

(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 inter-link data transfer parameters, "Module 1 → 2" and "Module 1 → 3."

The diagram below shows an example of transfer between network number 1 and network number 2.
Set the "Inter-link data transfer parameters" for the PLC 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.



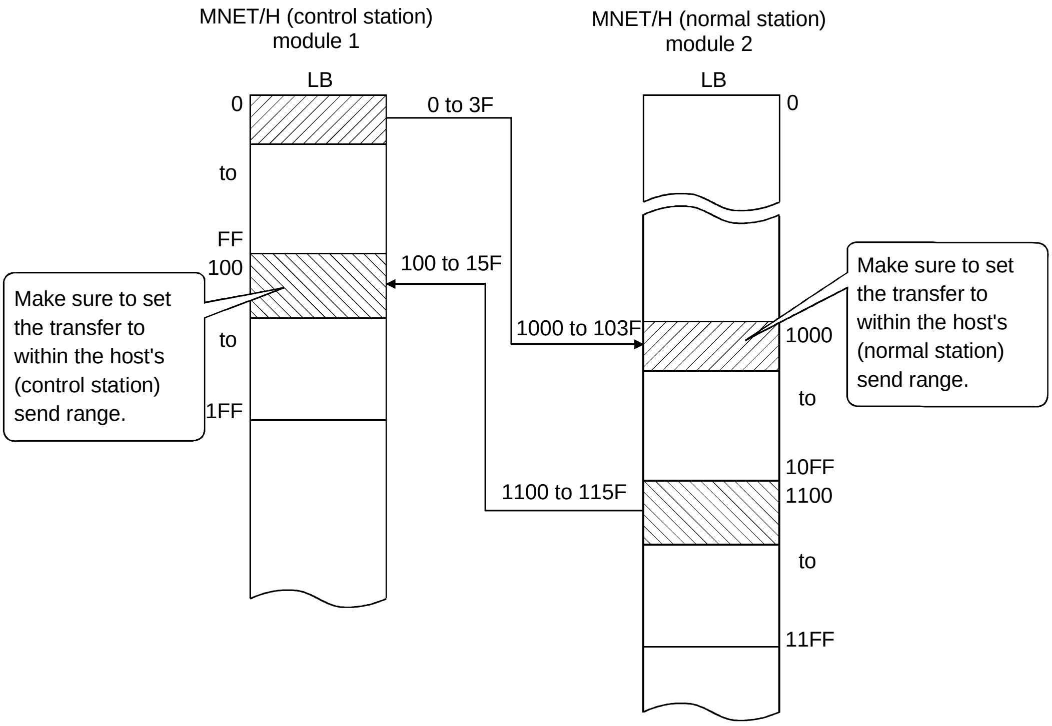
(2) Inter-link data parameters

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.

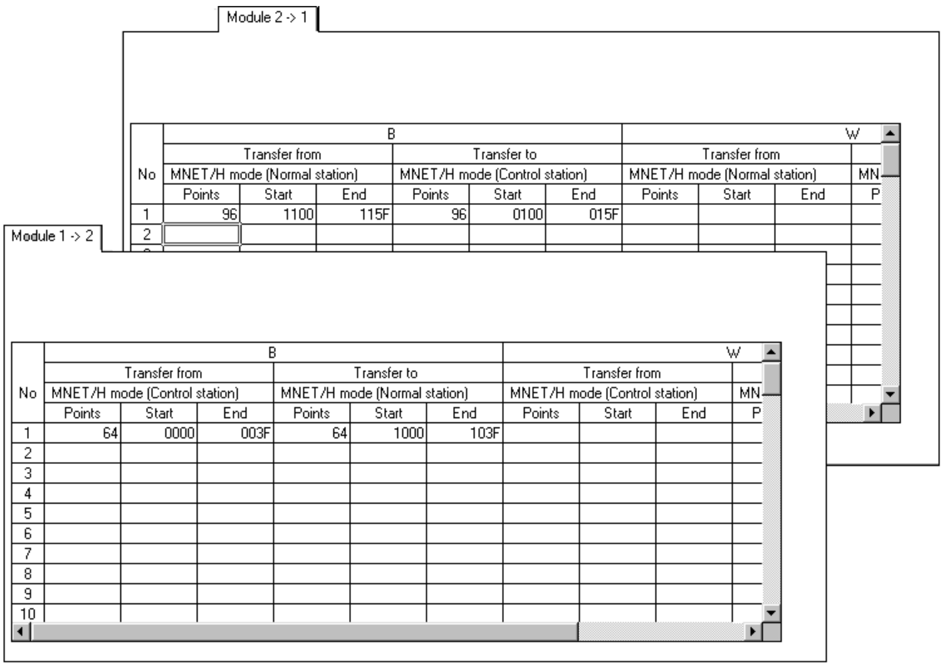
[Setting example]

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



Module 2 -> 1

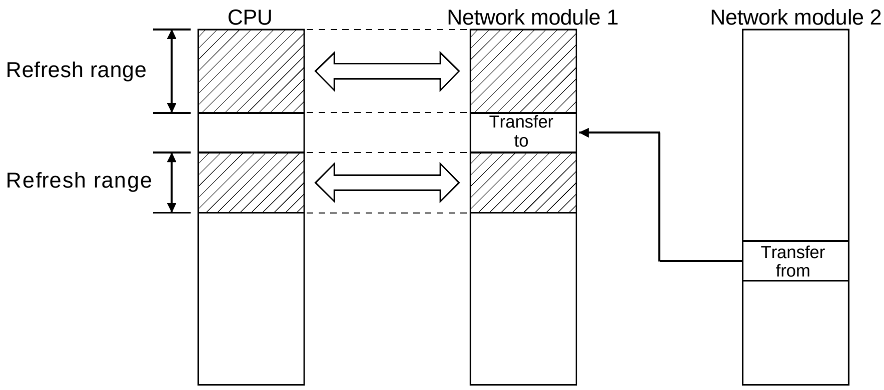
No	B Transfer from MNET/H mode (Normal station) Points	Start	End	Transfer to MNET/H mode (Control station) Points	Start	End	W Transfer from MNET/H mode (Normal station) Points	Start	End
1	96	1100	115F	96	0100	015F			
2									

Module 1 -> 2

No	B Transfer from MNET/H mode (Control station) Points	Start	End	Transfer to MNET/H mode (Normal station) Points	Start	End	W Transfer from MNET/H mode (Control station) Points	Start	End
1	64	0000	003F	64	1000	103F			
2									
3									
4									
5									
6									
7									
8									
9									
10									

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 should be transferred to the device on the CPU side by network refreshing.

POINT

When it is necessary to set 65 or more transfer ranges for the inter-link data transfer function, the data should 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

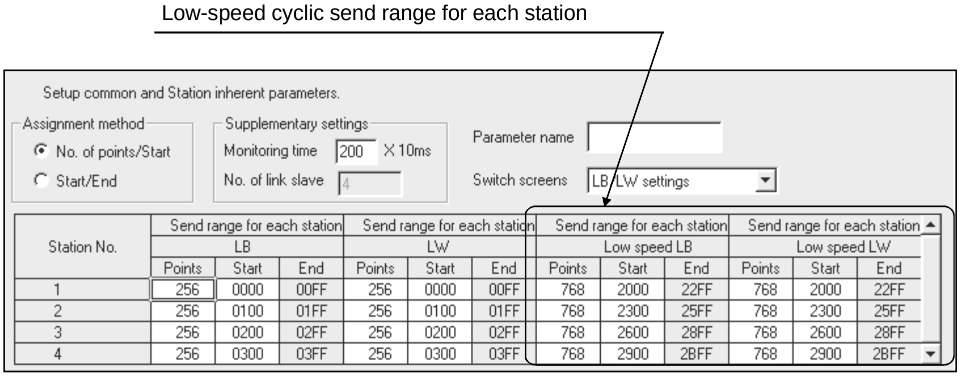
As shown in the table below, the control stations and normal stations are available.

Transfer from \ Transfer to		MELSECNET/H Control station	MELSECNET/H Normal station	MELSECNET/H Standby station
MELSEC NET/H	Control station	○	○	×
	Normal station	○	○	×
	Standby station	×	×	×

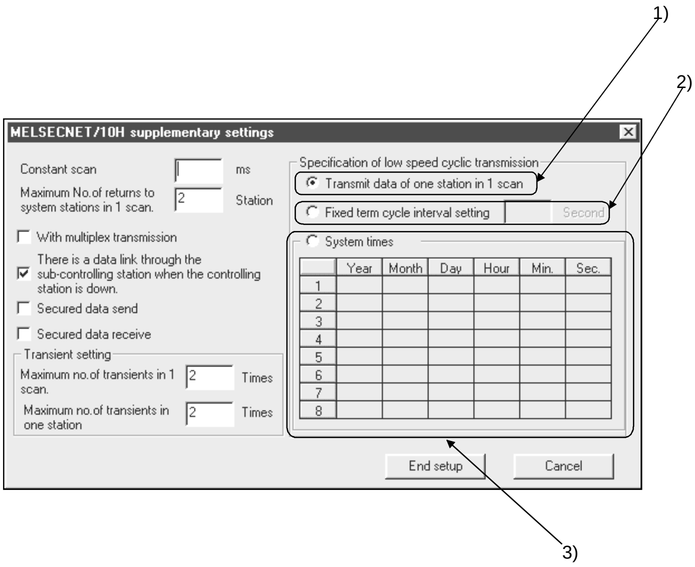
○: Available ×: Not available

7.3 Low-Speed Cyclic Transmission Function (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

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 cyclic devices (LB/LW).
It is a cyclic transmission, but the performance is the same as for the transient transmission. For further details of the performance, see 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 should 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.
The following screen shows the network range assignment settings of the common parameters.



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 designated 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.

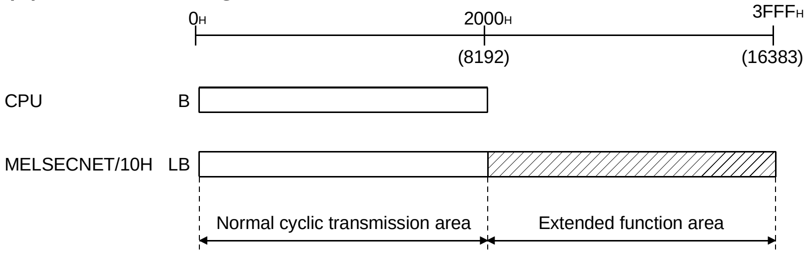


POINT
On the Q00J/Q00/Q01CPU, you cannot set low-speed cyclic transmission designation. Hence, you cannot use the low-speed cyclic transmission function.

7.3.1 Send range settings

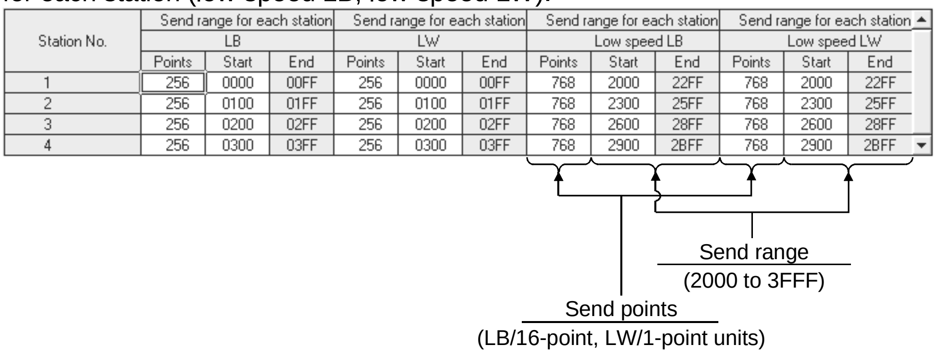
Each station's send range of link devices (low-speed LB, low-speed LW) is assigned to the extended area (2000 to 3FFF) in 16-point units for LB (start : □ □ □ 0 to end □ □ □ F) and in one-point units for LW.
Each station's send range can also be assigned using a random station number assignment sequence.
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 LB			Send range for each station LW			Send range for each station Low speed LB			Send range for each station 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
2	256	0100	01FF	256	0100	01FF	768	2300	25FF	768	2300	25FF
3	256	0200	02FF	256	0200	02FF	768	2600	28FF	768	2600	28FF
4	256	0300	03FF	256	0300	03FF	768	2900	2BFF	768	2900	2BFF

POINT

(1) When double-word (32 bits) data is used, the 32-bit data guarantee is automatically enabled when the 32-bit data guarantee conditions are satisfied. If these conditions are not satisfied, a request to change the setting is displayed.
The conditions for the 32-bit data guarantee can be displayed by clicking the Help-Network setting button.

(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.

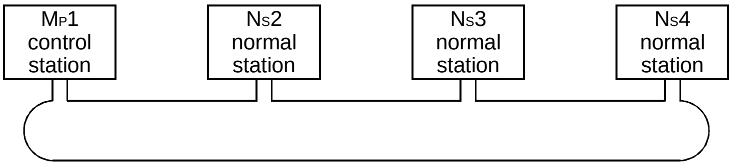
(3) The total of the send ranges per station must not exceed 2000 bytes in the low-speed cyclic transmission. (The send range for the normal cyclic transmission is not included.)

(4) The LX and LY cannot be set as low-speed cyclic devices.

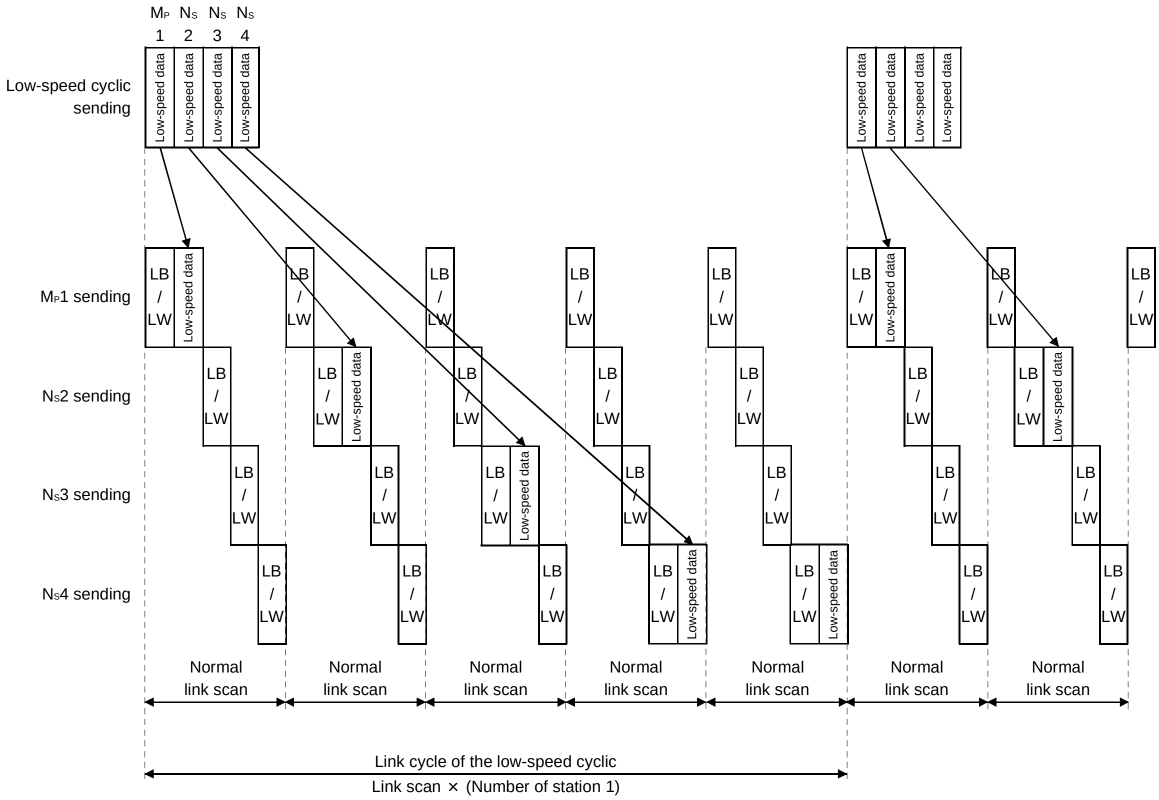
7.3.2 Send timing

The low-speed cyclic transmission is executed separately from the normal cyclic transmission.
The number of sending stations for each link scan is changed by the parameter setting.
When "Transmission of data for one station per link scan" is set, data for low-speed cyclic transmission is sent once for each low-speed link cycle at the maximum rate of one station per link scan.
When "Periodical cycle interval" or "System timer setting" is set, the sending is executed once per link cycle at the rate of the number of stations set by the "Transient settings" – "Maximum number of transients per scan." (For details on the "Transient settings," see Section 7.4.1.)
For example, when "Maximum number of transients per scan = 2 times," the sending is executed once per link cycle at the rate of two stations per link scan.

The following diagram shows an example of the send timing when four stations execute the low-speed cyclic transmission by selecting "Sending of data for one station per link scan" with a parameter.



[Example]
Transmitting data for one station per link scan



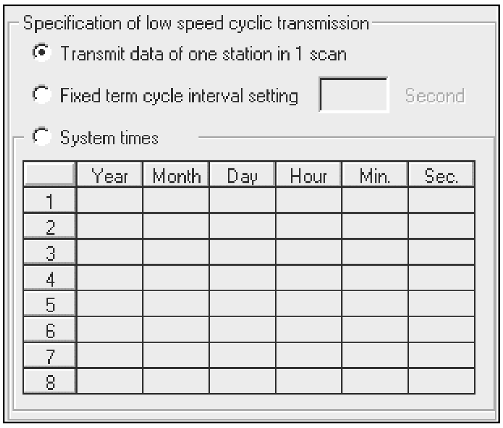
7.3.3 Startup

(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.



POINT

The fastest link scan time in the low-speed cyclic transmission can be calculated by the following equation:

LS_L = LS × number of stations + LS
= LS × (number of stations + 1)

LS_L : The fastest link scan time in the low-speed cyclic transmission
LS : Normal link scan time

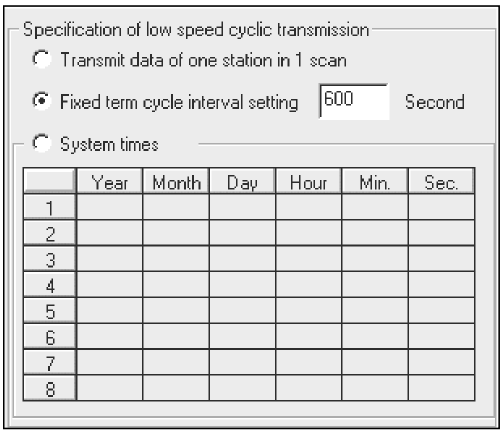
(2) Fixed term cycle interval setting

The low-speed cyclic data is sent in the link cycle of the designated time frequency.

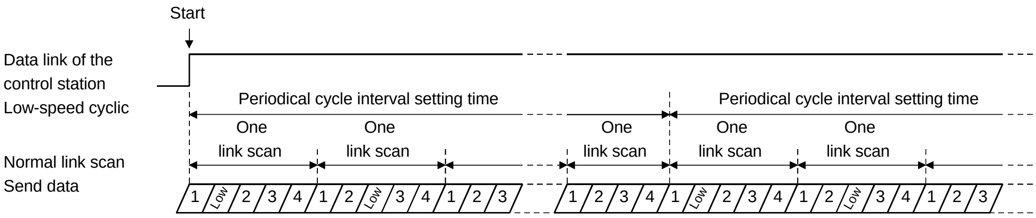
Valid setting frequency: 1 to 65535 s (18 h, 12 min and 15 s)

[Setting method]

1) Click (◉) [Fixed term cycle interval setting] to select.
2) Set the time in seconds (the screen shows a value of 600).



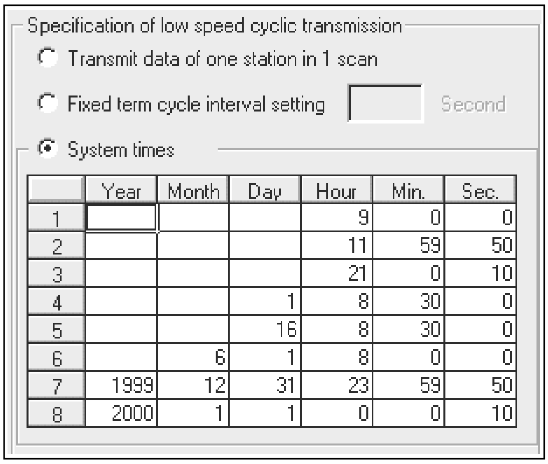
[Example]
When [Maximum number of transients per scan] is set to 1 with [Transient settings]



(3) System timer interval

The low-speed cyclic data is sent in the link cycle at the designated 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 designated time.
   In the following screen example:
   Points 1 to 3 : By omitting year, month and date, data is sent every day at the designated time.
   Points 4 and 5 : By omitting year and month, data is sent at the designated time monthly.
   Point 6 : By omitting the year, data is sent at the designated time every year.
   Points 7 and 8 : Data is sent only once at the designated time.



	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	1999	12	31	23	59	50
8	2000	1	1	0	0	10

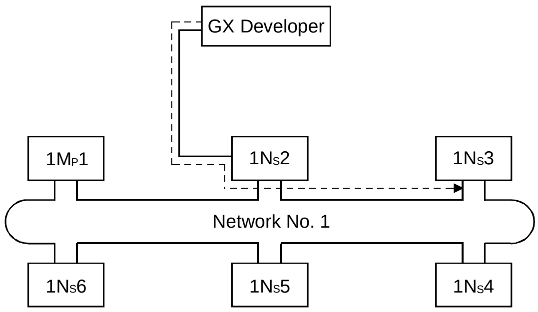
POINT

(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 block guarantee per station function, new and old data may coexist. Apply interlocks in the programs (see Section 6.2.3).

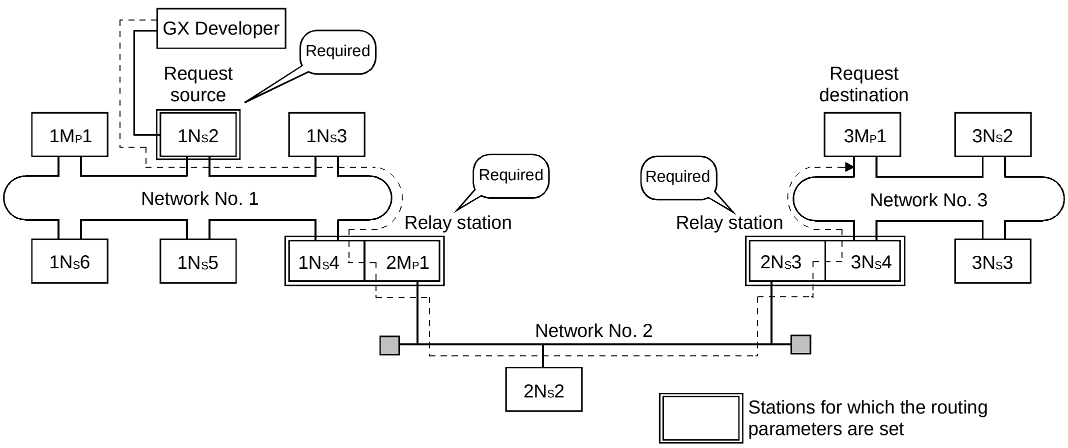
7.4 Transient Transmission Function (Non-Periodical Communication)

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

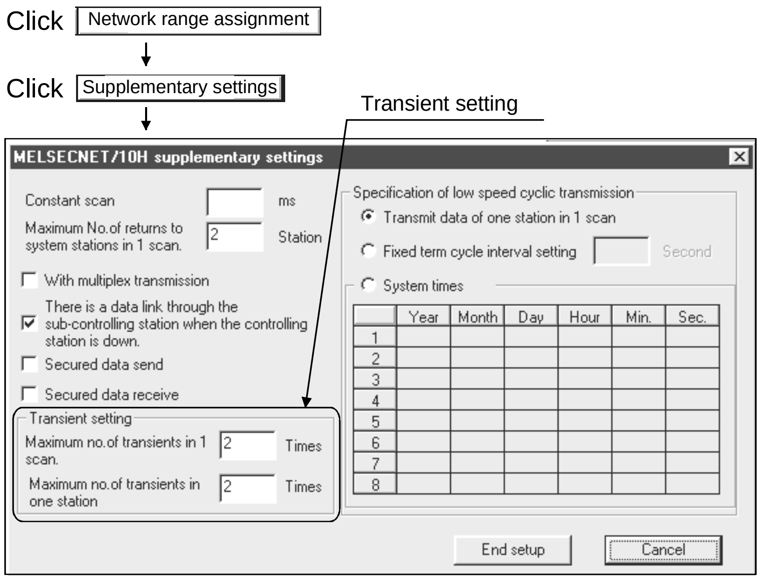
(1) Parameter settings

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 (see Points below).

Setting item \ Setting value	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]



POINT

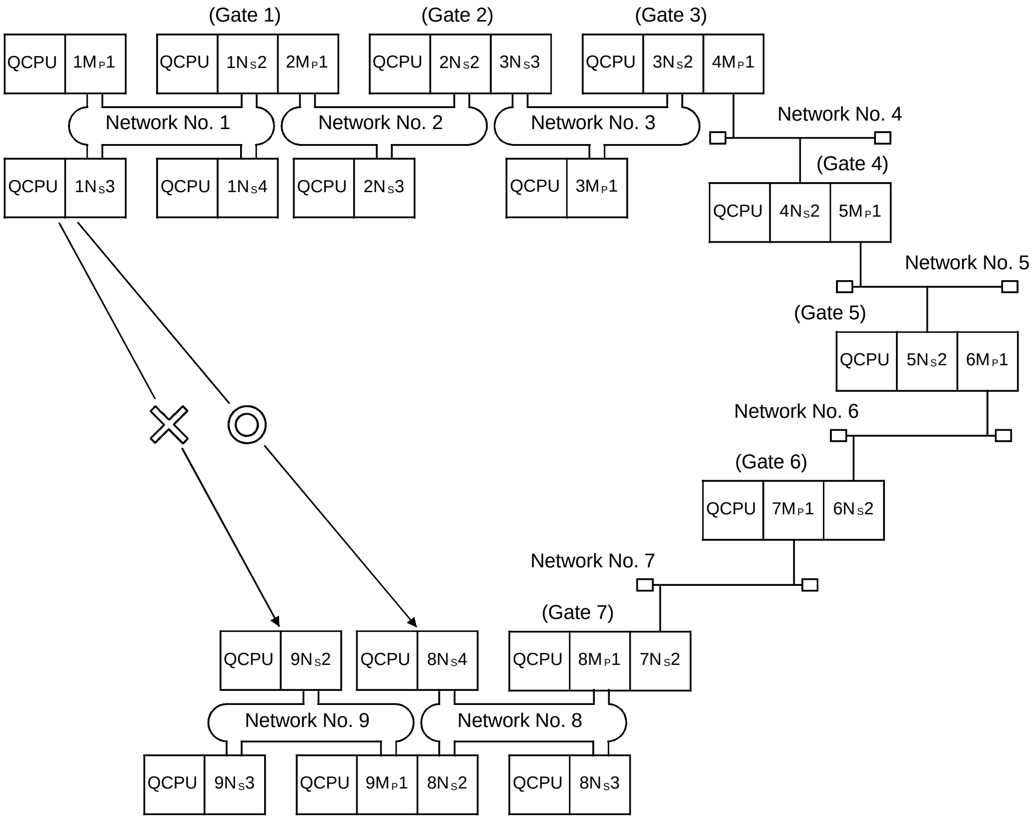
(1) By increasing the number of transients, multiple transient instructions can be executed at the same time (in one link scan).

(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 diagram illustrates the transient transmission range using an example where the destinations are limited to eight networks.



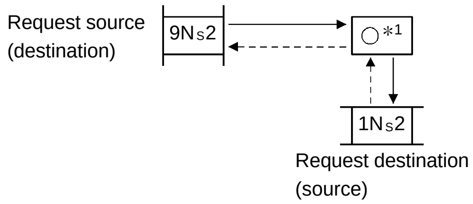
＊: The Q00J/Q00/Q01CPU cannot be used on a relay station.

[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 designating a network module that is close to the request source of the same PLC).



◎: Possible

○: Possible by setting the routing parameter

×: Not possible

∗1: Communication is possible by designating a network module that is close to the request source of the same PLC

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.

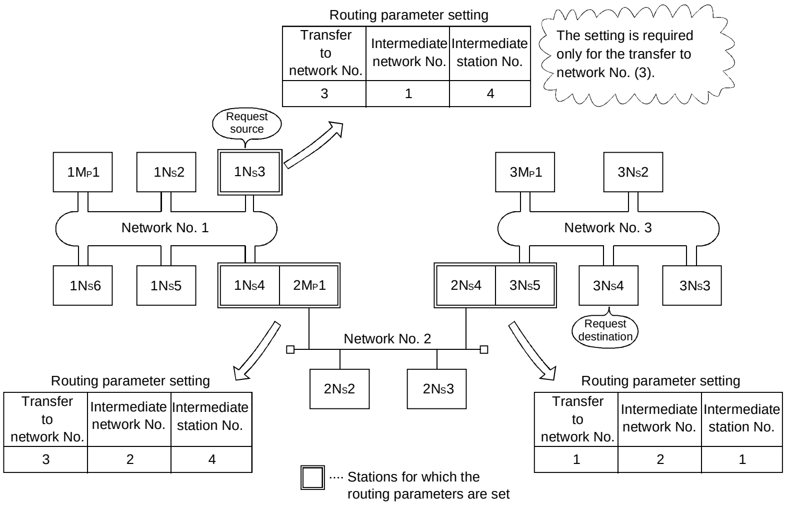
(c) The setting is not required for the request destination.

In the example shown in the diagram 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
Designate the network number (3) of the Transfer to, the relay station (1NS4), and the relay network number (1) to the relay station.

2) Setting for 1NS4 that functions as a bridge
Designate the network number (3) of the Transfer to, the relay station (2NS4), and the relay network number (2) to the relay station. It is not necessary to set the return route because it is designated 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 number (1) as the Transfer to network number and to designate the relay station (2MP1) and the relay network number (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, you can set up to 64 pieces of "Transfer to network No." for the Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU, or up to eight pieces for the Q00J/Q00/Q01CPU.
Note that the same Transfer to network number cannot be designated 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 "transfer designation network numbers."

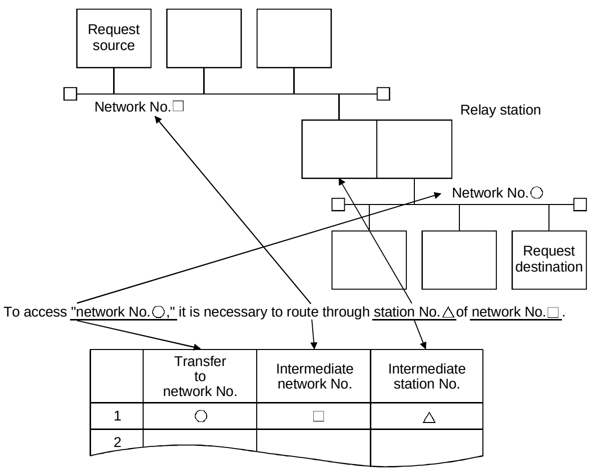
Setting item	Valid setting range
Transfer to network No.	1 to 239
Intermediate network No. (Relay destination network No.)	1 to 239
Intermediate station No. (Relay destination station No.)	1 to 64

[Screen display]

Click Routing parameters

(b) Setting method

Set the routing parameters according to the procedure described below.

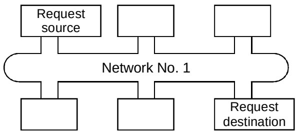


(3) Settings for different network system configurations and setting contents

The stations to set for the transient transmission and the contents of the routing parameters vary depending on the system configuration.

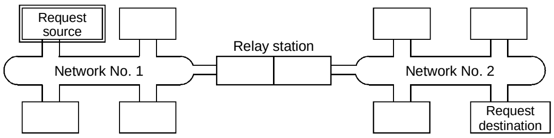
(a) Single network system

It is not necessary to set the routing parameters for the transient transmission to the same network.



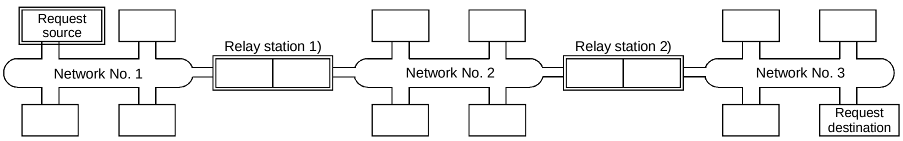
(b) Multiple network system: two networks

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.



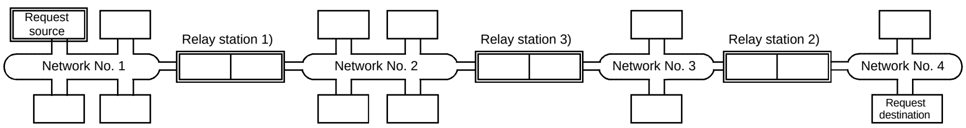
(c) Multiple network system: three networks

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).



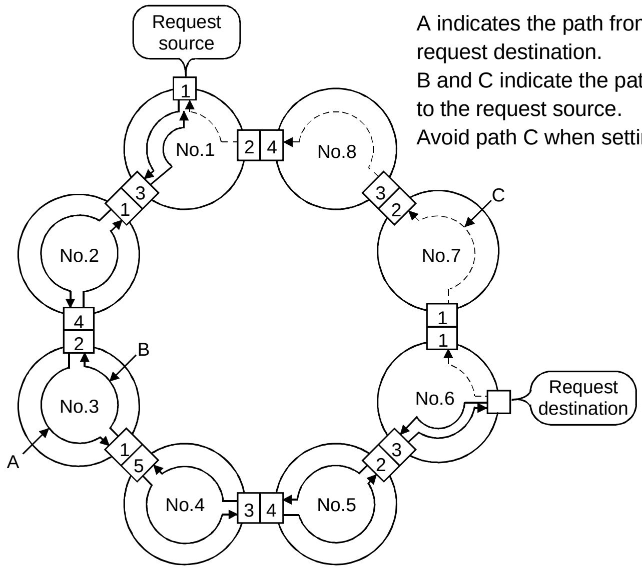
(d) Multiple network system: four networks

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 No. 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).

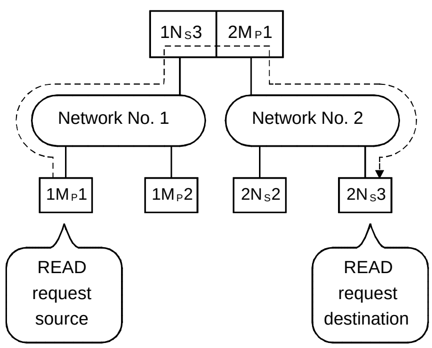
(4) Calculation of transmission delay time

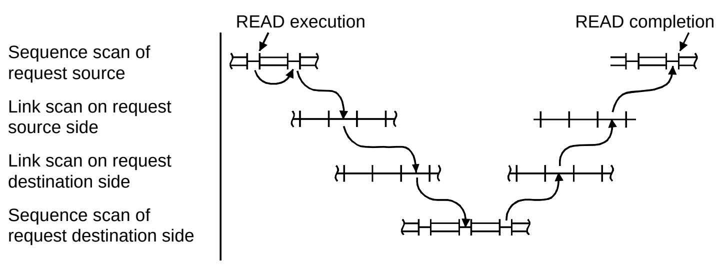
The processing time of the transient transmission instruction to access a station on other network in a multiple network system can be obtained by adding the following transmission delay factors.

(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 1MP1 to station 1NS3.
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 2MP1 to station 2NS3.
Use the equation for the transmission delay time described in Section 3.3.2 to calculate the delay time.



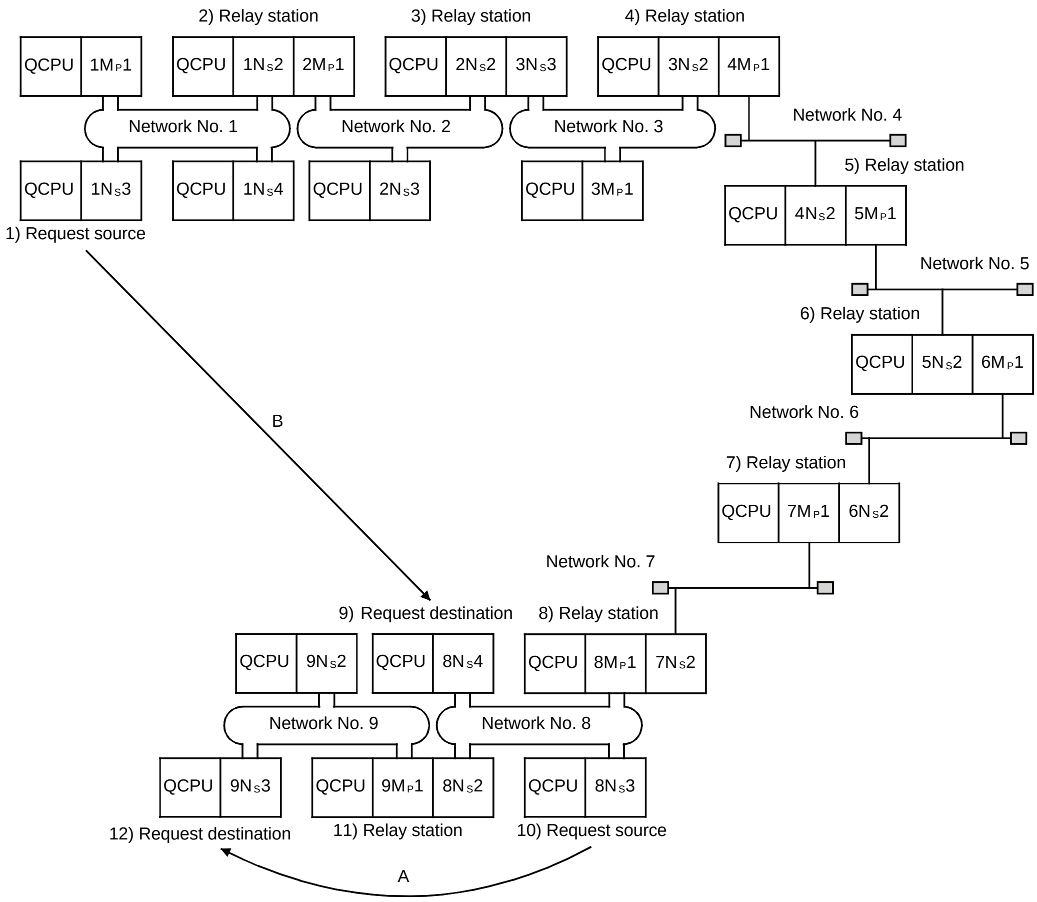


REMARK

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

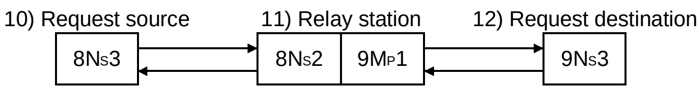
The routing parameter setting examples (A, B) are explained using the following system configuration.



✻ : The Q00J/Q00/Q01CPU cannot be used on a relay station.

(a) Setting example A

The routing parameter must be set for request source 10).

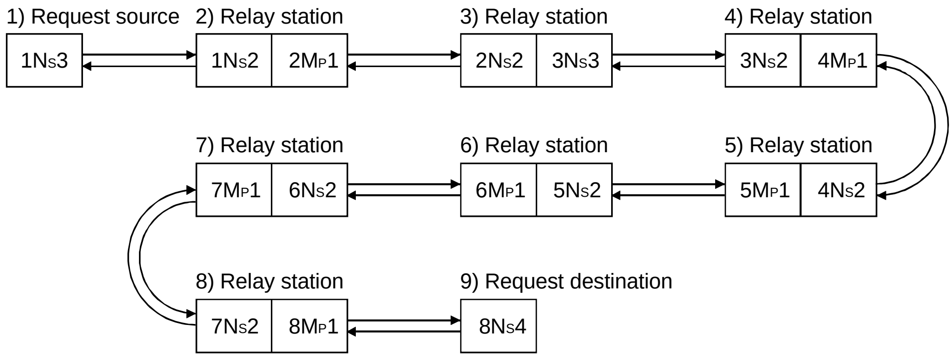


10) Request source

No.	Transfer to network No.	Intermediate network No.	Intermediate station No.
1	[9]	[8]	[2]

(b) Setting example B

The routing parameters must be set for the request source1), 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.



Station	No.	Transfer to network No.	Intermediate network No.	Intermediate 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

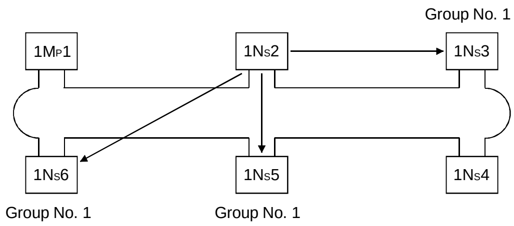
If a transient transmission (SEND, READ, SREAD, WRITE, SWRITE or REQ) was terminated abnormally, the "Time" when an error was detected, "Abnormal detection network number," and "Abnormal detection station number" can be checked from the control data of the instruction used.
For detail on these instructions, see 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 designation to the target station number in the control data of a dedicated 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.

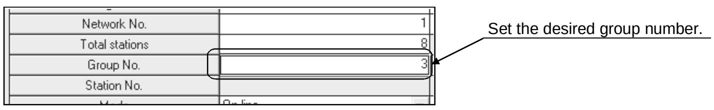
(1) Visual representation of the function

The following figure shows an example of grouping. When a transient transmission is executed by designating group No. 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.



Item \ Setting	Valid setting range	Default
Parameter screen Group No.	1 to 32	0 (no group designation)
Control data target station No.	81H(1) to A0H (32)	—

(3) Transient transmission instructions that allows group designation

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	Writing 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 reception buffer space error" (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.

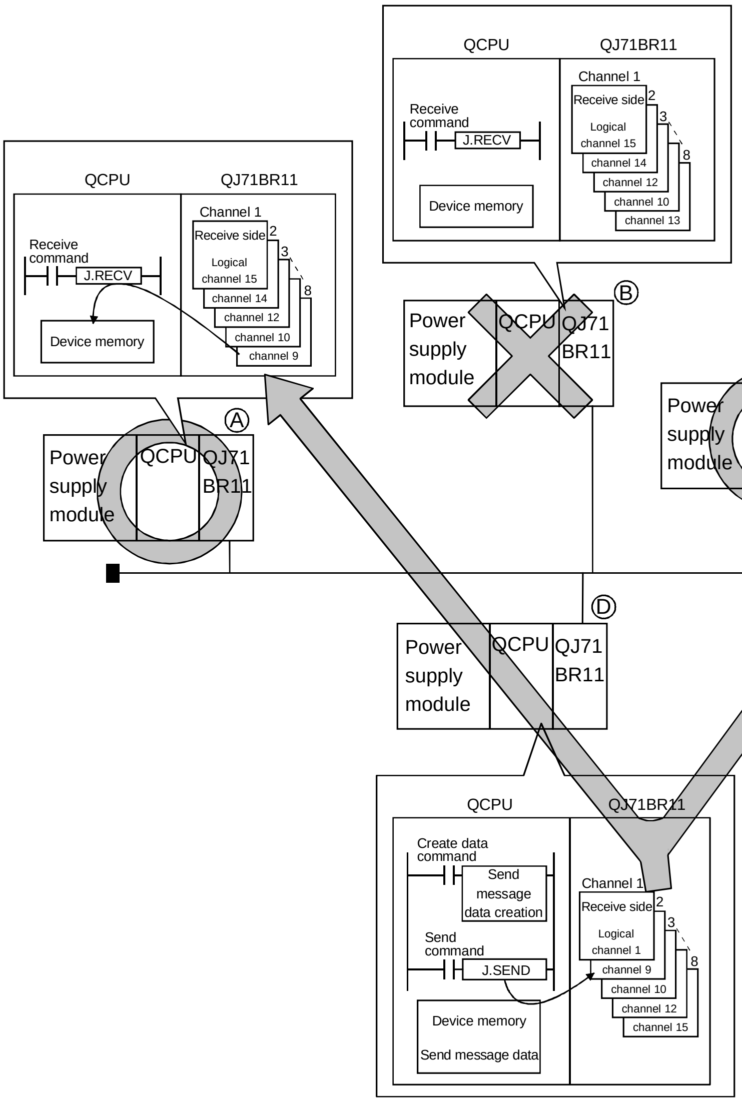
7.4.4 Message sending function using the logical channel numbers

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 designating a specific station number (although designation 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 special link 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 empty 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 (SW8 to SWF) with the sequence program.

SW No.	Name	Valid setting range	Default
SW8	Logical channel setting (channel 1)	1 to 64	0: (Logical channel 1) *1
SW9	Logical channel setting (channel 2)	1 to 64	0: (Logical channel 2) *1
SWA	Logical channel setting (channel 3)	1 to 64	0: (Logical channel 3) *1
SWB	Logical channel setting (channel 4)	1 to 64	0: (Logical channel 4) *1
SWC	Logical channel setting (channel 5)	1 to 64	0: (Logical channel 5) *1
SWD	Logical channel setting (channel 6)	1 to 64	0: (Logical channel 6) *1
SWE	Logical channel setting (channel 7)	1 to 64	0: (Logical channel 7) *1
SWF	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.

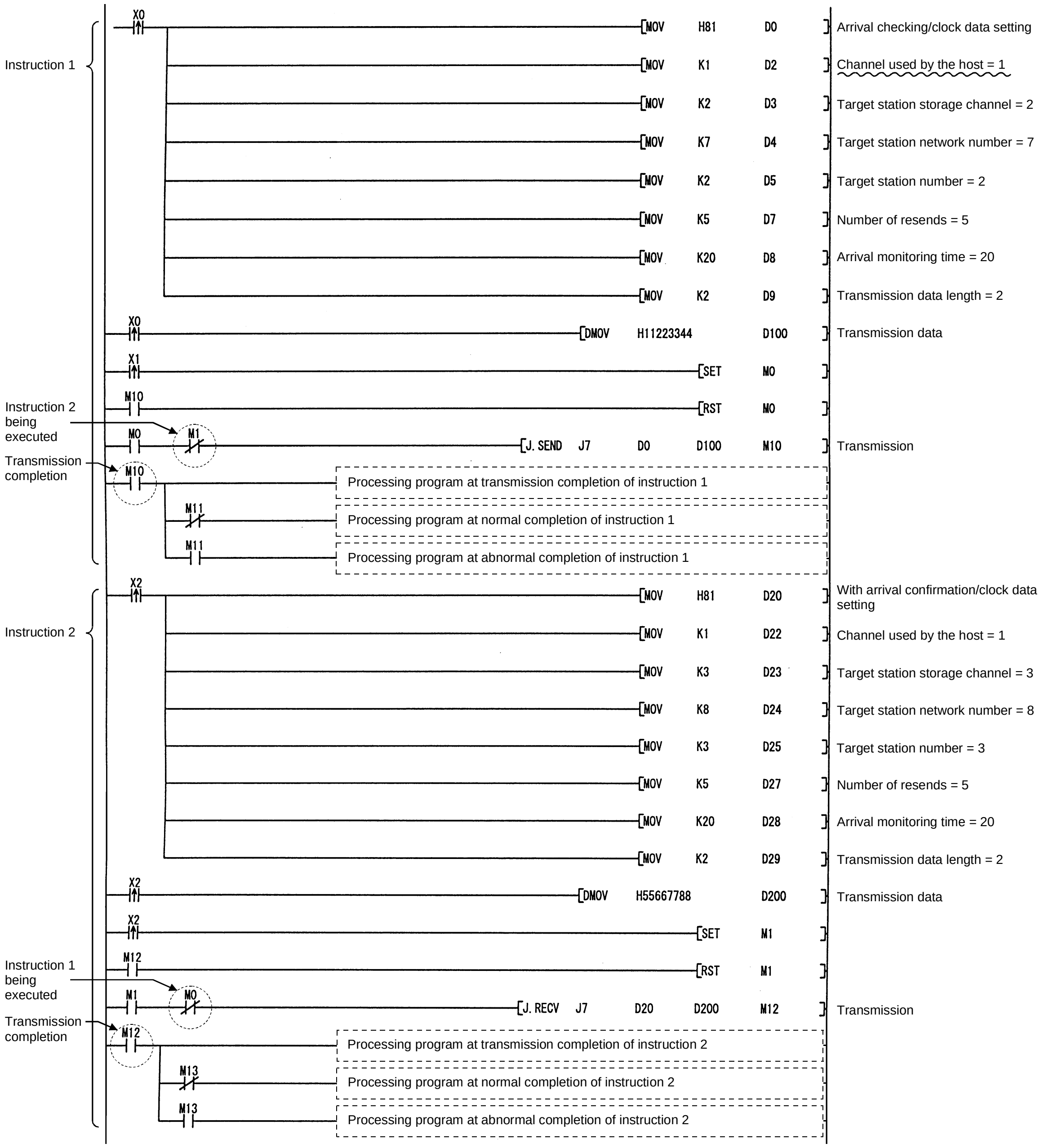
(3) Transient transmission instruction that allows logical channel designation

No.	Instruction	Description	Reference
1	SEND	Sends data.	Section 7.4.5 (1) (d)

7.4.5 Programming

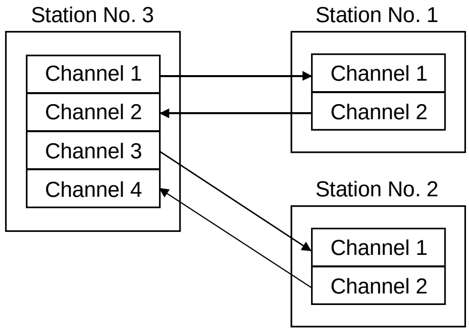
In the transient transmission, the interlock as shown in the figure below must be applied in the program.
A network module has eight channels for executing instructions. All of the eight channels can be used at the same time, but the same channel cannot be used for multiple instructions simultaneously.
When multiple instructions are executed, instructions to be executed later have to wait until the execution of the previous instruction is completed as shown below; so, create a program to turn on the flag until the previous instruction is completed.

[Example]
When executing two instructions on the same channel



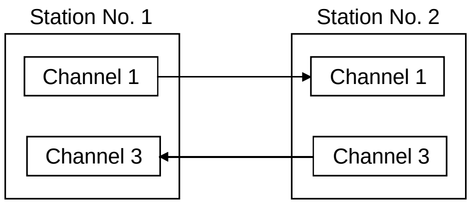
POINT

(1) When accessing simultaneously from the same communication request source station to multiple communication request destination stations, change the target channel No. of the communication request source station for each destination station.



(2) When accessing other stations with the same channel No. specified, make the next other station access after completion of the preceding access.

(3) When making mutual access between the communication request source station and communication request destination station, change the target channel No. of the communication request source station for each instruction.



(4) When the communication request destinations differ, up to eight instructions can be put in an executing status simultaneously if the channel Nos. (1 to 8) specified in the control data of the instructions do not overlap.

REMARK

Take all necessary precautions when using the same channel for the instructions of both the scan execution program and the interrupt program.
While a channel is being used by an instruction of the scan execution program, that channel cannot be used by an instruction of the interrupt program that is executed later; it will be placed in a wait status until the currently executing instruction is completed.
For the scan execution program, an instruction waiting for the next scan is executed. However, in case of the interrupt program, the instruction cannot be executed because there is no next scan. For this reason, the use of the same channel should be avoided when dedicated instructions are used in the interrupt program.

(1) Data sending/receiving (SEND, RECV)

The following explains the SEND/RECV instruction format and a program example:

(a) Instruction format

1) SEND instruction

[Network No. designation]

Send command

JP.SEND	Jn	(S1)	(S2)	(D1)

JP: Executed at startup

[Network module start I/O No. designation]

Send command

GP.SEND	Un	(S1)	(S2)	(D1)

GP: Executed at startup

	Description of setting	Setting range
Jn	Host's network No.	1 to 239 254: Network number designated with valid module during other station access
Un	Start I/O number of the host's network module Designate the higher two digits of the 3-digit I/O number	0 to FEH : Q02/Q02H/Q06H/Q12H/Q25H/ Q12PH/Q25PHCPU 0 to 3EH : Q00CPU,Q01CPU 0 to EH : Q00JCPU
(S1)	Control data storage head device Designate the head device of the host that stores the control data.	Word device ＊2
(S2)	Send data storage head device Designate the head device of the host that stores the send data.	Word device ＊2
(D1)	Send completion device Designate a device to be turned on for one scan upon send completion (D1) Off : Not completed On : Complete (D1)+1 Off : Normal On : Abnormal	Bit device ＊1 Bit designation of word device ＊3

＊1: Bit device : X, Y, M, L, F, V, and B

＊2: Word device : T, C, D, W, ST, R, and ZR

(The Q00JCPU cannot use Z and ZR.)

＊3: Bit designation of word device : Word device, bit number

[Control data configuration (S1)]

For details on each item, see the next page.

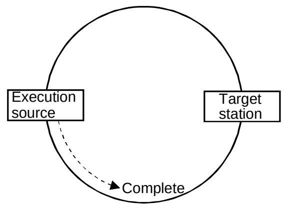
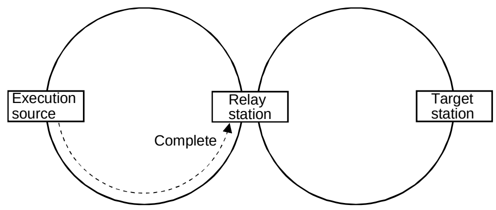
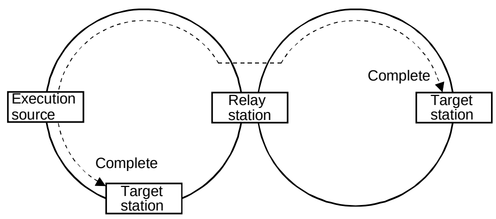
Device	Item	Data set	
		User (at execution) ＊1	System (upon completion) ＊2
(S1)	Execution/abnormal completion type	○	
(S1)+1	Completion status		○
(S1)+2	Channel used by the host	○	
(S1)+3	Target station storage channel (logical channel No.)	○	
(S1)+4	Target station network No.	○	
(S1)+5	Target station No.	○	
(S1)+6	(Use prohibited)	—	—
(S1)+7	Number of resends	○	○
(S1)+8	Arrival monitoring time	○	
(S1)+9	Send data length	○	
(S1)+10	(Use prohibited)	—	—
(S1)+11	Clock set flag		○
(S1)+12	Year (lower two digits)/month of abnormal completion		○
(S1)+13	Date/hour of abnormal completion		○
(S1)+14	Minute/second of abnormal completion		○
(S1)+15	Year(higher two digits)/day of the week of abnormal completion		○
(S1)+16	Abnormal detection network No.		○
(S1)+17	Abnormal detection station number		○

Used when the abnormal completion type is set to "with clock data setting."

＊1: Items set by the sequence program

＊2: Items automatically stored upon instruction completion

Detailed description of the control data

Device	Item	Description
(S1)	Execution/abnormal 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 local network: Completed when data is sent from the host.  When the target station is on other network: Completed when the data arrives at the relay station on the network of the local station.  1: With arrival confirmation Completed when the data is stored in the target station's designated channel.  2) Abnormal completion type (bit 7) Sets the clock data set status at abnormal completion. 0: Does not set clock data : Does not store the clock data at error occurrence in (S1) + 11 to (S1) + 17. 1: Sets clock data : Stores the clock data at error occurrence in (S1) + 11 to (S1) + 17.
(S1)+1	Completion status	Stores the status when an instruction is completed. 0 : Normal Other than 0 : Abnormal (see Section 8.1 for error codes)
(S1)+2	Channel used by the host	Designates the channel to be used by the host. 1 to 8 (channels)
(S1)+3	Target station storage channel (logical channel No.)	Designates the target station's channel to store the data. 1 to 64 (logical channel)
(S1)+4	Target network No.	Designates the network No. of the target station. 1 to 239 : Network No. 254 : Designates with the parameter setting, "Valid module during other station access" setting, when 254 is designated in Jn.

Detailed description of the control data

Device	Item	Description
(S1)+5	Target station number	Designates the target station number. 1 to 64 : Station number 81H to A0H : Group designation (Valid when the execution type designated in (S1) is "0: No arrival confirmation.") FFH : All stations with the target network No. (Valid when the execution type designated in (S1) is "0: No arrival confirmation."): Excluding the host. When a group is designated, set the group No. of the target station with the network parameters from GX Developer.
(S1)+ 6	(Use prohibited)	—
(S1)+7	Number of resends (retry)	1) At instruction execution Becomes valid when the execution type designated in (S1) is "1: With arrival confirmation." Set the number of resends when the instruction fails to complete within the monitoring time designated by (S1) + 8. 0 to 15 (times) 2) At instruction completion Store the number of resends executed (result). 0 to 15 (times)
(S1)+8	Arrival monitoring time	Becomes valid when the execution type designated in (S1) is "1: With arrival confirmation." Set the monitoring time until the instruction completion. When the instruction fails to complete within the monitoring time, it is resent for the number of resends designated in (S1) + 7. 0 : 10 s 1 to 32767 : 1 to 32767 s
(S1)+9	Resend data length	Designates the length of data to be sent in (S2) to (S2) + n. 1 to 480 (words)
(S1)+10	(Use prohibited)	—
(S1)+11	Clock set flag	Stores the valid/invalid status of the clock data in (S1) + 12 to (S1) + 17. 0: Invalid 1: Valid
(S1)+12	Month/year (lower two digits) of abnormal completion	Month and year (the lower two digits of the 4-digit year) are stored as BCD codes. b15 to b8: Month (01H to 12H); b7 to b0: Year (00H to 99H)
(S1)+13	Hour/date of abnormal completion	Hour and date are stored as BCD codes. b15 to b8: Hour (00H to 23H); b7 to b0: Date (01H to 31H)
(S1)+14	Second/minute of abnormal completion	Second and minute are stored as BCD codes. b15 to b8: Second (00H to 59H); b7 to b0: Minute (00H to 59H)
(S1)+15	Year (higher two digits)/day of the week of abnormal completion	Year (the higher two digits of the 4-digit year) and day of the week are stored as BCD codes. b15 to b8: Year (00H to 99H) ＊1; b7 to b0: Day of the week (00H to 06H) 00H(Sunday) to 06H (Saturday)
(S1)+16	Abnormal detection network No.	Stores the network No. of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use (F7C1H)." 1 to 239 (network No.)
(S1)+17	Abnormal detection number	Stores the station number of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use (F7C1H)." 1 to 64 (station number)

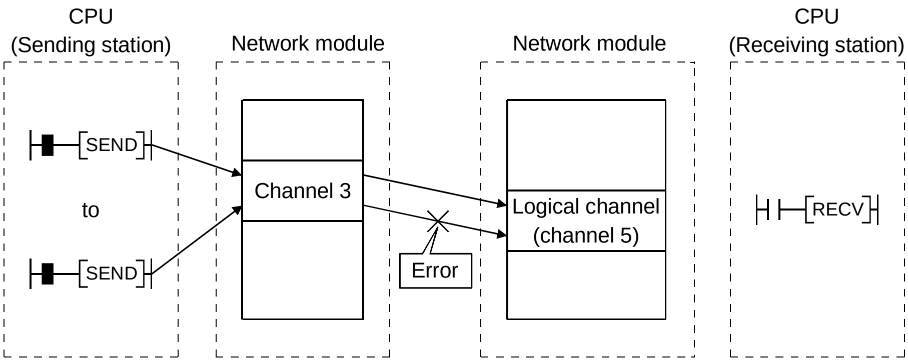
＊1: [00H] will be stored in the [Year] field (higher two digits) when the CPU targeted by special instructions is a QnACPU. (Clock data will not be stored when errors have been completed in the case of the ACPU.)

POINT

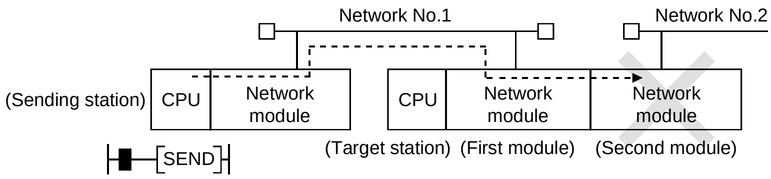
(1) In order to improve the reliability of data, it is recommended to execute instructions by setting the execution type to "With arrival confirmation."

(2) If the communication itself is normally completed when the execution type is set to "No arrival confirmation," the sending is considered as being normally completed by the sending station even if the contents of the send data are abnormal.
In addition, even if the contents of the send data are normal, when an instruction is executed to the same station from multiple stations, a "receive buffer full error (F222H)" may occur in the target station but the sending station completes normally.

(3) 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.

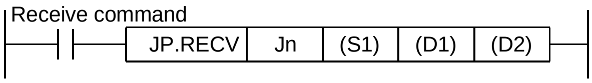


(4) As the target station of data sending, specify the network number and station number of the network module or Ethernet module that will receive a request from the sending station.
＊ In the following diagram, specify the network number and station number of the first network module.
You cannot execute 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 diagram, you cannot execute the SEND instruction after specifying the network number and station number of the second network module.



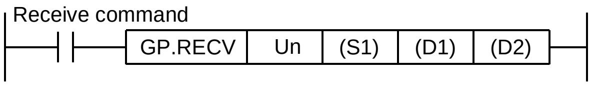
1) RECV instruction

[Network No. designation]



JP: Executed at startup

[Network module start I/O No. designation]



GP: Executed at startup

	Description of setting	Setting range
Jn	Host's network No.	1 to 239 254: Network number designated by valid module during other station access.
Un	Start I/O number of the host's network module Designate the higher two digits of the 3-digit I/O number.	0 to FEH : Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU 0 to 3EH : Q00CPU,Q01CPU 0 to EH : Q00JCPU
(S1)	Control data storage head device Designate the head device of the host that stores the control data.	Word device ＊2
(D1)	Receive data storage head device Designate the head device of the host that stores the receive data.	Word device ＊2
(D2)	Receive completion device Designate a device to be turned on for one scan upon receive completion. (D2) Off : Not completed On : Complete (D2)+1 Off : Normal On : Error	Bit device ＊1 Bit designation of word device ＊3

＊1: Bit device : X, Y, M, L, F, V, and B

＊2: Word device : T, C, D, W, ST, R, and ZR
(The Q00JCPU cannot use R and ZR.)

＊3: Bit designation of word device : Word device, bit number

[Control data configuration (S1)]

For details on each item, see the next page.

Device	Item	Data set	
		User (at execution) ＊1	System (upon completion) ＊2
(S1)	Execution/abnormal completion type	○	
(S1)+1	Completion status		○
(S1)+2	Host storage channel	○	
(S1)+3	Channel used by the sending station		○
(S1)+4	Sending station network No.		○
(S1)+5	Sending station number		○
(S1)+6	(Use prohibited)	–	–
(S1)+7	Number of resends		○
(S1)+8	Arrival monitoring time	○	
(S1)+9	Receive data length		○
(S1)+10	(Use prohibited)	–	–
(S1)+11	Clock set flag		○
(S1)+12	Year (lower two digits)/month of abnormal completion		○
(S1)+13	Date/hour of abnormal completion		○
(S1)+14	Minute/second of abnormal completion		○
(S1)+15	Year(higher two digits)/day of the week of abnormal completion		○
(S1)+16	Abnormal detection network No.		○
(S1)+17	Abnormal detection station number		○

(S1)+11 to (S1)+17: Used when the abnormal completion type is set to "with clock data setting."

＊1: Items set by the sequence program

＊2: Items automatically stored upon instruction completion

Detailed description of the control data

Device	Item	Description
(S1)	Abnormal completion type	b15 to b8 b7 b6 to b0 / 0 to 0 1) 0 to 0 1) Abnormal completion type (bit 7) Sets the clock data set status at abnormal completion. 0: Does not set clock data : Does not store the clock data at error occurrence in (S1) + 11 to (S1) + 15. 1: Sets clock data : Stores the clock data at error occurrence in (S1) + 11 to (S1) + 15.
(S1)+1	Completion status	Stores the status when an instruction is completed. 0 : Normal Other than 0 : Abnormal (see Section 8.1 for error codes)
(S1)+2	Host storage channel	Designates the channel that stores data to be read. 1 to 8 (channels)
(S1)+3	Channel used by the sending station	Stores the channel used by the sending station. 1 to 8 (channels)
(S1)+4	Sending station network No.	Stores the sending station's network No.. 1 to 239: Network No.
(S1)+5	Sending station number	Stores the station number of the sending station. 1 to 64 : Station number
(S1)+6	(Use prohibited)	—
(S1)+7	Number of resends	1) At instruction execution Becomes valid when the execution type designated in (S1) is "1: With arrival confirmation." Set the number of resends when the instruction fails to complete within the monitoring time designated by (S1) + 8. 0 to 15 (times) 2) At instruction completion Store the number of resends executed (result). 0 to 15 (times)
(S1)+8	Arrival monitoring time	Sets the monitoring time until the instruction completion. When the instruction fails to complete within the monitoring time, it is abnormally completed. 0 : 10 s 1 to 32767 : 1 to 32767 s
(S1)+9	Receive data length	Stores the word count of the receive data stored in (D1) to (D1) + n. 1 to 480 (words)
(S1)+10	(Use prohibited)	—
(S1)+11	Clock set flag	Stores the valid/invalid status of the clock data in ((S1) + 12 to (S1) + 15). 0: Invalid 1: Valid
(S1)+12	Month/year (lower two digits) of abnormal completion	Month and year (the lower two digits of the 4-digit year) are stored as BCD codes. b15 to b8: Month (01_H to 12_H); b7 to b0: Year (00_H to 99_H)
(S1)+13	Hour/date of abnormal completion	Hour and date are stored as BCD codes. b15 to b8: Hour (00_H to 23_H); b7 to b0: Date (01_H to 31_H)
(S1)+14	Second/minute of abnormal completion	Second and minute are stored as BCD codes. b15 to b8: Second (00_H to 59_H); b7 to b0: Minute (00_H to 59_H)

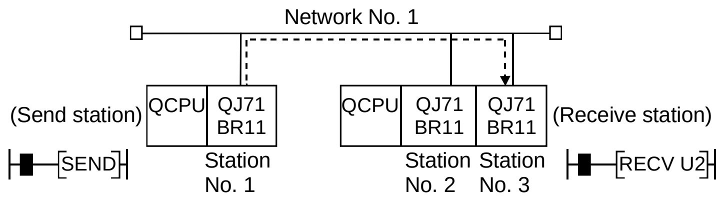
Detailed description of the control data

Device	Item	Description
(S1)+15	Year (higher two digits)/day of the week of abnormal completion	Year (the higher two digits of the 4-digit year) and day of the week are stored as BCD codes. b15 to b8: Year (00H to 99H) ∗1; b7 to b0: Day of the week (00H to 06H) 00H (Sunday) to 06H (Saturday)
(S1)+16	Abnormal detection network No.	Stores the network No. of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use (F7C1H)." 1 to 239 (network No.)
(S1)+17	Abnormal detection number	Stores the station number of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use (F7C1H)." 1 to 64 (station number)

∗1: [00H] will be stored in the [Year] field (higher two digits) when the CPU targeted by special instructions is a QnACPU. (Clock data will not be stored when errors have been completed in the case of the ACPU.)

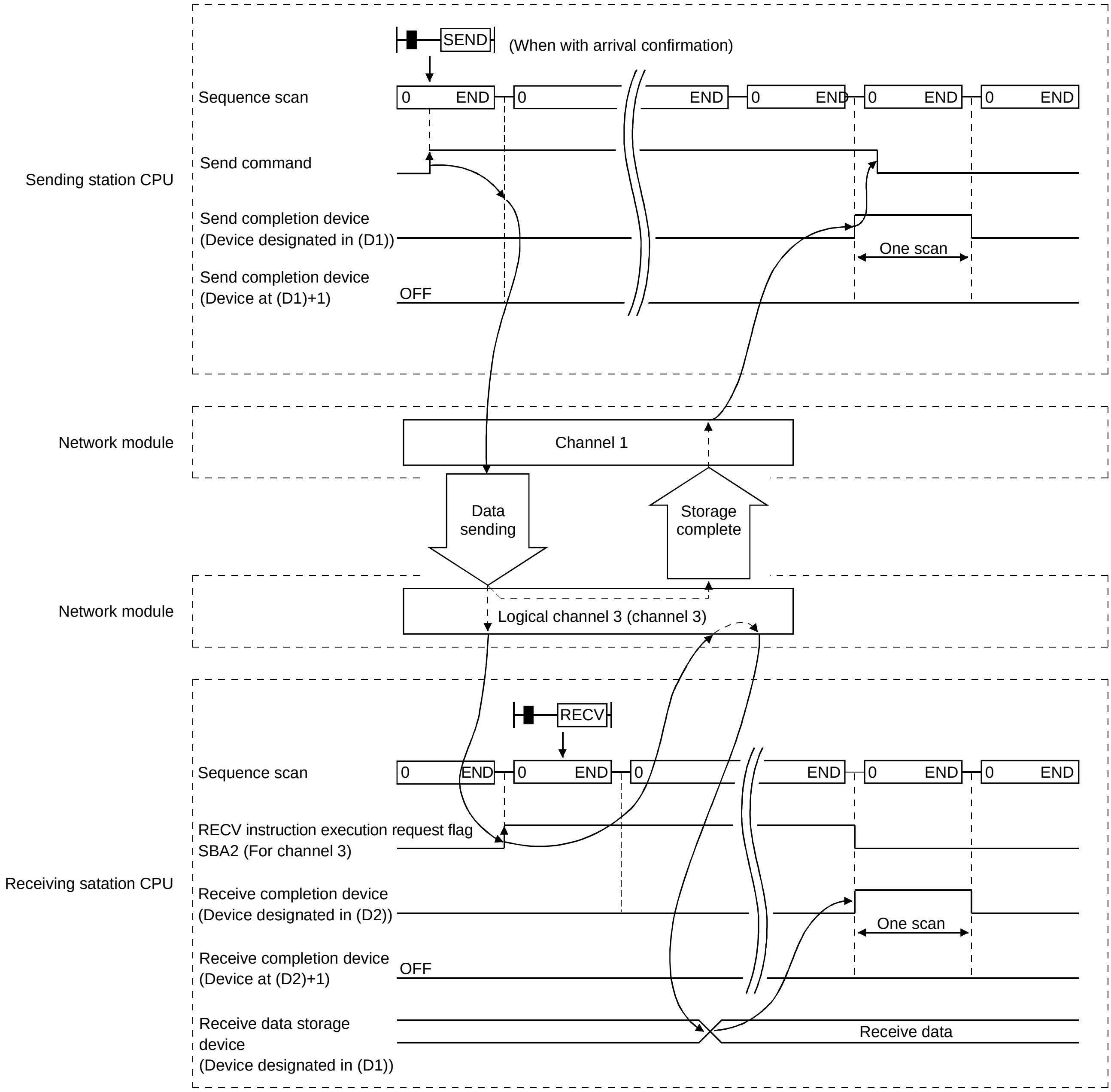
POINT

(1) When multiple network modules of the same network No. are mounted on the receive station, specify "Un" for the network module that will receive data with the RECV instruction.
When "Jn" is specified to execute the RECV instruction, the PLC CPU will execute the RECV instruction for the module that has a lower head I/O No.
(Example) Specify "U2" when executing the RECV instruction at station No. 3 in response to the SEND instruction from station No. 1.

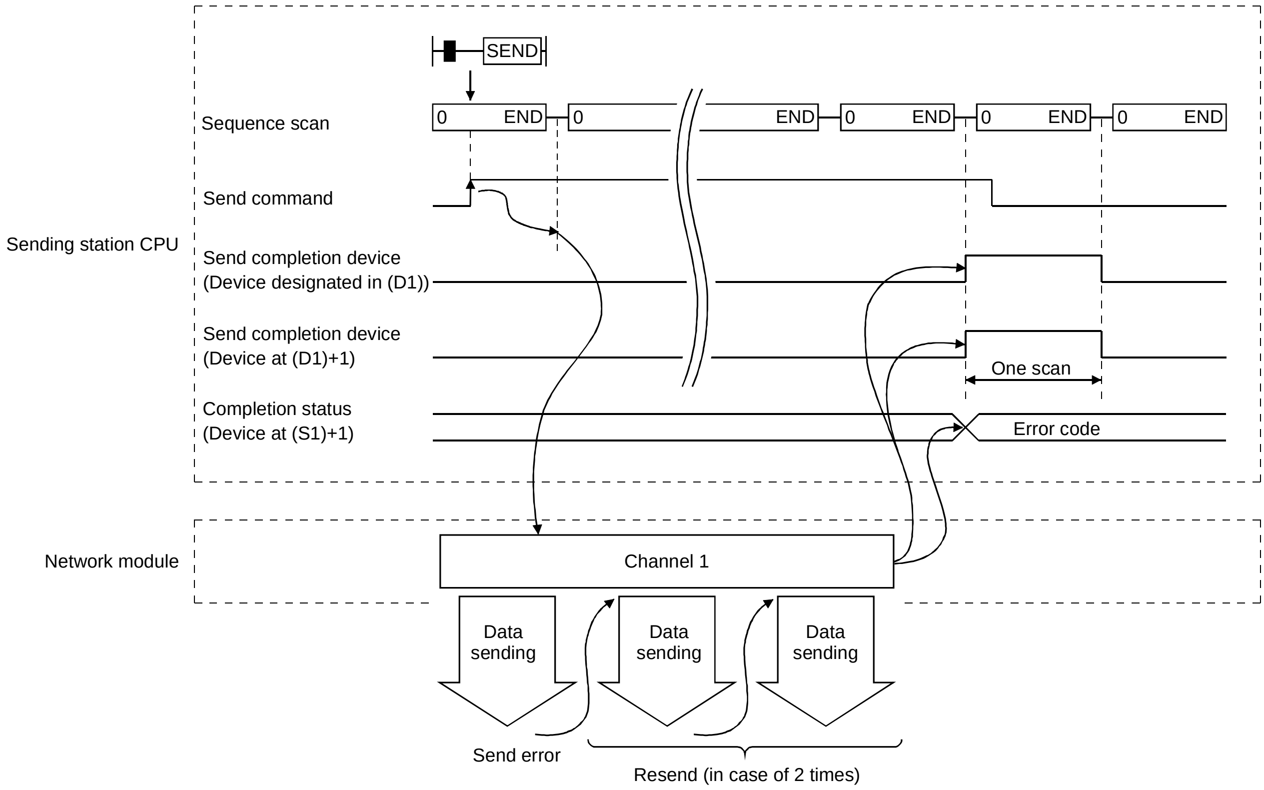


(b) Instruction execution timing

1) Normal completion



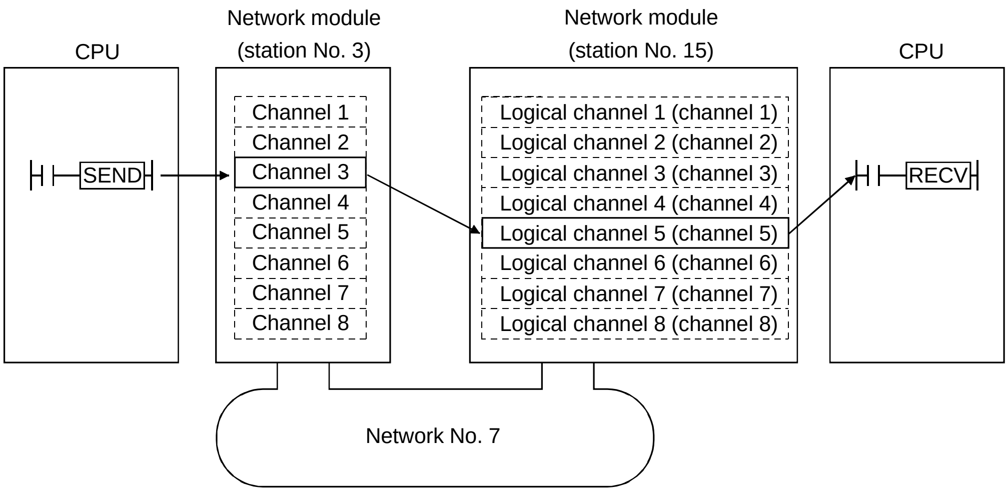
2) Abnormal completion
[In case of the SEND instruction]



(c) Program example 1 (target station is designated)

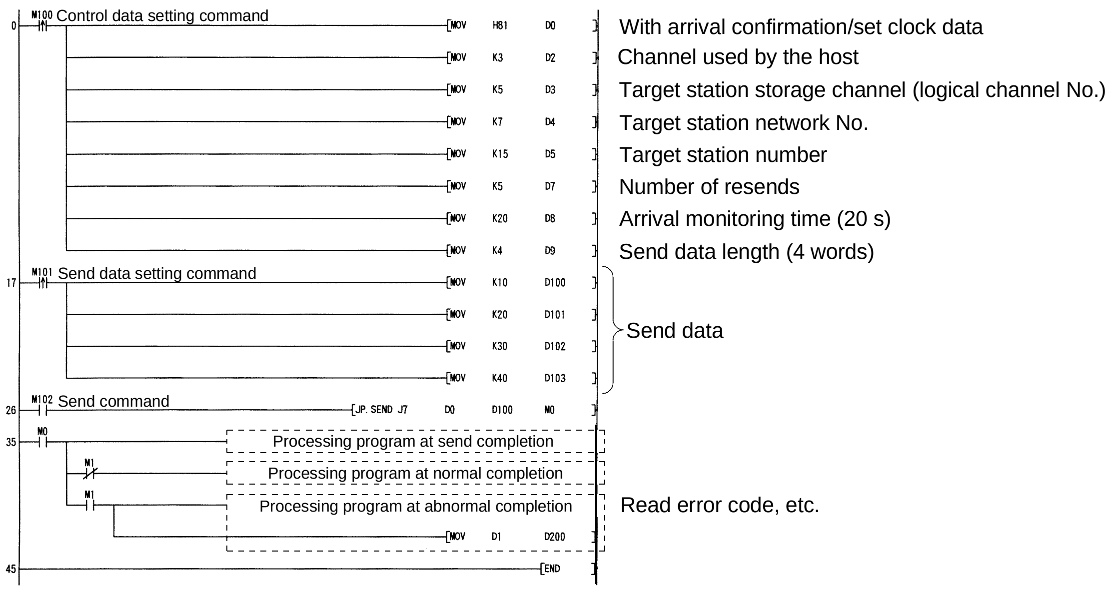
Station number 3 uses channel 3 and sends data to the target station of station number 15's storage channel 5 (logical channel 5) using the SEND instruction.

Upon receiving the data, station number 15 reads data from channel 5.

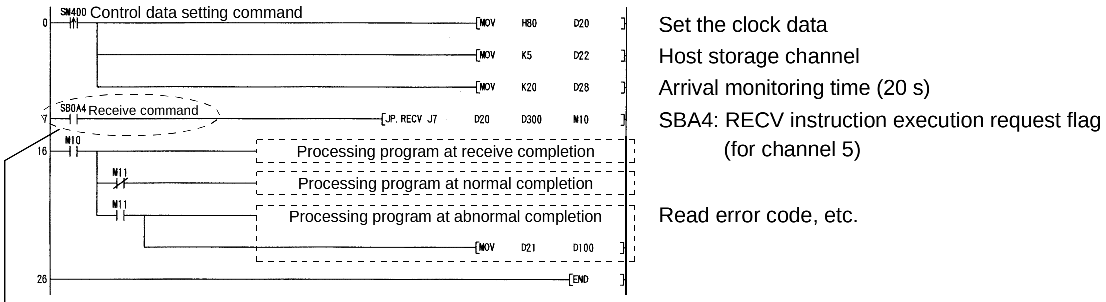


1) Program for station number 3 (SEND instruction)

When actually using the following program, interlock the program by referring to Section 6.1.



2) Program for station number 15 (RECV instruction)
When actually using the following program, interlock the program by seeing to Section 6.1.

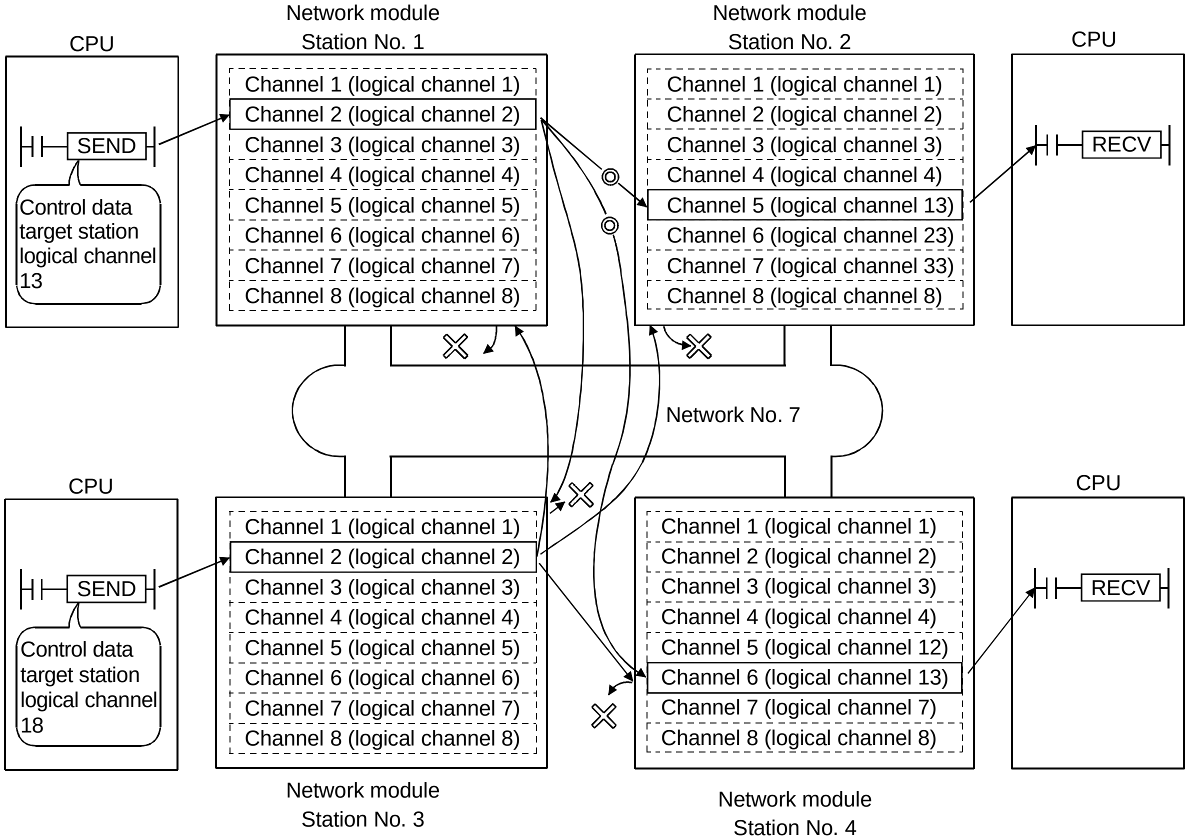


When data is stored in the receiving station's channel, the special link relay (SBA0 to A7) corresponding to each channel turns on.
By using this signal for the receive command, data can be read automatically.
The signal turns off when the RECV instruction completes.

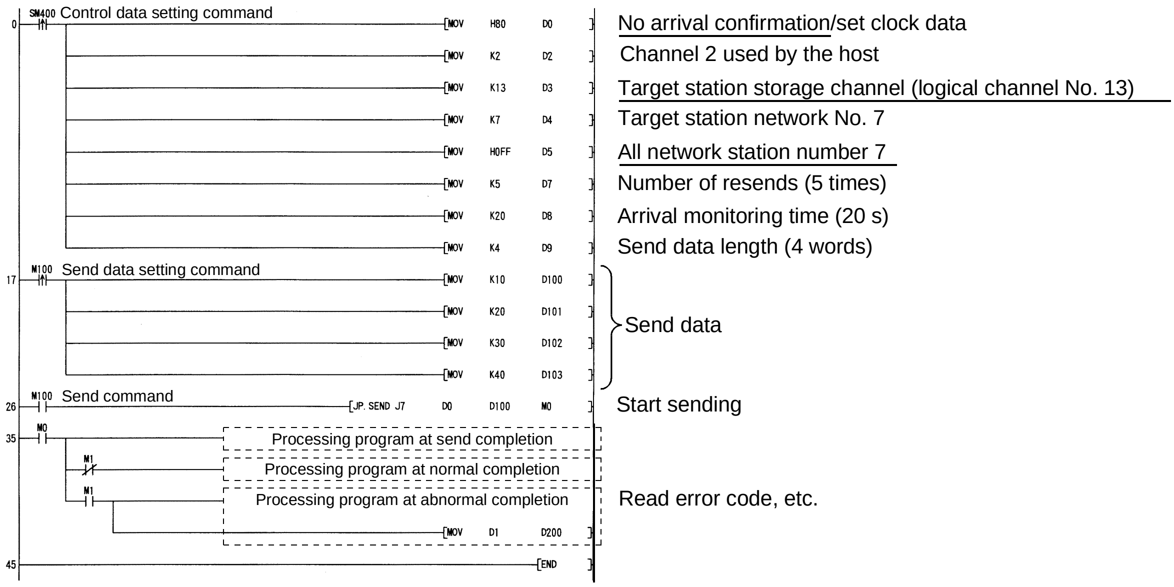
Network module

	RECV receive instruction flag	Logical channel setting register
Channel 1	SB A0	SW 08
Channel 2	SB A1	SW 09
Channel 3	SB A2	SW 0A
Channel 4	SB A3	SW 0B
Channel 5	SB A4	SW 0C
Channel 6	SB A5	SW 0D
Channel 7	SB A6	SW 0E
Channel 8	SB A7	SW 0F

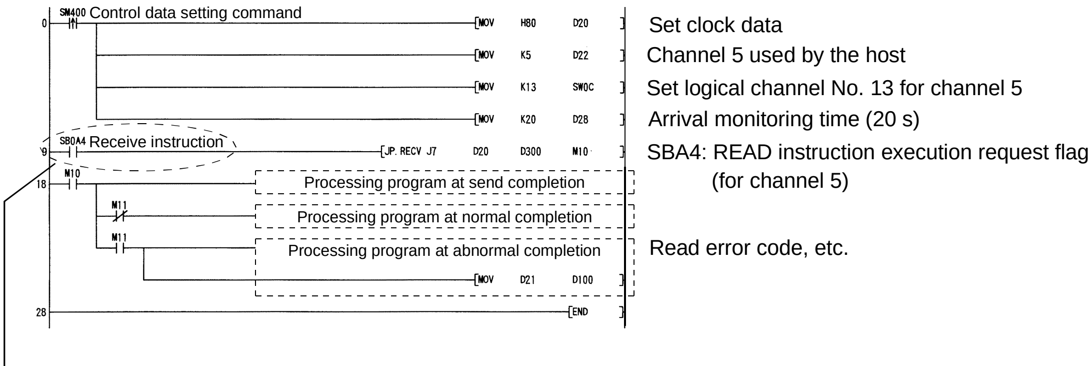
(d) Program example 2 (logical channel numbers are used)
Station number 1 uses channel 2 and sends message data to the target station storage channel number 13 (logical channel 13) using the SEND instruction.
Station number 2 executes the RECV instruction and reads the received data from channel 5 (logical 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, interlock the program by seeing Section 6.1.



2) Program for receiving station (station number 2) (RECV instruction)
When using the following program, interlock the program by seeing Section 6.1.



When the data is stored in the receiving station's channel, the link special relay (SBA0 to A7) 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 →	SB A0	SW 08
Channel 2 →	SB A1	SW 09
Channel 3 →	SB A2	SW 0A
Channel 4 →	SB A3	SW 0B
Channel 5 →	SB A4	SW 0C
Channel 6 →	SB A5	SW 0D
Channel 7 →	SB A6	SW 0E
Channel 8 →	SB A7	SW 0F

(2) Reading from/writing to word devices of other stations (READ, SREAD, WRITE, SWRITE)

The following explains the READ/WRITE instruction format and some program examples.

(a) Instruction format

1) READ and SREAD instructions

[Network No. designation]

Read command

JP.READ	Jn	(S1)	(S2)	(D1)	(D2)

JP: Executed at startup

Read command

JP.SREAD	Jn	(S1)	(S2)	(D1)	(D2)	(D3)

JP: Executed at startup

[Network module start I/O No. designation]

Read command

GP.READ	Un	(S1)	(S2)	(D1)	(D2)

GP: Executed at startup

Read command

GP.SREAD	Un	(S1)	(S2)	(D1)	(D2)	(D3)

GP: Executed at startup

	Description of setting	Setting range
Jn	Host's network No.	1 to 239 254: Network designated by valid module during other station access
Un	Start I/O number of the host's network module Designate the higher two digits of the 3-digit I/O number.	0 to FE$_H$: Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU 0 to 3E$_H$: Q00CPU,Q01CPU 0 to E$_H$: Q00JCPU
(S1)	Control data storage head device Designate the head device of the host that stores the control data.	Word device ＊2
(S2)	Read data storage head device (target station) Designate the head device of the target station that stores the data to be read.	Word device ＊2
(D1)	Read data storage head device (host) Designate the head device of the host that stores the data to be read.	Word device ＊2
(D2)	Read completion device (host) Designate the host's device to be turned on for one scan upon read completion. (D2) Off : Not completed On : Complete (D2)+1 Off : Normal On : Error	Bit device ＊1 Bit designation of word device ＊3
(D3)	Read notification device (target station) Designate the target station's device to be turned on for one scan upon completion of the reading. (It can verify that the data in the target station has been read from other station.) (D3) Off : Not completed On : Complete	Bit device ＊1 Bit designation of word device ＊3

＊1: Bit device : X, Y, M, L, F, V, and B
＊2: Word device : T, C, D, W, ST, R, and ZR
(The Q00JCPU cannot use Z and ZR.)
＊3: Bit designation of word device : Word device, bit number

[Control data configuration (S1)]

Device	Item	Data set	
		User (at execution) ＊1	System (upon completion) ＊2
(S1)	Abnormal completion type	○	
(S1)+1	Completion status		○
(S1)+2	Channel used by the host	○	
(S1)+3	(Use prohibited)	—	—
(S1)+4	Target station network No.	○	
(S1)+5	Target station number	○	
(S1)+6	(Use prohibited)		
(S1)+7	Number of resends (retry)	○	○
(S1)+8	Arrival monitoring time	○	
(S1)+9	Read data length	○	
(S1)+10	(Use prohibited)	—	—
(S1)+11	Clock set flag		○
(S1)+12	Year (lower two digits)/month of abnormal completion		○
(S1)+13	Date/hour of abnormal completion		○
(S1)+14	Minute/second of abnormal completion		○
(S1)+15	Year(higher two digits)/day of the week of abnormal completion		○
(S1)+16	Abnormal detection network No.		○
(S1)+17	Abnormal detection station number		○

$\left.\right\}$ Used when the abnormal complete type is set to "with clock data setting." ((S1)+11 to (S1)+17)

＊1: Items set by the sequence program

＊2: Items automatically stored upon instruction completion

Detailed description of the control data

Device	Item	Description
(S1)	Abnormal completion type	b15 to b7 to b0 [0 | 1) | 0 | 1] 1) Abnormal completion type (bit 7) Sets the clock data set status at abnormal completion. 0: Does not set clock data : Does not store the clock data at error occurrence in (S1) + 11 to (S1) + 17. 1: Sets clock data : Stores the clock data at error occurrence in (S1) + 11 to (S1) + 17.
(S1)+1	Completion status	Stores the status when an instruction is completed. 0 : Normal Other than 0 : Abnormal
(S1)+2	Host storage channel	Designates the channel to be used by the host. 1 to 8 (channels)
(S1)+3	(Use prohibited)	—
(S1)+4	Target network No.	Designates the network No. of the target station. 1 to 239 : Network No. 254 : When 254 is designated in Jn
(S1)+5	Target station number	Designates the target station number. 1 to 64: Station number
(S1)+6	(Use prohibited)	—
(S1)+7	Number of resends	1) At instruction execution Sets the number of resends when the instruction fails to complete within the monitoring time designated by (S1) + 8. 0 to 15 (times) 2) At instruction completion Stores the number of resends executed (result). 0 to 15 (times)

Detailed description of the control data

Device	Item	Description
(S1)+8	Arrival monitoring time	When the instruction fails to complete within the monitoring time, it is resent for the number of resends designated in (S1) + 7. 0 : 10 s 1 to 32767 : 1 to 32767 s
(S1)+9	Read data length	Designates the length of data to be read. 1 to 480 (words)
(S1)+10	(Use prohibited)	–
(S1)+11	Clock set flag	Stores the valid/invalid status of the clock data in (S1) + 12 to (S1) + 17. 0: Invalid 1: Valid
(S1)+12	Month/year (lower two digits) of abnormal completion	Month and year (the lower two digits of the 4-digit year) are stored as BCD codes. b15 to b8: Month (01_H to 12_H) b7 to b0: Year (00_H to 99_H)
(S1)+13	Hour/date of abnormal completion	Hour and date are stored as BCD codes. b15 to b8: Hour (00_H to 23_H) b7 to b0: Date (01_H to 31_H)
(S1)+14	Second/minute of abnormal completion	Second and minute are stored as BCD codes. b15 to b8: Second (00_H to 59_H) b7 to b0: Minute (00_H to 59_H)
(S1)+15	Year (higher two digits)/day of the week of abnormal completion	Year (the higher two digits of the 4-digit year) and day of the week are stored as BCD codes. b15 to b8: Year (00_H to 99_H) ∗1 b7 to b0: Day of the week (00_H to 06_H) 00_H (Sunday) to 06_H (Saturday)
(S1)+16	Abnormal detection network No.	Stores the network No. of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use ($F7C1_H$)." 1 to 239 (network number)
(S1)+17	Abnormal detection number	Stores the station number of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use ($F7C1_H$)." 1 to 64 (station number)

∗1: [00_H] will be stored in the [Year] field (higher two digits) when the CPU targeted by special instructions is a QnACPU. (Clock data will not be stored when errors have been completed in the case of the ACPU.)

POINT

(1) When the target station of the SREAD instruction is the Q00J/Q00/Q01CPU, the read notification device for the target station set in the argument (D3) is ignored. The operation of the SREAD instruction is the same as that of the READ instruction.
(2) The SREAD instruction can be programmed without the argument (D3). However, its operation is the same as that of the READ instruction. You can either use the SREAD instruction with or without D3.
(3) 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) WRITE and SWRITE instructions

[Network No. designation]

Write command

JP.WRITE	Jn	(S1)	(S2)	(D1)	(D2)

JP: Executed at startup

Write command

JP.SWRITE	Jn	(S1)	(S2)	(D1)	(D2)	(D3)

JP: Executed at startup

[Network module start I/O No. designation]

Write command

GP.WRITE	Un	(S1)	(S2)	(D1)	(D2)

GP: Executed at startup

Write command

GP.SWRITE	Un	(S1)	(S2)	(D1)	(D2)	(D3)

GP: Executed at startup

	Description of setting	Setting range
Jn	Host's network No.	1 to 239 254: Network designated by valid module during other station access
Un	Start I/O number of the host's network module Designate the higher two digits of the 3-digit I/O number.	0 to FE_H : Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU 0 to $3E_H$: Q00CPU,Q01CPU 0 to E_H : Q00JCPU
(S1)	Control data storage head device Designate the head device of the host that stores the control data.	Word device ＊2
(S2)	Write data storage head device (host) Designate the head device of the host that stores the data to be written.	Word device ＊2
(D1)	Write data storage head device (target station) Designate the head device of the target station that stores the data to be written.	Word device ＊2
(D2)	Write complete device (host) Designate the host's device to be turned on for one scan upon write completion. (D2) Off : Not completed On : Complete (D2)+1 Off : Normal On : Error	Bit device ＊1 Bit designation of word device ＊3
(D3)	Write notification device (target station) Designate the target station's device to be turned on for one scan upon completion of the writing. (The target station can identify that the data has been written from other station.) (D3) Off : Not completed On : Complete	Bit device ＊1 Bit designation of word device ＊3

＊1: Bit device : X, Y, M, L, F, V, and B

＊2: Word device : T, C, D, W, ST, R, and ZR
(The Q00JCPU cannot use R and ZR.)

＊3: Bit designation of word device : Word device, bit number

[Control data configuration (S1)]

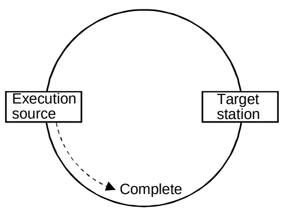
Device	Item	Data set	
		User (at execution) ＊1	System (upon completion) ＊2
(S1)	Execution/abnormal completion type	○	
(S1)+1	Completion status		○
(S1)+2	Channel used by the host	○	
(S1)+3	(Use prohibited)	–	–
(S1)+4	Target station network No.	○	
(S1)+5	Target station number	○	
(S1)+6	(Use prohibited)		
(S1)+7	Number of resends	○	○
(S1)+8	Arrival monitoring time	○	
(S1)+9	Write data length	○	
(S1)+10	(Use prohibited)	–	–
(S1)+11	Clock set flag		○
(S1)+12	Year (lower two digits)/month of abnormal completion		○
(S1)+13	Date/hour of abnormal completion		○
(S1)+14	Minute/second of abnormal completion		○
(S1)+15	Year(higher two digits)/day of the week of abnormal completion		○
(S1)+16	Abnormal detection network No.		○
(S1)+17	Abnormal detection station number		○

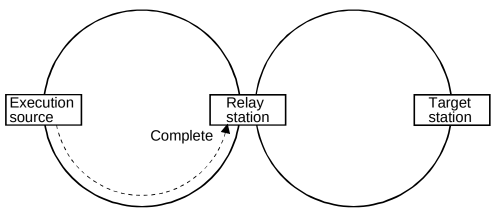
(S1)+11 to (S1)+17: Used when the abnormal completion type is set to "with clock data setting."

＊1: Items set by the sequence program

＊2: Items automatically stored upon instruction completion

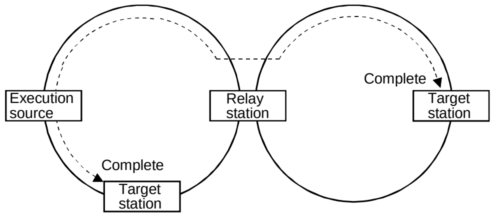
Detailed description of the control data

<table>
<tr><th>Device</th><th>Item</th><th>Description</th></tr>
<tr><td>(S1)</td><td>Execution/abnormal 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>2)</td><td>0</td><td>1)</td></tr>
</table>
1) Execution type (bit 0)
0: No arrival confirmation
When the target station is on the local network: Completed when data is sent from the host.


When the target station is on other network: Completed when the data arrives at the relay station on the network of the host.


</td></tr>
</table>

Detailed description of the control data

Device	Item	Description
(S1)	Execution/abnormal completion type	1: With arrival confirmation Completed when the data is written to the target station.  2) Abnormal completion type (bit 7) Sets the clock data set status at abnormal completion. 0: Does not set clock data : Does not store the clock data at error occurrence in (S1) + 11 to (S1) + 17. 1: Sets clock data : Stores the clock data at error occurrence in (S1) + 11 to (S1) + 17.
(S1)+1	Completion status	Stores the status when an instruction is completed. 0 : Normal Other than 0 : Abnormal
(S1)+2	Channel used by the host	Designates the channel used by the host. 1 to 8 (channels)
(S1)+3	(Use prohibited)	—
(S1)+4	Target station network No.	Designates the network No. of the target station. 1 to 239 : Network No. 254 : When 254 is designated in Jn
(S1)+5	Target station number	Designates the station number of the target station. 1 to 64 : The station with the corresponding station No. 81_H to $A0_H$: Group designation (Can be set when the execution type designated in (S1) is "0: No arrival confirmation.") FF_H : All stations of the target network No. (Can be set when the execution type designated in (S1) is "0: No arrival confirmation.") : excluding the host When a group is designated, set the group No. of the target station with the network parameters from GX Developer.
(S1)+6	(Use prohibited)	—
(S1)+7	Number of resends	1) At instruction execution Becomes valid when the execution type designated in (S1) is "1: With arrival confirmation." Set the number of resends when the instruction fails to complete within the monitoring time designated by (S1) + 8. 0 to 15 (times) 2) At instruction completion Stores the number of resends executed (result). 0 to 15 (times)
(S1)+8	Arrival monitoring time	Becomes valid when the execution type designated in (S1) is "1: With arrival confirmation." Set the monitoring time until the instruction completion. When the instruction fails to complete within the monitoring time, it is resent for the number of resends designated in (S1) + 7. 0 : 10 s 1 to 32767 : 1 to 32767 s
(S1)+9	Write data length	Designates the number of write data in (S2) to (S2) + n. 1 to 480 (words)
(S1)+10	(Use prohibited)	—
(S1)+11	Clock set flag	Stores the valid/invalid status of the clock data in (S1) + 12 to (S1) + 17. 0: Invalid 1: Valid

Detailed description of the control data

Device	Item	Description
(S1)+12	Month/year (lower two digits) of abnormal completion	Month and year (the lower two digits of the 4-digit year) are stored as BCD codes. b15 to b8: Month (01_H to 12_H); b7 to b0: Year (00_H to 99_H)
(S1)+13	Hour/date of abnormal completion	Hour and date are stored as BCD codes. b15 to b8: Hour (00_H to 23_H); b7 to b0: Date (01_H to 31_H)
(S1)+14	Second/minute of abnormal completion	Second and minute are stored as BCD codes. b15 to b8: Second (00_H to 59_H); b7 to b0: Minute (00_H to 59_H)
(S1)+15	Year (higher two digits)/day of the week of abnormal completion	Year (the higher two digits of the 4-digit year) and day of the week are stored as BCD codes. b15 to b8: Year (00_H to 99_H)*1; b7 to b0: Day of the week (00_H to 06_H) 00_H (Sunday) to 06_H (Saturday)
(S1)+16	Abnormal detection network No.	Stores the network No. of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use ($F7C1_H$)." 1 to 239 (network number)
(S1)+17	Abnormal detection station number	Stores the station number of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use ($F7C1_H$)." 1 to 64 (station number)

*1: [00_H] will be stored in the [Year] field (higher two digits) when the CPU targeted by special instructions is a QnACPU. (Clock data will not be stored when errors have been completed in the case of the ACPU.)

POINT

(1) When the target station of the SWRITE instruction is the Q00J/Q00/Q01CPU, the write notification device for the target station set in the argument (D3) is ignored. The operation of the SWRITE instruction is the same as that of the WRITE instruction.

(2) The SWRITE instruction can be programmed without the argument (D3). However, its operation is the same as that of the WRITE instruction. You can either use the SWRITE instruction with or without D3.

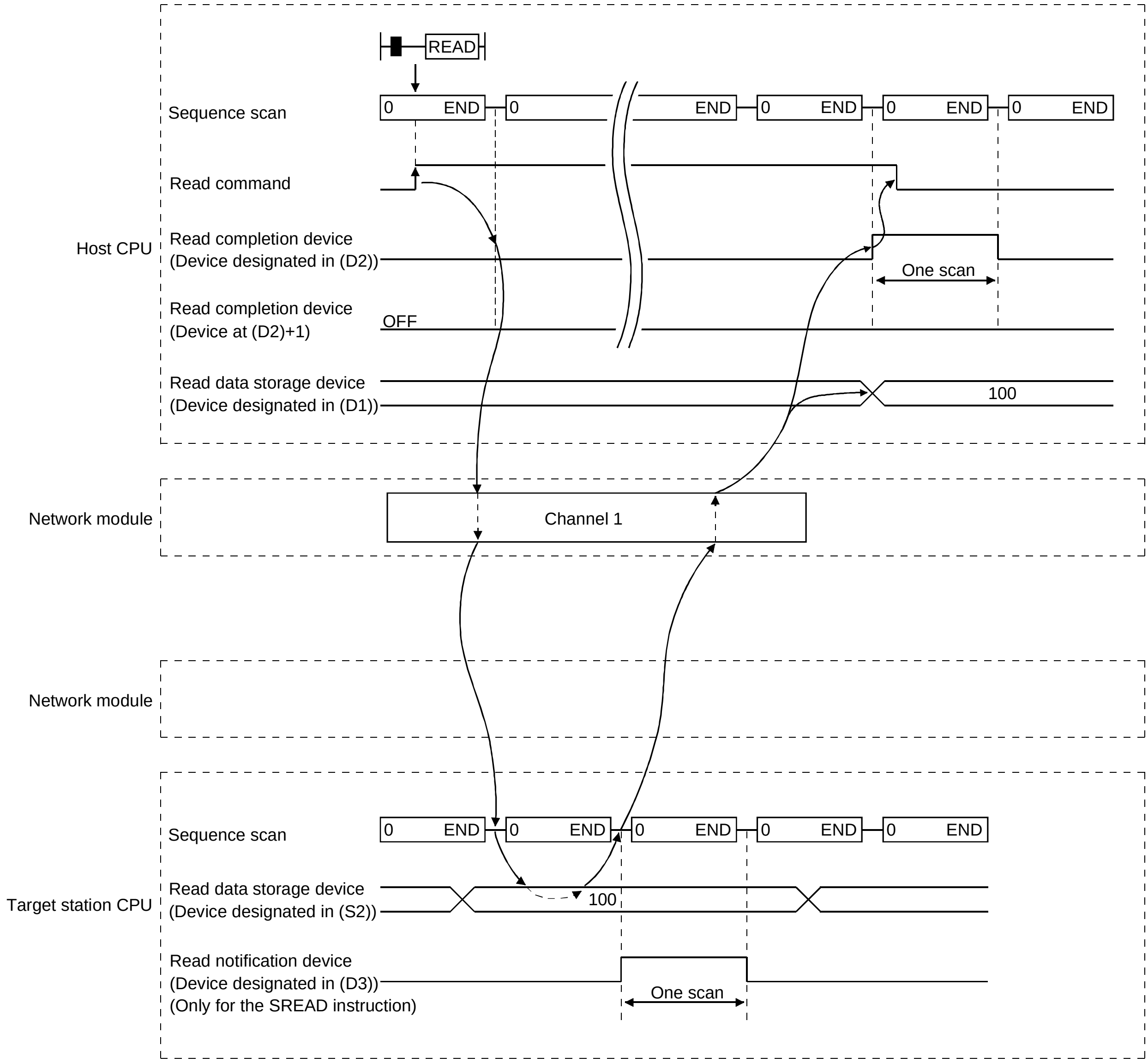
(3) Specify the device of the other station CPU module to be written with the WRITE/SWRITE instruction within the range available for the host CPU module.
(Head device No. (S2) of write target of other station CPU module) + (Number of write points - 1) ≤ (Last device No. of host CPU module *)
*: Last device number at the host CPU module having the same device name as (S2)

(4) In order to improve the reliability of data, it is recommended to execute instructions by setting the execution type to "With arrival confirmation".

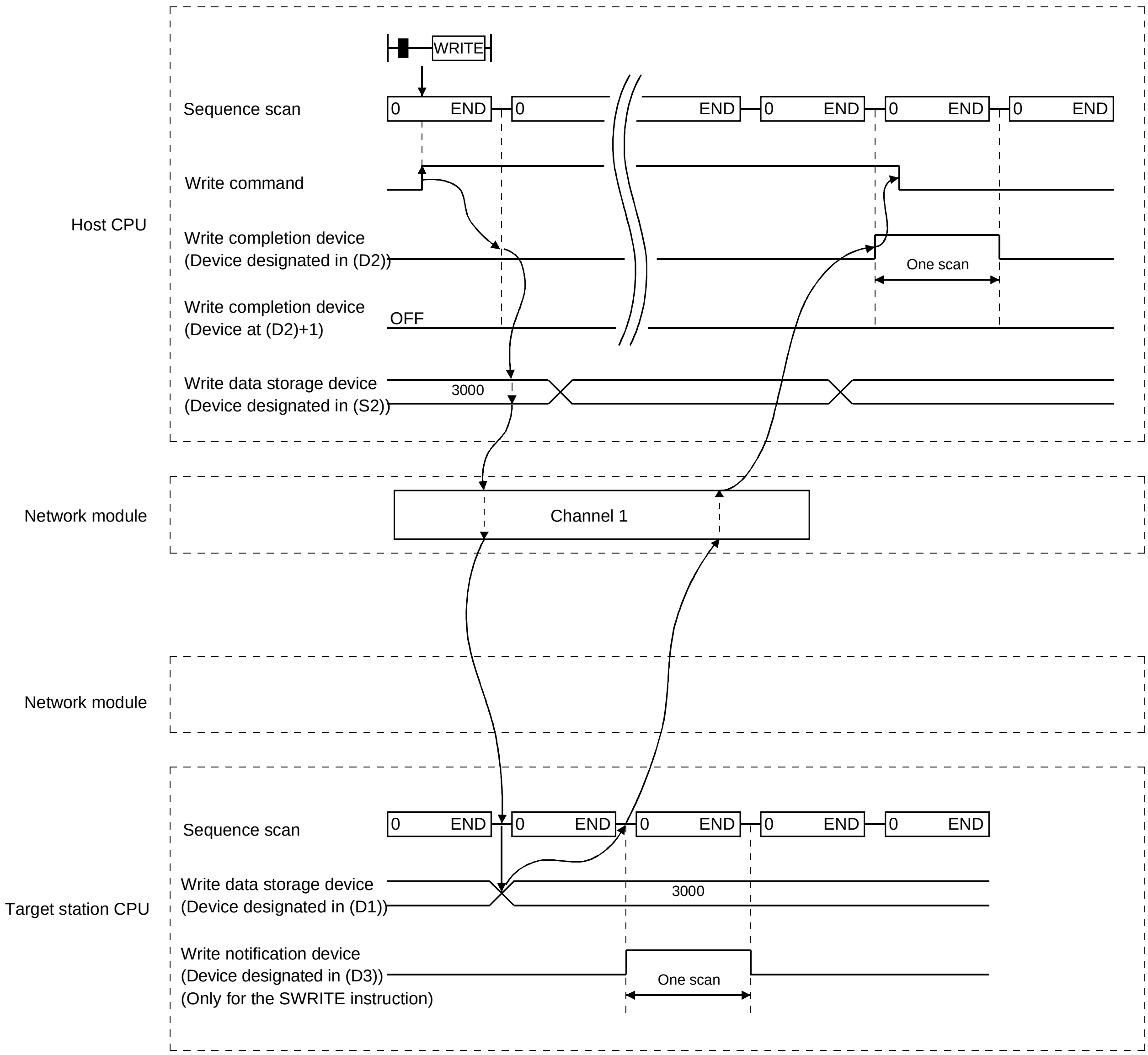
(5) If the execution type is set to "No arrival confirmation," all of the normally completed transmission is considered as normal even if the contents of the send data are abnormal.
In addition, even if the contents of the send data are normal, when an instruction is executed to the same station from multiple stations, a "receive buffer full error ($F222_H$)" may occur in the target station but the sending completes normally in the sending station.

(b) Instruction execution timing

1) Normal completion
[READ and SREAD instructions]

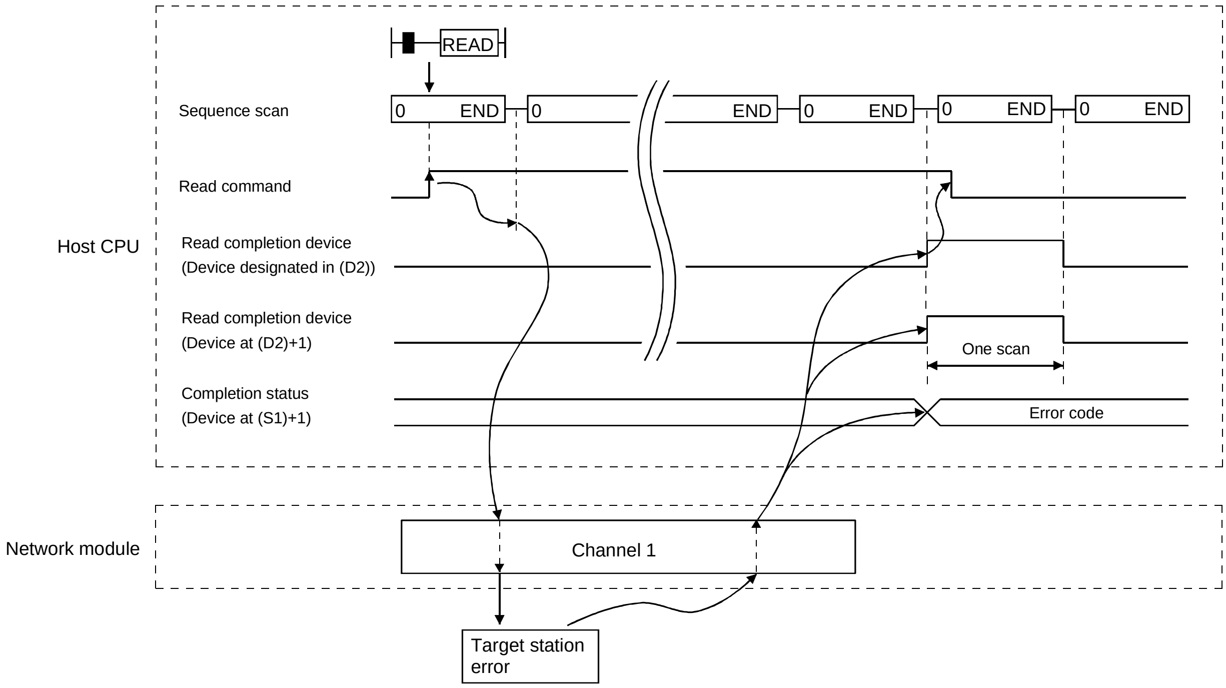


[WRITE and SWRITE instructions]

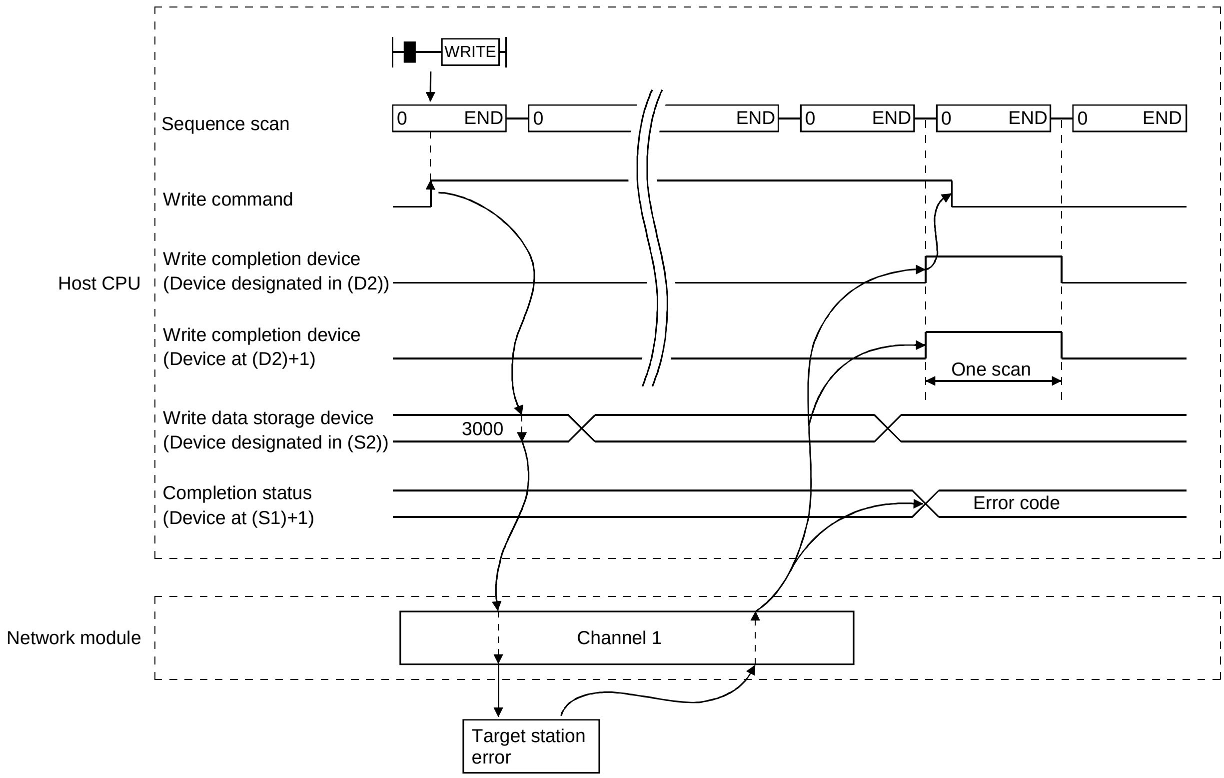


2) Abnormal completion

[READ and SREAD instructions]



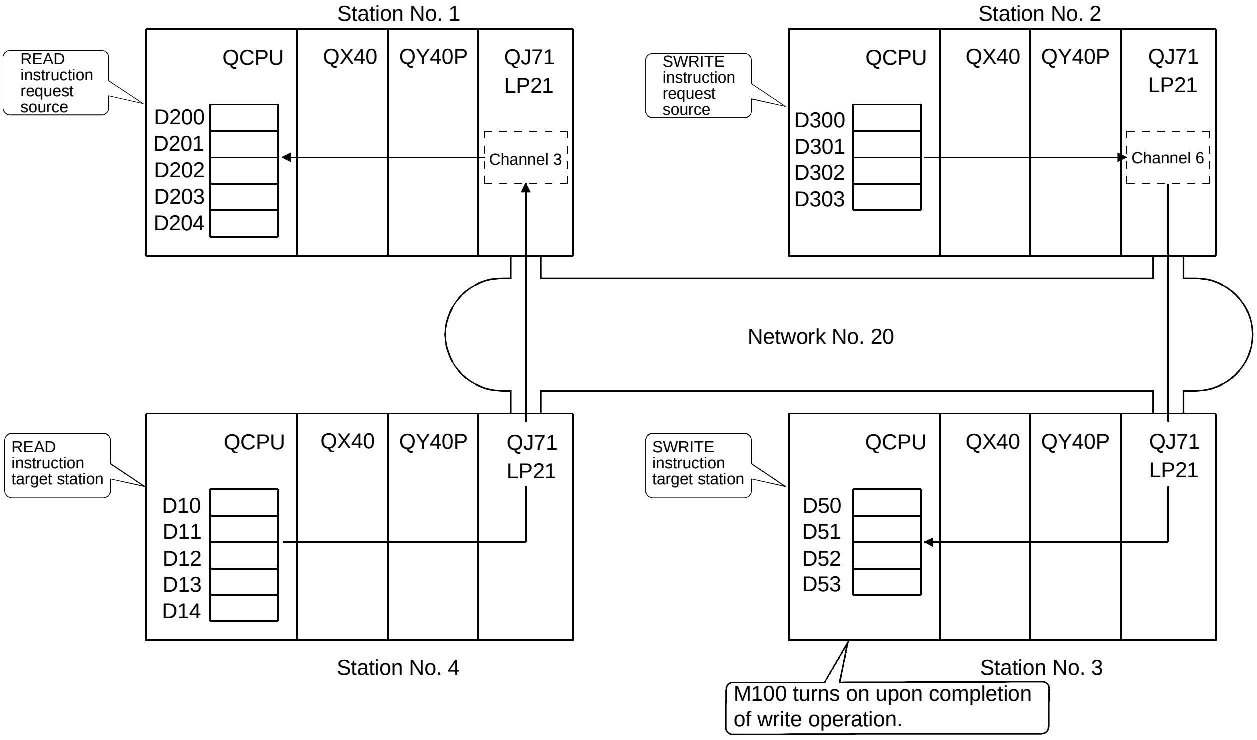
[WRITE and SWRITE instructions]



(c) Program example

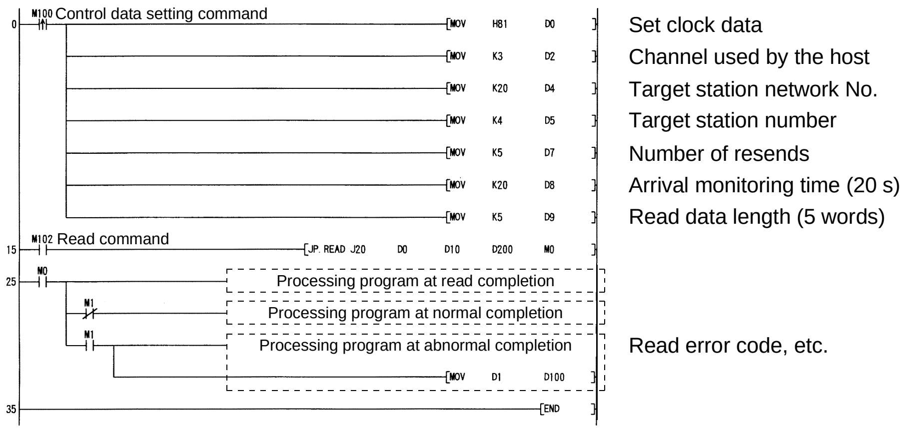
Read the data in D10 to D14 of station number 4 to D200 to D204 of station number 1.

Write the data stored in D300 to D303 of station number 2 to D50 to D53 of station number 3.

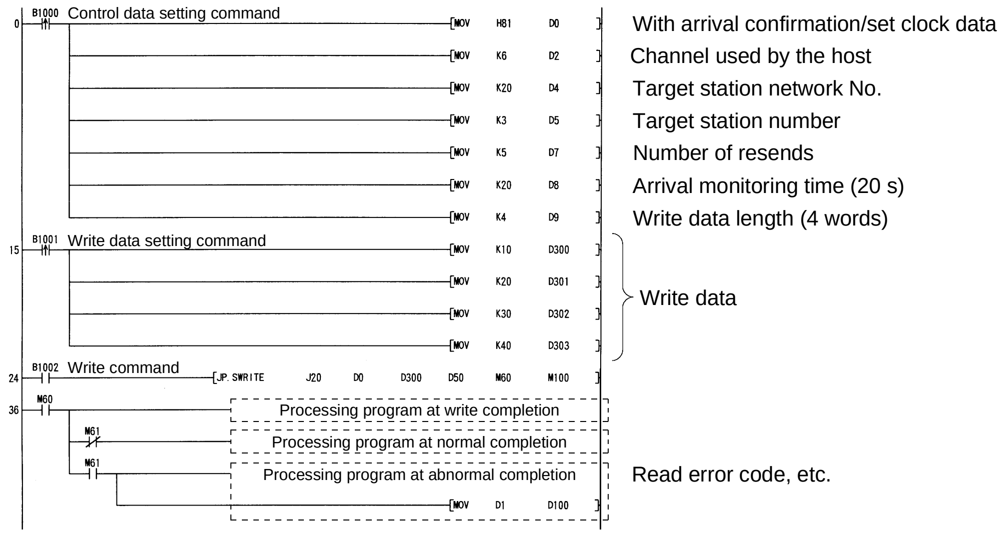


1) Program for station number 1 (READ instruction)

When actually using the following program, interlock the program by seeing Section 6.1.



2) Program for station number 2 (SWRITE instruction)
When actually using the following program, interlock the program by seeing Section 6.1.



(3) Requesting transient transmission to other station (REQ)

The following explains the REQ instruction format and a program example.

(a) Instruction format

[Network No. designation]

Execute command

J.REQ	Jn	(S1)	(S2)	(D1)	(D2)	JP: Executed when on

Execute command

JP.REQ	Jn	(S1)	(S2)	(D1)	(D2)	JP: Executed at startup

[Network module start I/O No. designation]

Execute command

G.REQ	Un	(S1)	(S2)	(D1)	(D2)	G: Executed when on

Execute command

GP.REQ	Un	(S1)	(S2)	(D1)	(D2)	GP: Executed at startup

	Description of setting	Setting range
Jn	Host's network No.	1 to 239 254: Network designated by valid module during other station access.
Un	Start I/O number of the host's network module Designate the higher two digits of the 3-digit I/O number.	0 to FEH : Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU 0 to 3EH : Q00CPU,Q01CPU 0 to EH : Q00JCPU
(S1)	Control data storage head device Designate the head device of the host that stores the control data.	Word device ＊2
(S2)	Request data storage head device (host) Designate the head device of the host that stores the request data.	Word device ＊2
(D1)	Response data storage head device (host) Designate the head device of the host that stores the response data. However, response data is stored only when reading clock data.	Word device ＊2
(D2)	Read complete device (host) Designate the host's device to be turned on for one scan upon execution completion. (D2) Off : Not completed On : Complete (D2)+1 Off : Normal On : Error	Bit device ＊1 Bit designation of word device ＊3

＊1: Bit device : X, Y, M, L, F, V, and B

＊2: Word device : T, C, D, W, ST, R, and ZR
(The Q00JCPU cannot use R and ZR.)

＊3: Bit designation of word device : Word device, bit number

[Control data configuration (S1)]

Device	Item	Data set	
		User (at execution) ＊1	System (upon completion) ＊2
(S1)	Abnormal completion type	○	
(S1)+1	Completion status		○
(S1)+2	Channel used by the host	○	
(S1)+3	(Use prohibited)		
(S1)+4	Target station network No.	○	
(S1)+5	Target station number	○	
(S1)+6	(Use prohibited)		
(S1)+7	Number of resends	○	○
(S1)+8	Arrival monitoring time	○	
(S1)+9	Request data length	○	
(S1)+10	Response data length	○	
(S1)+11	Clock set flag		○
(S1)+12	Year (lower two digits)/month of abnormal completion		○
(S1)+13	Date/hour of abnormal completion		○
(S1)+14	Minute/second of abnormal completion		○
(S1)+15	Year(higher two digits)/day of the week of abnormal completion		○
(S1)+16	Abnormal detection network No.		○
(S1)+17	Abnormal detection station number		○

$\left.\right\}$ Used when the abnormal completion type is set to "with clock data setting." ((S1)+11 to (S1)+17)

＊1: Items set by the sequence program
＊2: Items automatically stored upon instruction completion

Detailed description of the control data

Device	Item	Description
(S1)	Abnormal completion type	b15 to b7 to b4 to b0 | 0 | 1) | 0 | 1 | 0 | 1 | 1) Abnormal completion type (bit 7) Sets the clock data set status at abnormal completion. 0: Does not set clock data : Does not store the clock data at error occurrence in (S1) + 11 to (S1) + 17. 1: Sets clock data : Stores the clock data at error occurrence in (S1) + 11 to (S1) + 17.
(S1)+1	Completion status	Stores the status when an instruction is completed. 0 : Normal Other than 0 : Error (see Section 8.1 for error codes)
(S1)+2	Channel used by the host	Designates the channel used by the host. 1 to 8 (channels)
(S1)+3	(Use prohibited)	–
(S1)+4	Target station network No.	Designates the target station's network No. 1 to 239 : Network number 254 : When 254 is designated in Jn
(S1)+5	Target station number	Designates the station number of the target station. 1 to 64 : Station number 81_H to $A0_H$: Group designation (Possible only for clock data write and remote RUN/STOP) FF_H : All stations of the target network No. (Possible only for clock write read and remote RUN/STOP): excluding the host When a group is designated, set the group No. of the target station with the network parameters from GX Developer.
(S1)+6	(Use prohibited)	–

Detailed description of the control data

Device	Item	Description
(S1)+7	Number of resends	1) At instruction execution Sets the number of resends when the instruction fails to complete within the monitoring time designated by (S1) + 8. 0 to 15 (times) 2) At instruction completion Stores the number of resends executed (result). 0 to 15 (times)
(S1)+8	Arrival monitoring time	Sets the monitoring time until the instruction completion. When the instruction fails to complete within the monitoring time, it is resent for the number of resends designated in (S1) + 7. 0 : 10 s 1 to 32767 : 1 to 32767 s
(S1)+9	Receive data length	Designates the request data count (words). 2: Clock data read 7: Clock data write 3: Remote STOP 4: Remote RUN
(S1)+10	Response data length	Stores the response data count (words). 4: Clock data read
(S1)+11	Clock set flag	Stores the valid/invalid status of the clock data in ((S1) + 12 to (S1) + 17). 0: Invalid 1: Valid
(S1)+12	Month/year (lower two digits) of abnormal completion	Month and year (the lower two digits of the 4-digit year) are stored as BCD codes. b15 to b8: Month (01_H to 12_H) b7 to b0: Year (00_H to 99_H)
(S1)+13	Hour/date of abnormal completion	Hour and date are stored as BCD codes. b15 to b8: Hour (00_H to 23_H) b7 to b0: Date (01_H to 31_H)
(S1)+14	Second/minute of abnormal completion	Second and minute are stored as BCD codes. b15 to b8: Second (00_H to 59_H) b7 to b0: Minute (00_H to 59_H)
(S1)+15	Year (higher two digits)/day of the week of abnormal completion	Year (the higher two digits of the 4-digit year) and day of the week are stored as BCD codes. b15 to b8: Year (00_H to 99_H)*1 b7 to b0: Day of the week (00_H to 06_H) 00_H (Sunday) to 06_H (Saturday)
(S1)+16	Abnormal detection network No.	Stores the network No. of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use ($F7C1_H$)." 1 to 239 (network No.)
(S1)+17	Abnormal detection number	Stores the station number of the station that detected an abnormality. However, it is not stored when the completion status of (S1) + 1 is "Channel in use ($F7C1_H$)." 1 to 64 (station number)

*1: [00_H] will be stored in the [Year] field (higher two digits) when the CPU targeted by special instructions is a QnACPU. (Clock data will not be stored when errors have been completed in the case of the ACPU.)

[Request data (S2)/response data(D1) (for reading/writing the clock data)]

1) Request data

Device	Item	Description	Clock data read	Clock data write
(S2)	Request type	0001_H: Clock data read 0011_H: Clock data write	○	○
(S2)+1	Sub-request type	0002_H: Clock data read 0001_H: Clock data write	○	○
(S2)+2	Pattern to be changed Year to be changed	1) Pattern to be changed (bit 0 to 7) Designates which item(s) to write, from the high byte of (S2) + 2 to (S2) + 5. 0: No change 1: Change 2) Year to be changed (bit 8 to 15) Year (the lower two digits of the 4-digit year) is stored as BCD codes. b15–b8: Year (00_H to 99_H); b7: 0; b6: Day of the week; b5: Second; b4: Minute; b3: Hour; b2: Date; b1: Month; b0: Year (lower two digits)	–	○
(S2) + 3	Month and date to be changed	Designate month and date with BCD codes. b15 to b8: Date (01_H to 31_H) b7 to b0: Month (01_H to 12_H)	–	○
(S2) + 4	Hour and minute to be changed	Designate hour and minute with BCD codes. b15 to b8: Minute (00_H to 59_H) b7 to b0: Hour (00_H to 23_H)	–	○
(S2) + 5	Second and day of the week to be changed	Designate second and day of the week with BCD codes. b15 to b8: Day of the week (00_H to 06_H) → 00_H (Sunday) to 06_H (Saturday) b7 to b0: Second (00_H to 59_H)	–	○

2) Response data

Device	Item	Description	Clock data read	Clock data write
(D1)	Month and year (lower two digits) read	Month and year (the lower two digits of the 4-digit year) are stored as BCD codes. b15 to b8: Month (01_H to 12_H) b7 to b0: Year (00_H to 99_H)	○	–
(D1)+1	Hour and date read	Hour and date are stored as BCD codes. b15 to b8: Hour (00_H to 23_H) b7 to b0: Date (01_H to 31_H)	○	–
(D1)+2	Second and minute read	Second and minute are stored as BCD codes. b15 to b8: Second (00_H to 59_H) b7 to b0: Minute (00_H to 59_H)	○	–
(D1)+3	Year (higher two digits) and day of the week read	Year (the higher two digits of the 4-digit year) and day of the week are stored as BCD codes. b15 to b8: Year (00_H to 99_H) b7 to b0: Day of the week (00_H to 06_H) → 00_H (Sunday) to 06_H (Saturday)	○	–

POINT

When there is a system protection on the CPU module of the target station, the clock data cannot be read or written.

[Request data (S2)/response data (D1) at remote RUN/STOP]

1) Request data

Device	Item	Description	Remote RUN	Remote STOP
(S2)	Request type	0010H	○	○
(S2)+1	Sub-request type	0001H: Remote RUN 0002H: Remote STOP	○	○
(S2)+2	Mode	Designates whether or not to forcefully execute remote RUN/STOP. 0001H: Does not force execution 0003H: Force execution (setting at remote STOP) (The forced execution is a function for forcefully executing remote RUN from other station when the station that executed the remote STOP is no longer able to execute remote RUN.)	○	○
(S2)+3	Clear mode	Designates the device memory status of the CPU module when remote RUN is executed. 0000H: Does not clear (setting at remote STOP) 0001H: Clears (excluding the latch range) 0002H: Clears (including the latch range)	○	×

2) Response data

Device	Item	Description	Remote RUN	Remote STOP
(D1)	Request type	0090H	○	○
(D1)+1	Sub-request type	0001H: Remote RUN 0002H: Remote STOP	○	○

POINT

(1) Remote RUN/STOP becomes valid when the RUN/STOP switch of the target station's CPU module is in the "RUN" position.

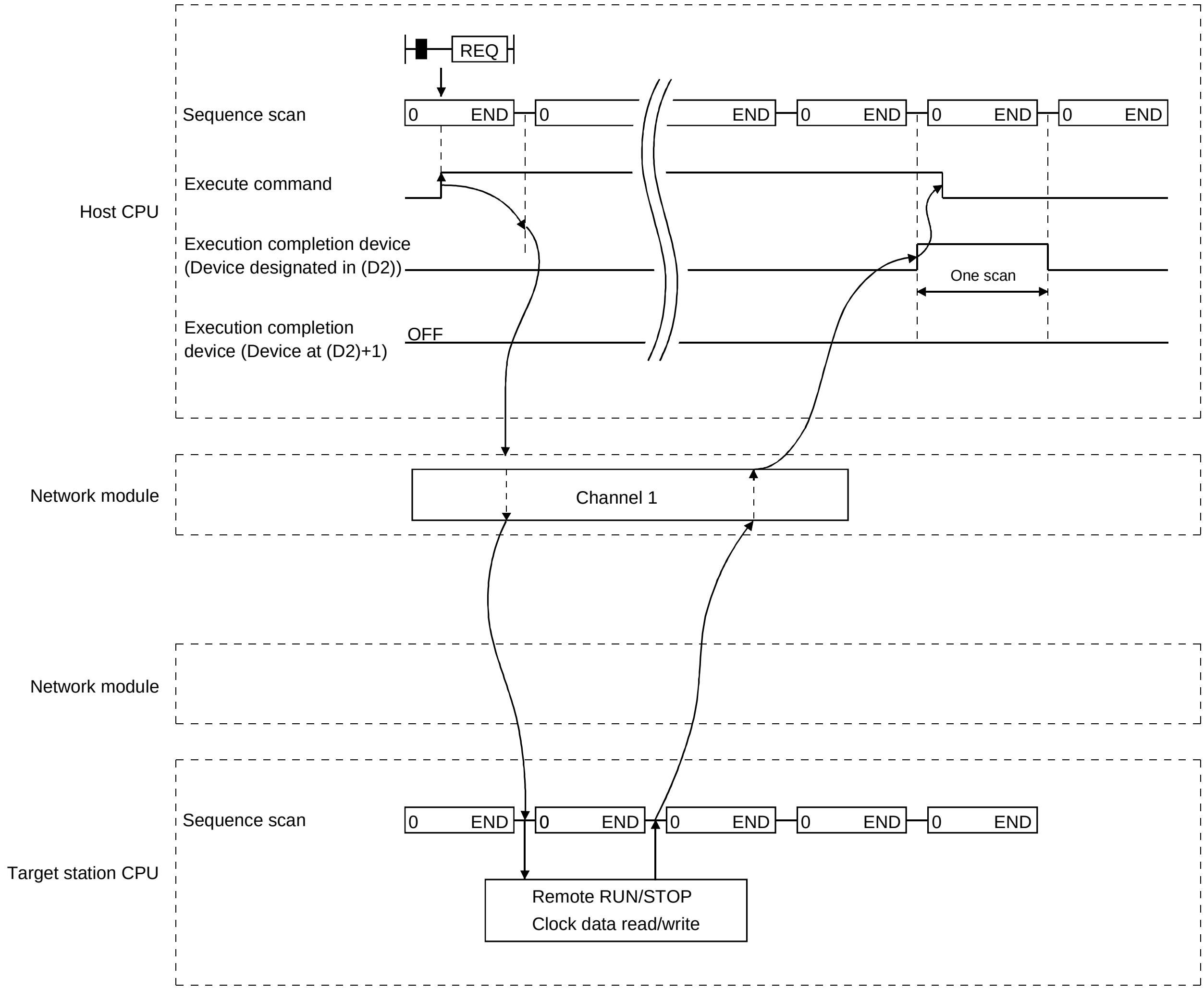
(2) Remote RUN/STOP cannot be executed when there is a system protection on the target station's CPU module.

(3) When other station has executed a remote STOP/PAUSE on the target station, the RUN request cannot be executed if the mode of (S2) + 1 is "Does not force execution (0001H)."

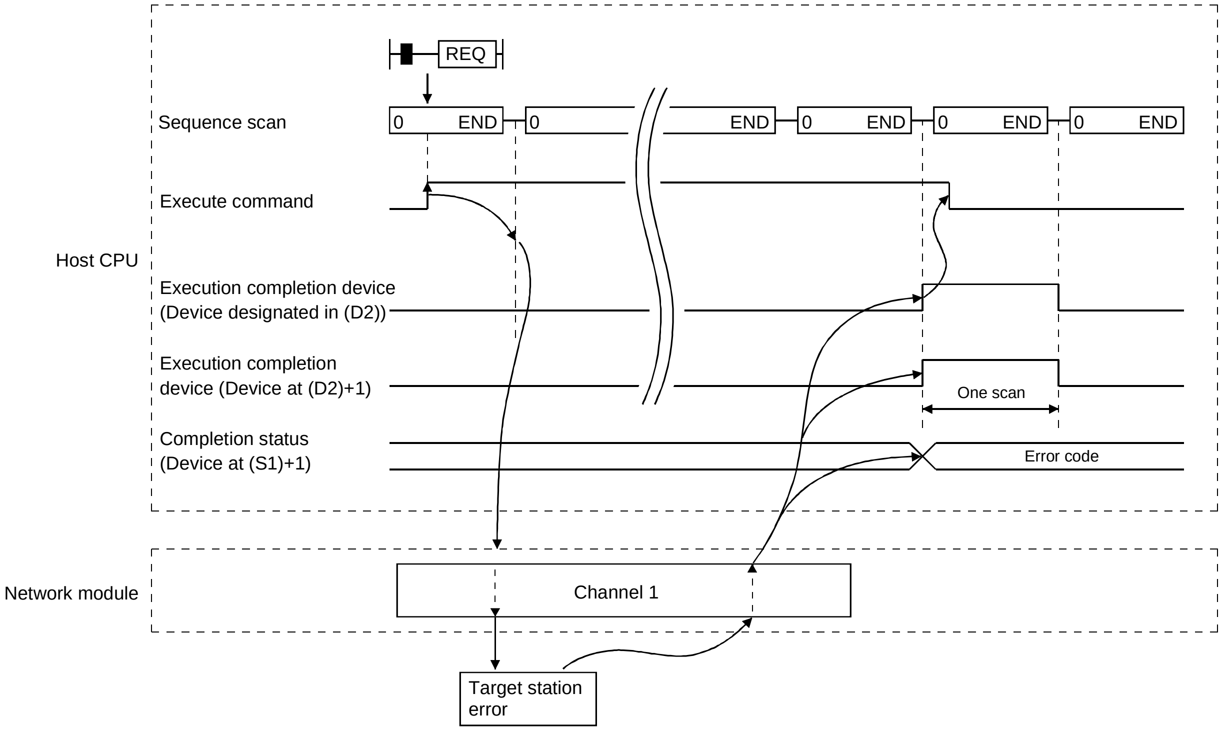
(4) If the CPU module of the target station on which a remote RUN/STOP has been executed is reset, the information of the remote RUN/STOP will be erased.

(b) Instruction execution timing

1) Normal completion



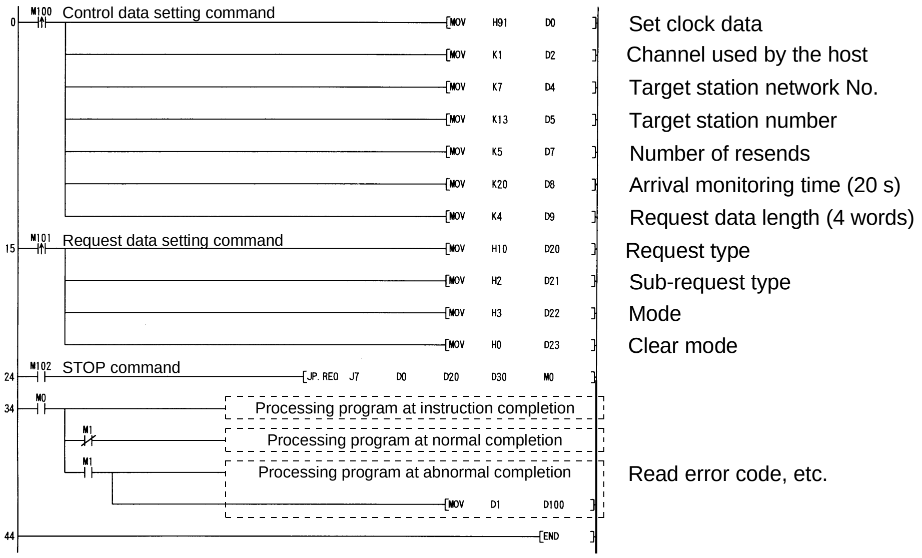
2) Abnormal completion



(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, interlock the program by seeing Section 6.1.



(4) Reading/writing word devices of other stations (ZNRD/ZNWR)

The following explains the ZNRD/ZNWR instruction format and some program examples.

(a) Instruction format

1) ZNRD instruction

[Network No. designation]

Read command

J.ZNRD	Jn	n1	(S1)	(D1)	n2	(D2)

J: Executed when on

Read command

JP.ZNRD	Jn	n1	(S1)	(D1)	n2	(D2)

JP: Executed at startup

	Description of setting	Setting range
Jn	Target station's network No.	1 to 239
n1	Target station number	1 to 64 (Constant) Designation of the number of digits for bit device ＊2 Word device ＊3
(S1)	Head device of the target station from which data is read	T, C, D and W
(D1)	Head device of the host that stores the data to read	Word device ＊3
(n2)	Number of points to read (word)	1 to 230 (Constant) Designation of the number of digits for bit device ＊2 Word device ＊3
(D2)	Completion device Designate the host's device to be turned on for one scan upon read completion (D2) Off : Not completed On : Complete (D2)+1 Off : Normal On : Abnormal	Bit device ＊1 Bit designation of word device ＊4

＊1: Bit device : X, Y, M, L, F, V, and B

＊2: Designation of the number of digits for bit device : Number of digits of K, bit device head No.

＊3: Word device : T, C, D, W, ST, ST, R, and ZR
(The Q00JCPU cannot use R and ZR.)

＊4: Bit designation of word device : Word device, bit number

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)

1) ZNWR instruction
[Network No. designation]

Write command

J.ZNWR	Jn	n1	(D1)	(S1)	n2	(D2)

J: Executed when on

Write command

JP.ZNWR	Jn	n1	(D1)	(S1)	n2	(D2)

JP: Executed at startup

	Description of setting	Setting range
Jn	Target network No.	1 to 239
n1	Target station number	1 to 64 (Constant) 81_H to $A0_H$: Group designation FF_H: Target network No. for all stations: excluding the host Designation of the number of digits for bit device *2 Word device *3 When a group is designated, set the group No. of the target station with the network parameters from GX Developer.
(D1)	Head device of the target station from which data is written	T, C, D, and W
(S1)	Head device of the host that stores the data to write	Word device *3
n2	Number of points to write (word)	1 to 230 (Constant) Designation of the number of digits for bit device *2 Word device *3
(D2)	Complete device Designate the host's device to be turned on for one scan upon write completion (D2) Off : Not completed On : Complete (D2)+1 Off : Normal On : Error	Bit device *1 Bit designation of word device *4

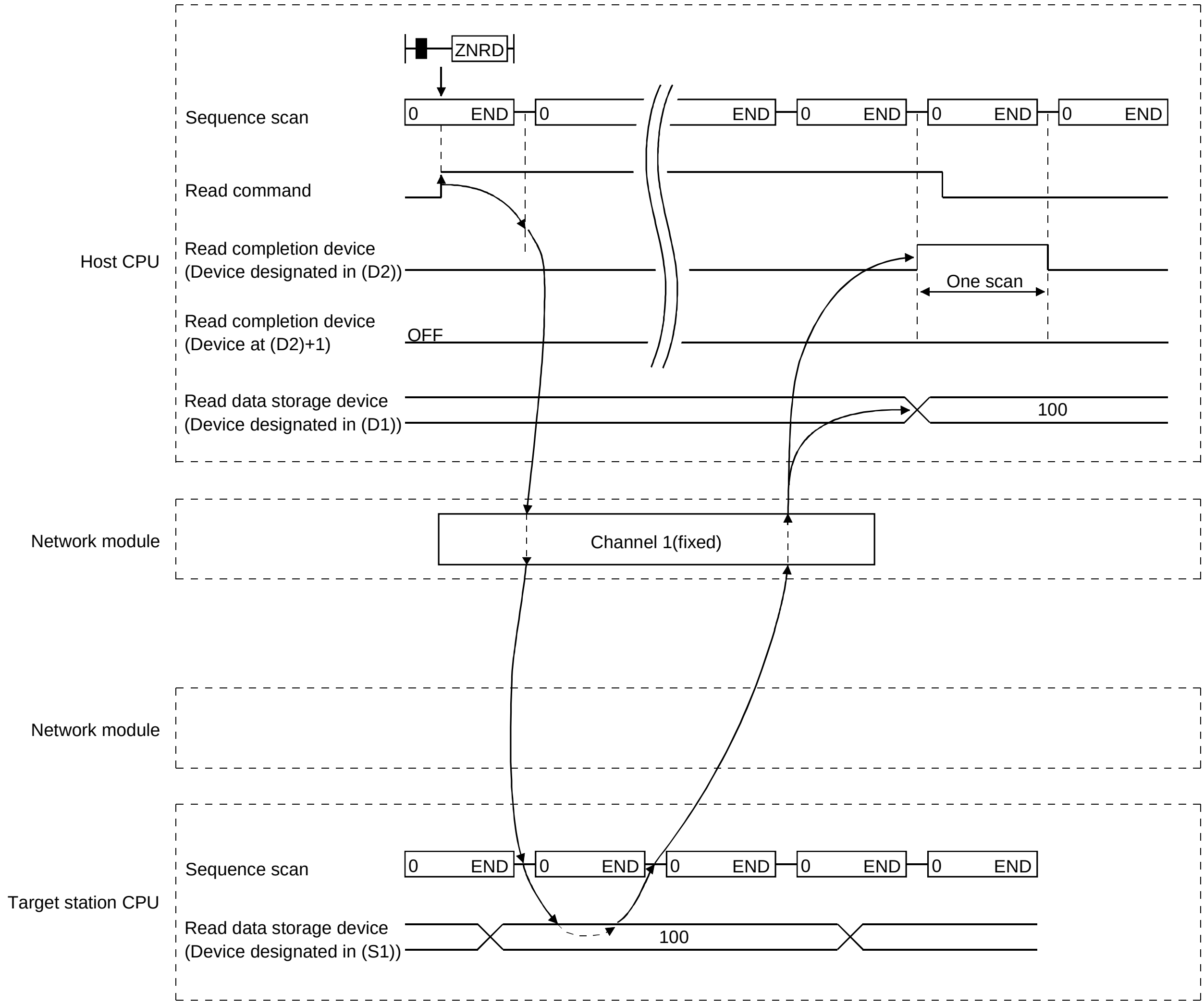
*1: Bit device : X, Y, M, L, F, V, and B
*2: Designation of the number of digits for bit device : Number of digits of K , bit device head No.
*3: Word device : T, C, D, W, ST, ST, R, and ZR
(The Q00JCPU cannot use R and ZR.)
*4: Bit designation of word device : Word device, bit number

POINT

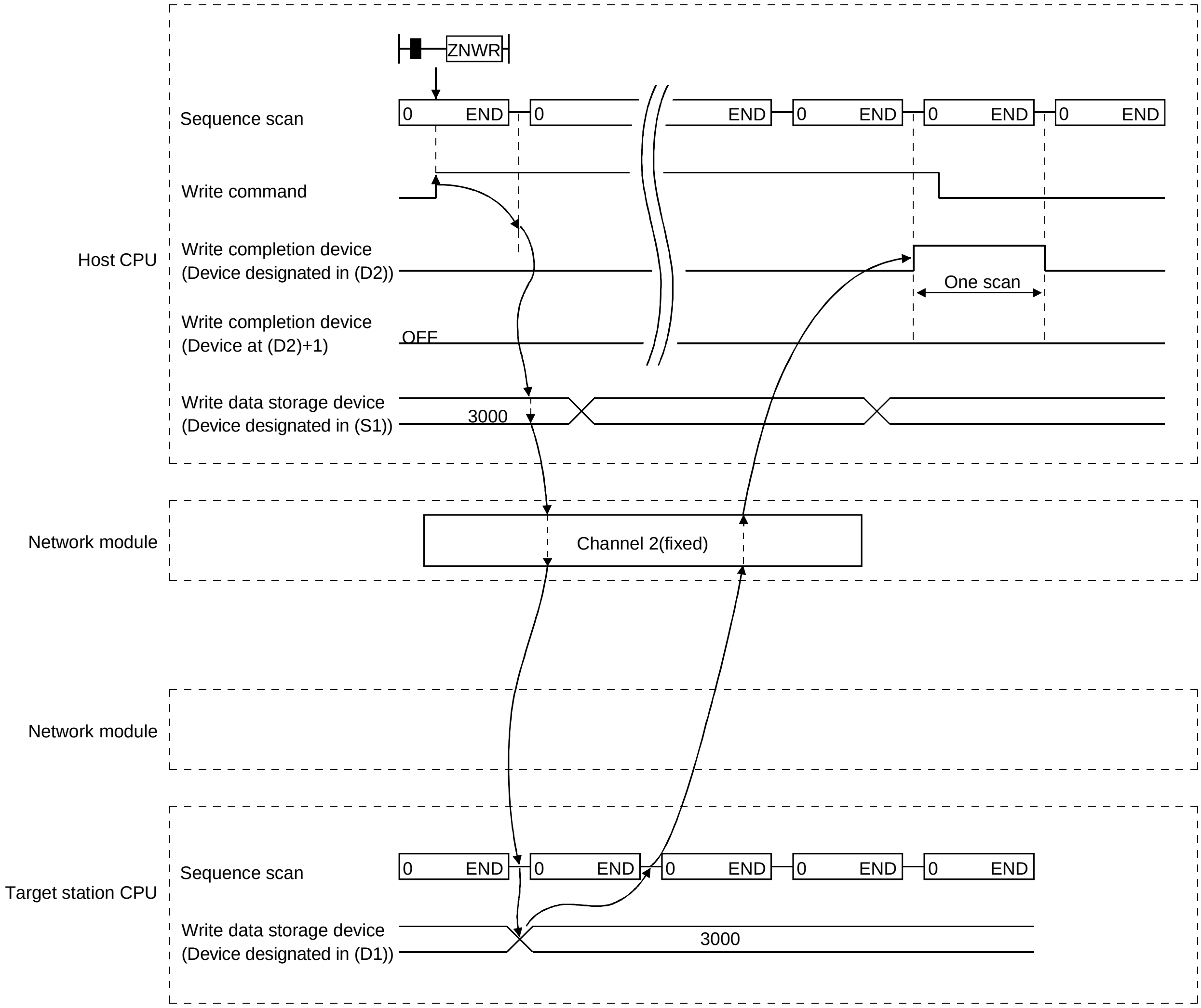
(1) Specify the device of the other station CPU module to be written with the ZNWR instruction within the range available for the host CPU module.
(Head device No. (S1) of write target of other station CPU module) + (Number of write points - 1) ≤ (Last device No. of host CPU module *)
*: Last device number at the host CPU module having the same device name as (S1)

(b) Instruction execution timing

1) Normal completion
[ZNRD instruction]

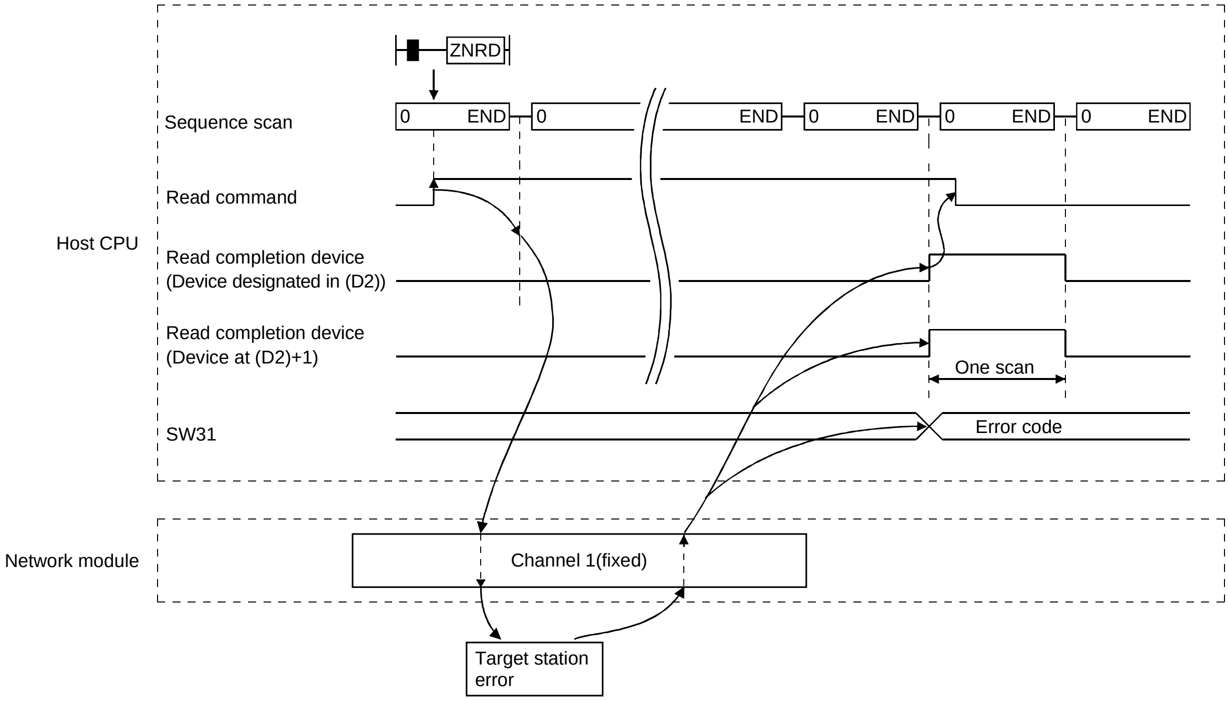


[ZNWR instruction]

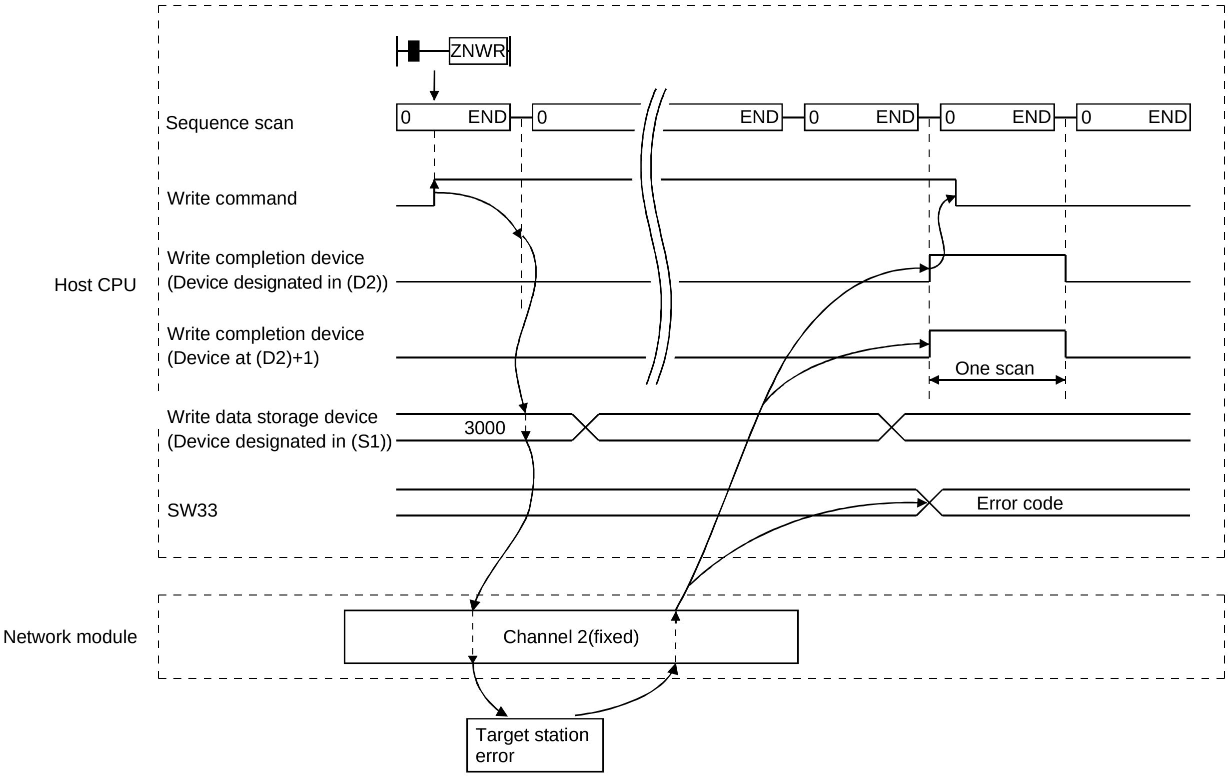


2) Abnormal completion

[ZNRD instruction]



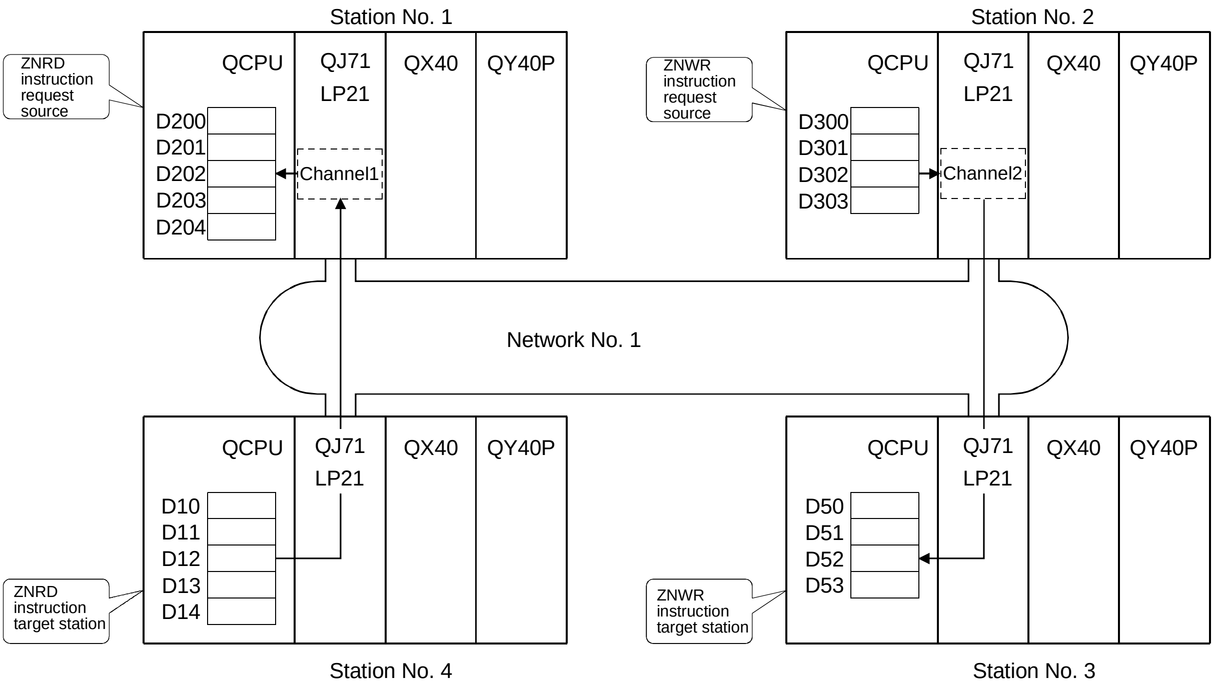
[ZNWR instruction]



(c) Program examples

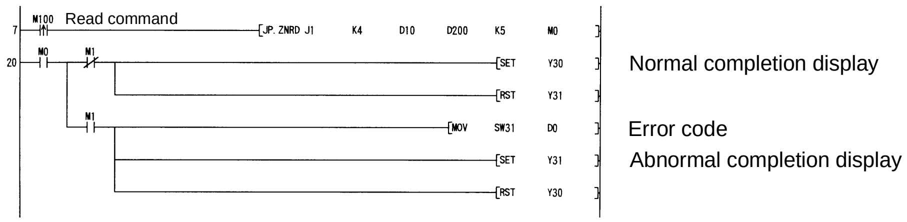
The program examples shown below are programmed for the following system configuration.

When actually using the programs below, interlock the programs by seeing Section 6.1.



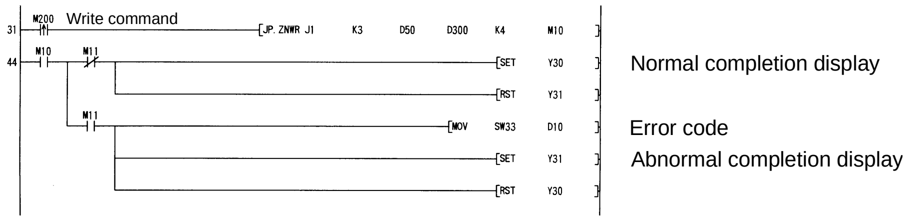
1) ZNRD instruction

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.



(5) Remote RUN/Remote STOP (RRUN/RSTOP)

This section explains the RRUN and RSTOP instruction formats, and provides program samples.

The RRUN instruction runs other station CPU module operations remotely.

The RSTOP instruction stops other station CPU module operations remotely.

(a) Instruction format

1) RRUN instruction

[Network No. designation]

Execution command

Z.RRUN	"Jn"	n1	n2	n3	n4	D

Z: Executed when ON

Execution command

ZP.RRUN	"Jn"	n1	n2	n3	n4	D

ZP: Executed during start-up

	Description of setting	Setting range
Jn	Target network No.	1 to 239
(n1)	Channel used by the host	1 to 8
(n2)	Target station number	1 to 64 81H to A0H: Group designation FFH: Target network No. for all stations: excluding the host When a group is designated, set the group No. of the target station with the network parameters from GX Developer.
(n3)	Target CPU number	3FFH: Anything except multipul PLC systems, or control PLCs 3E0H: PLC No.1 3E1H: PLC No.2 3E2H: PLC No.3 3E3H: PLC No.4
(n4)	Mode	✻1
(D)	Completion device (host) Designate the host device to set scan 1 at ON when execution has been completed. (D) Off : Not completed On : Complete (D)+1 Off : Normal On : Abnormal	Bit device ✻2 Bit designation of word device ✻3

✻1: Settings each of the following modes.

b15 to b8	b7 to b4	b3 to b0
0	2)	1)

1) Operation mode:

→ Designates the enforced execution of the RRUN instruction.

1H: Not forcibly executed

3H: Forcibly executed. (The enforced execution mode enables the remote RUN instruction to be forcibly executed from another station when the station for which the remote STOP instruction was executed no longer operates under the remote RUN instruction.)

2) Clear mode:

→ Sets whether the device memory is to be cleared or not when the RRUN instruction is executed.

0H: Not cleared. However, the local device is cleared.

1H: Cleared with the exception of the latch range.

2H: Clears all device memories, including the latch range.

✻2: Bit device : X, Y, M, L, F, V, and B

✻3: Bit designation of word device : Word device, bit No.

Word device : T, C, D, W, ST, R, and ZR (The Q00JCPU cannot use R and ZR.)

POINT

(1) The remote RUN instruction is enabled when the RUN/STOP switch on the targeted station's CPU module is set to "RUN".
(2) Remote RUN is not possible when the system protection function has been activated for the targeted station's CPU module.
(3) If remote STOP or PAUSE are already in effect for the targeted station from other stations, it is not possible to perform RUN if the (n4) mode is set at "Not forcibly executed (0001H)".

2) RSTOP instruction

[Network No. designation]

Execution command

Z.RSTOP	"Jn"	n1	n2	n3	n4	D

Z: Executed when ON

Execution command

ZP.RSTOP	"Jn"	n1	n2	n3	n4	D

ZP: Executed during start-up

	Description of setting	Setting range
Jn	Target network No.	1 to 239
(n1)	Channel used by the host	1 to 8
(n2)	Target station number	1 to 64 81H to A0H: Group designation FFH: Target network No. for all stations: excluding the host When a group is designated, set the group No. of the target station with the network parameters from GX Developer.
(n3)	Target CPU number	3FFH: Anything except multipul PLC systems, or control PLCs 3E0H: PLC No.1 3E1H: PLC No.2 3E2H: PLC No.3 3E3H: PLC No.4
(n4)	Mode	＊1
(D)	Complete device (host) Designate the host device to set scan 1 at ON when execution has been completed. (D) Off : Not completed On : Complete (D)+1 Off : Normal On : Error	Bit device ＊2 Bit designation of word device ＊3

＊1: Settings each of the following modes.

b15 to b4	b3 to b0
0	1)

1) Operation mode → 1H (fixed)

＊2: Bit device : X, Y, M, L, F, V, and B

＊3: Bit designation of word device : Word device, bit No.

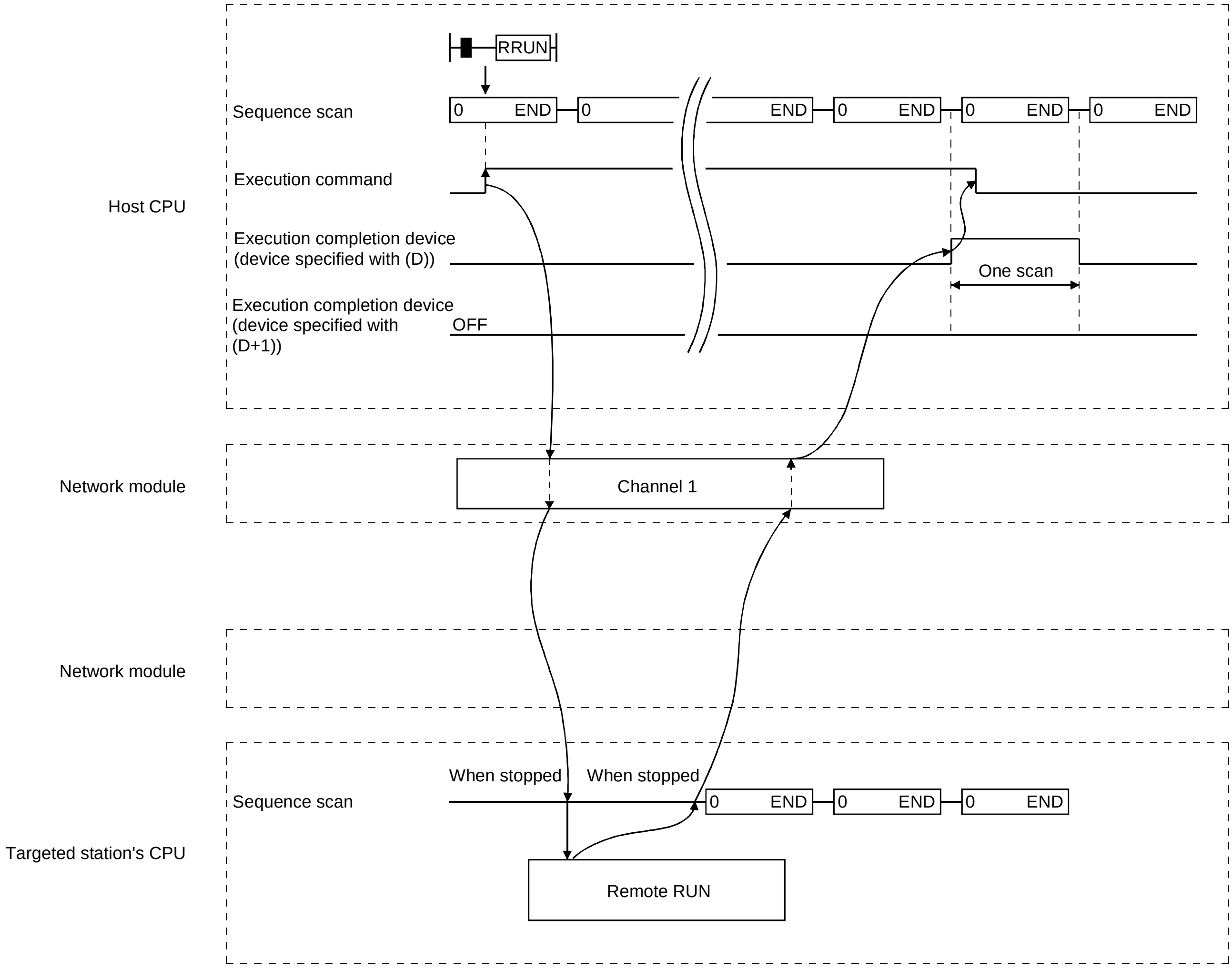
Word device : T, C, D, W, ST, R, and ZR (The Q00JCPU cannot use R and ZR.)

POINT

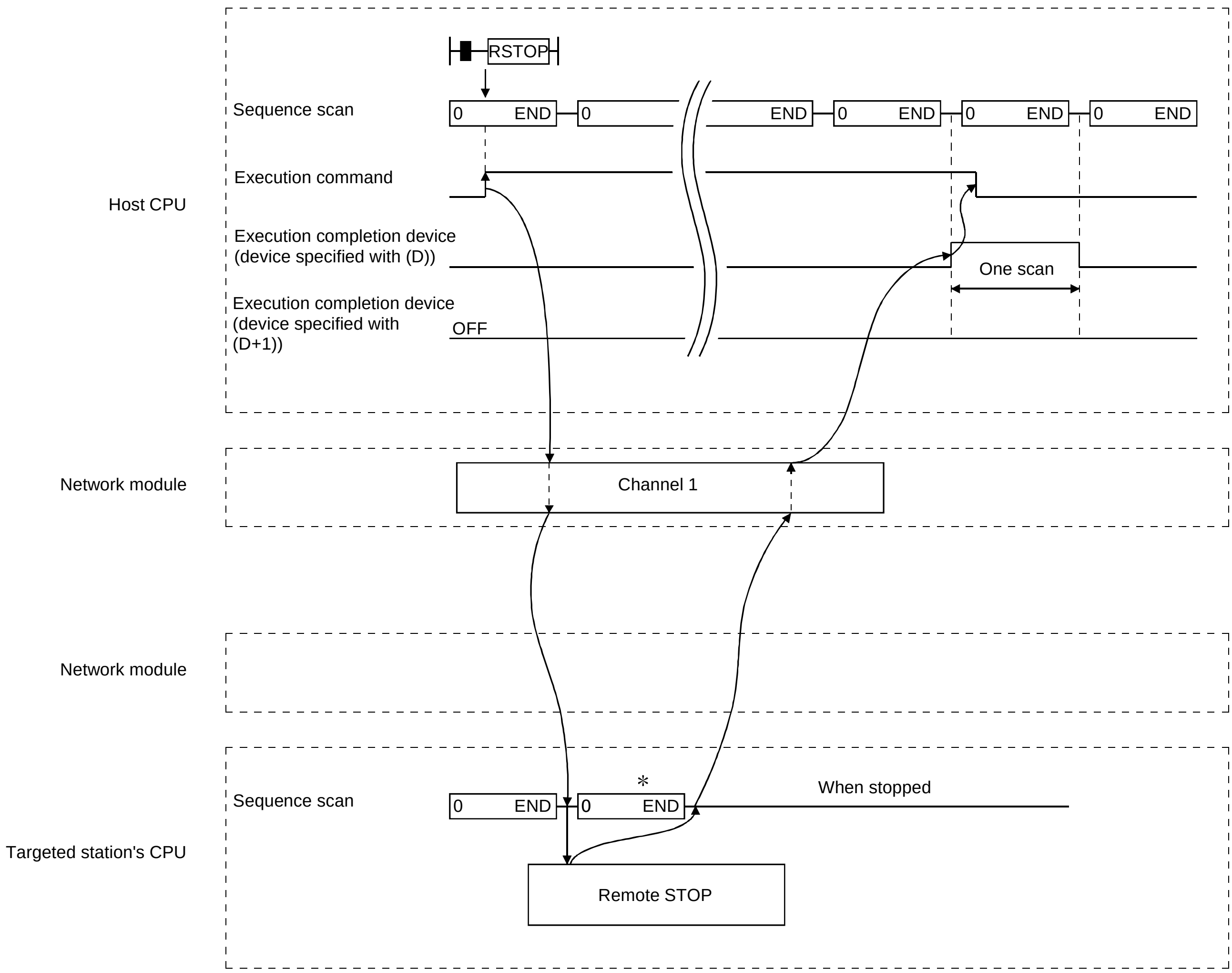
(1) Remote STOP is not possible when the system protection function has been activated for the targeted station's CPU module.
(2) The remote STOP information will be deleted if the target station's CPU module for which remote STOP is being performed is reset.

(b) Instruction execution timing

1) Normal completion
[RRUN instruction]



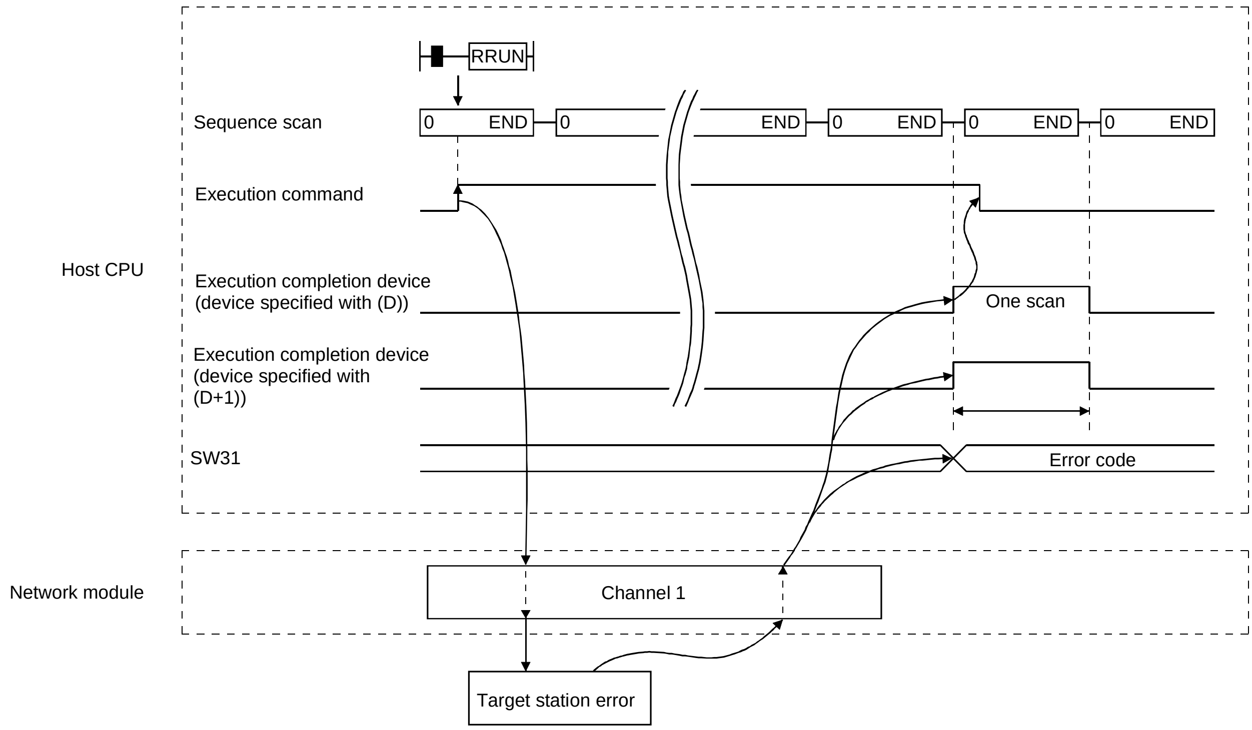
[RSTOP instruction]



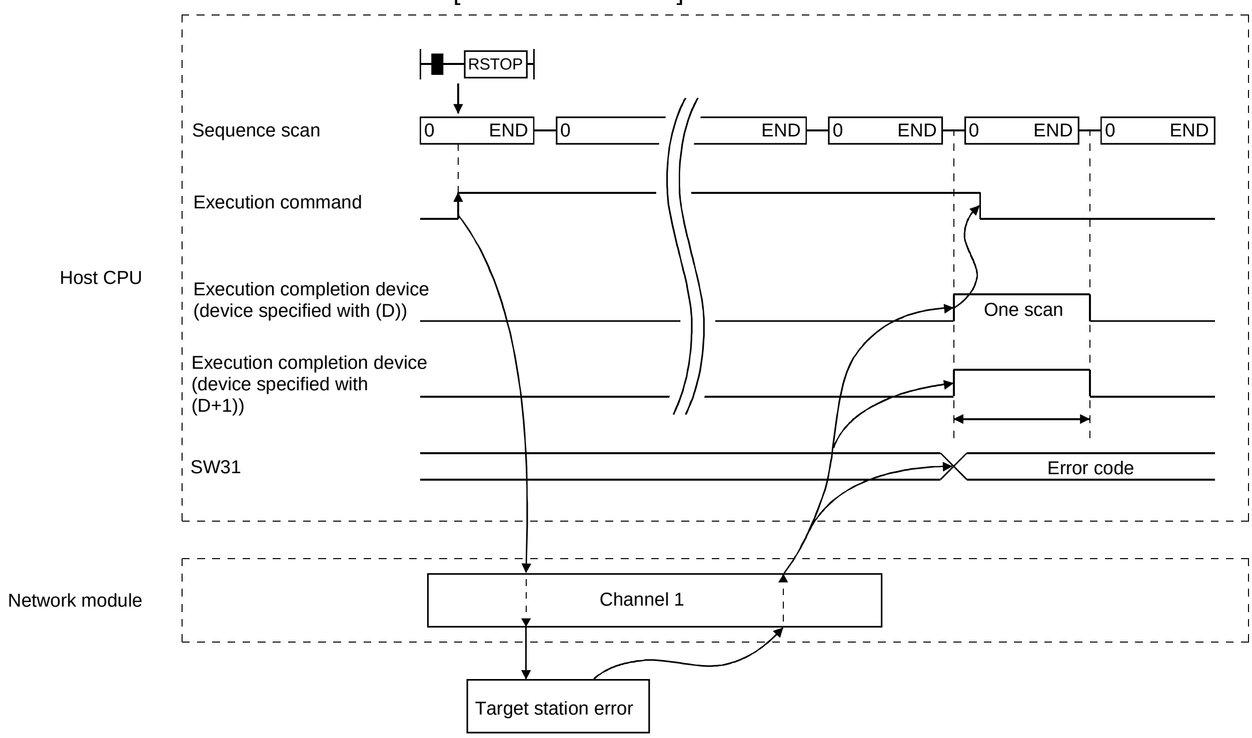
* According to the system organization, sequence scan time, etc., several scans will be run unitil the sequence scan STOP instruction is given.

2) Abnormal completion

[RRUN instruction]



[RSTOP instruction]



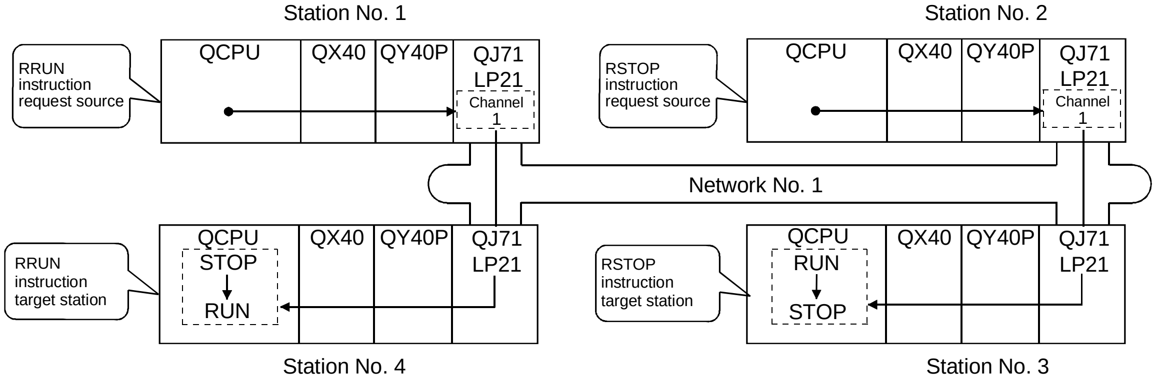
POINT

The error code will be stored in SW31 to SW3F depending on the channel number in use. Refer to section 8.3 (3) for further details.

(c) Program examples

The program examples shown below are programmed for the following system configuration.

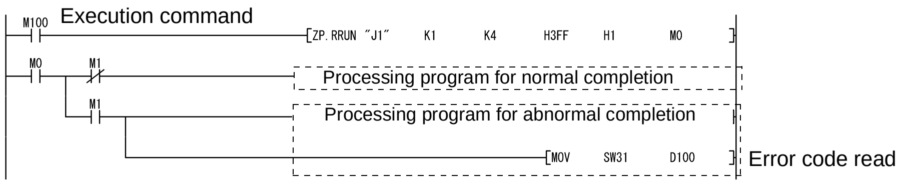
When actually using the programs below, interlock the programs by seeing Section 6.1.



1) RRUN instruction

A program to execute the remote RUN instruction using channel 1 for the station No.4 control PLC is shown below.

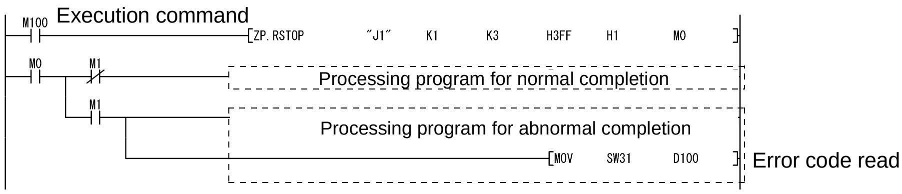
M0 is used as the completion device.



2) RSTOP instruction

A program to execute the remote STOP instruction using channel 1 for the station No.3 control PLC is shown below.

M0 is used as the completion device.



(6) Reading and writing other station CPU module's clock data (RTMRD/RTMWR)

This section explains the RTMRD and RTMWR instruction formats, and provides program samples.

The RTMRD instruction reads other station CPU module clock data.

The RTMWR instruction writes other station CPU module clock data.

(a) Instruction format

1) RTMRD instruction

[Network No. designation]

Read command

Z.RTMRD	"Jn"	n1	n2	n3	D1	D2

Z: Executed when ON

Read command

ZP.RTMRD	"Jn"	n1	n2	n3	D1	D2

ZP: Executed during start-up

	Description of setting	Setting range
Jn	Target network No.	1 to 239
(n1)	Channel used by the host	1 to 8
(n2)	Target station number	1 to 64
(n3)	Target CPU number	3FF$_H$: Anything except multipul PLC systems, or control PLCs 3E0$_H$: PLC No.1 3E1$_H$: PLC No.2 3E2$_H$: PLC No.3 3E3$_H$: PLC No.4
(D1)	First device storing the read clock data ＊1	Bit device digit designation ＊2 Word device ＊3
(D2)	Completion device (host) Designate the host device to set scan 1 at ON when execution has been completed. (D2)........ Off : Not completed On : Complete (D2)+1..... Off : Normal On : Abnormal	Bit device Bit designation of word device ＊4

＊1: The following details of the read clock data are stored with the BCD code.

Device	Item	Description
(D1)	Year (lower two digits)/month the data was read	b15 to b8: Year (lower two digits) (00$_H$ to 99$_H$); b7 to b0: Month (01$_H$ to 12$_H$)
(D1)+1	Date/hour the data was read	b15 to b8: Date (01$_H$ to 31$_H$); b7 to b0: Hour (00$_H$ to 23$_H$)
(D1)+2	Minute/second the data was read	b15 to b8: Minutes (00$_H$ to 59$_H$); b7 to b0: Seconds (00$_H$ to 59$_H$)
(D1)+3	Year (higher two digits)/day the data was read	b15 to b8: Year (higher two digits) (19$_H$/20$_H$); b7 to b0: Day (00$_H$ to 06$_H$) → 00$_H$ (Sunday) to 06$_H$ (Saturday)

＊2: Bit device : X, Y, M, L, F, V, and B

＊3: Word device : T, C, D, W, ST, R, and ZR

＊4: Bit designation of word device : Word device, bit No. (The Q00JCPU cannot use R and ZR.)

POINT

(1) Clock data cannot be read when the system protection function has been activated for the targeted station's CPU module.

(2) The readable range for the year (4 digits) is from 1980 to 2079.

2) RTMWR instruction
[Network No. designation]

Write command

| Z.RTMWR | "Jn" | n1 | n2 | n3 | D1 | D2 |

Z: Executed when ON

Write command

| ZP.RTMWR | "Jn" | n1 | n2 | n3 | D1 | D2 |

ZP: Executed during start-up

	Description of setting	Setting range
Jn	Target network No.	1 to 239
(n1)	Channel used by the host	1 to 8
(n2)	Target station number	1 to 64 81_H to $A0_H$: Group designation FF_H: Target network No. for all stations: excluding the host When a group is designated, set the group No. of the target station with the network parameters from GX Developer.
(n3)	Target CPU number	$3FF_H$: Anything except multipul PLC systems, or control PLCs $3E0_H$: PLC No.1 $3E1_H$: PLC No.2 $3E2_H$: PLC No.3 $3E3_H$: PLC No.3
(D1)	First device storing the write clock data ＊1	Bit device digit designation ＊2 Word device ＊3
(D2)	Completion device (host) Designate the host device to set scan 1 at ON when execution has been completed. (D2)…….. Off : Not completed On : Complete (D2)+1…. Off : Normal On : Abnormal	Bit device Bit designation of word device ＊4

＊1: The following details of the written clock data are stored with The BCD code.

Device	Item	Description
(D1)	Amendment pattern	Specifies the item into which the (D1)+1 to (D1)+4 clock data is to be written. 0: Not amended 1: Amended b15 to b8: 0 to 0 b0 → Year (lower two digits) b1 → Month b2 → Date b3 → Hour b4 → Minutes b5 → Seconds b6 → Day b7 → Year (higher two digits)
(D1)+1	Year (lower two digits)/month the data write	b15 to b8: Year (lower two digits) (00_H to 99_H) b7 to b0: Month (01_H to 12_H)
(D1)+2	Date/hour the data write	b15 to b8: Date (01_H to 31_H) b7 to b0: Hour (00_H to 23_H)
(D1)+3	Minute/second the data write	b15 to b8: Minutes (00_H to 59_H) b7 to b0: Seconds (00_H to 59_H)
(D1)+4	Year (higher two digits)/day the data write	b15 to b8: Year (higher two digits) (19_H/20_H) b7 to b0: Day (00_H to 06_H) → 00_H (Sunday) to 06_H (Saturday)

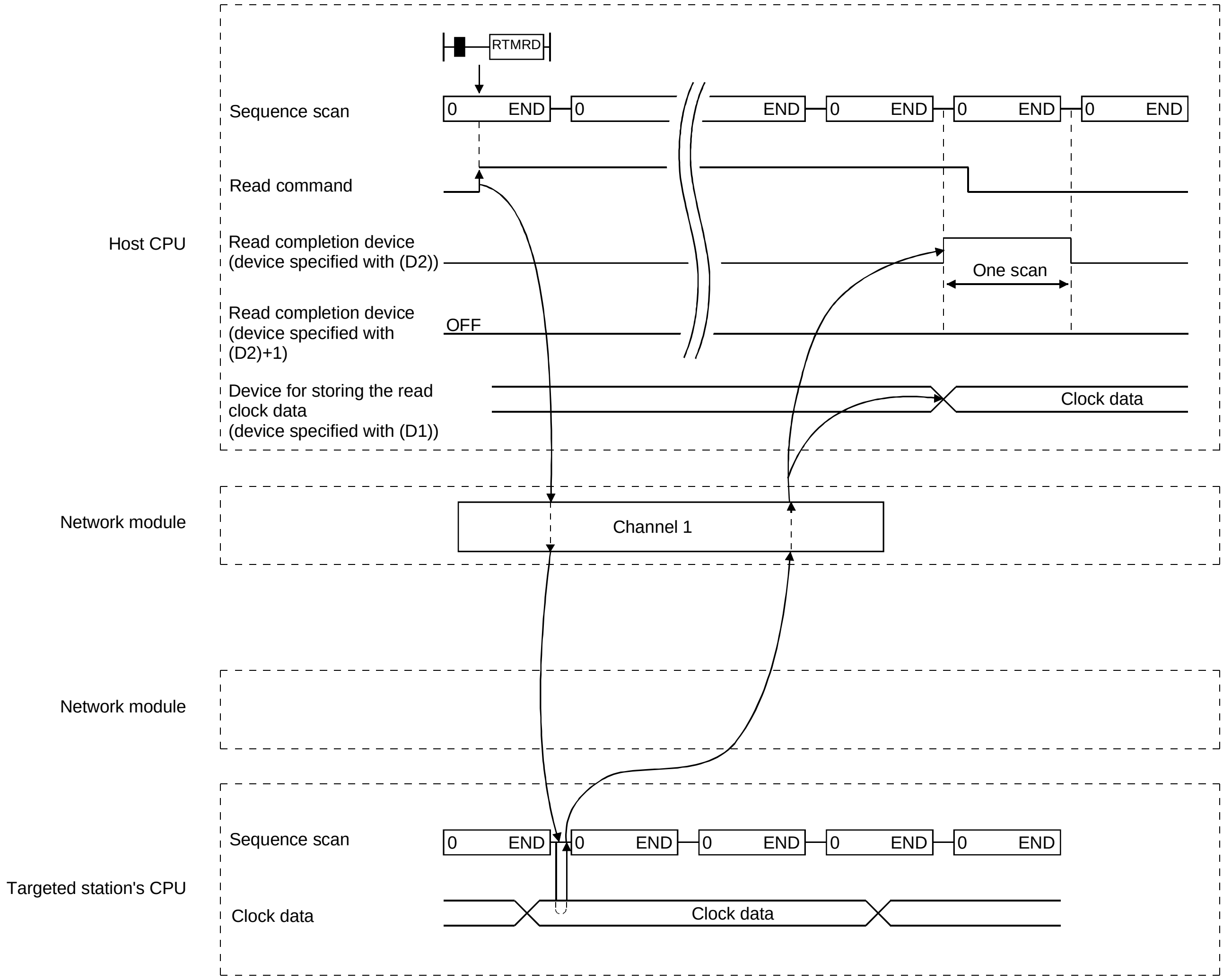
＊2: Bit device : X, Y, M, L, F, V, and B
＊3: Word device : T, C, D, W, ST, R, and ZR
＊4: Bit designation of word device : Word device, bit No. (The Q00JCPU cannot use R and ZR.)

POINT

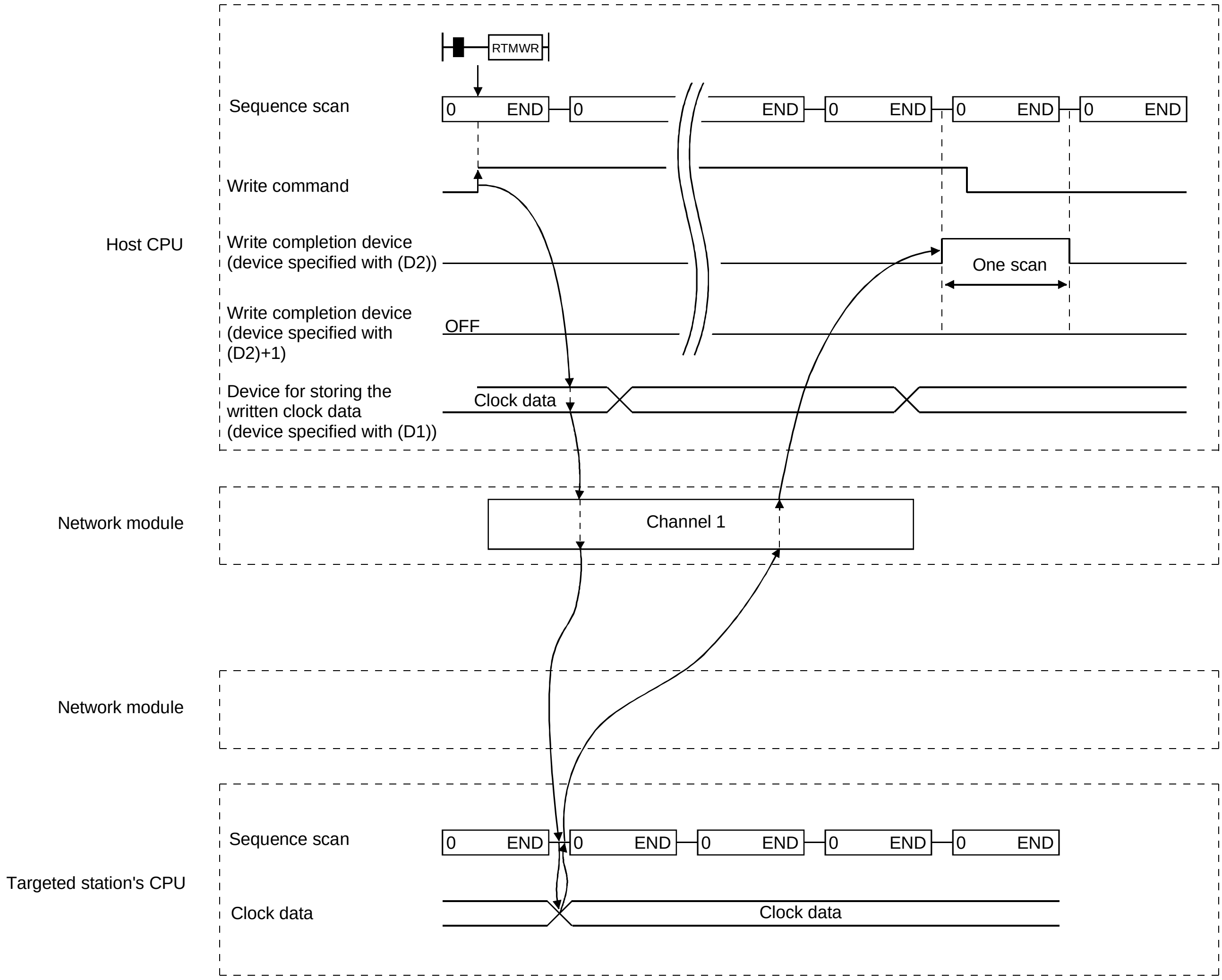
(1) Clock data cannot be written when the system protection function has been activated for the targeted station's CPU module.
(2) The writable range for the year (4 digits) is from 1980 to 2079.

(b) Instruction execution timing

1) Normal completion
[RTMRD instruction]

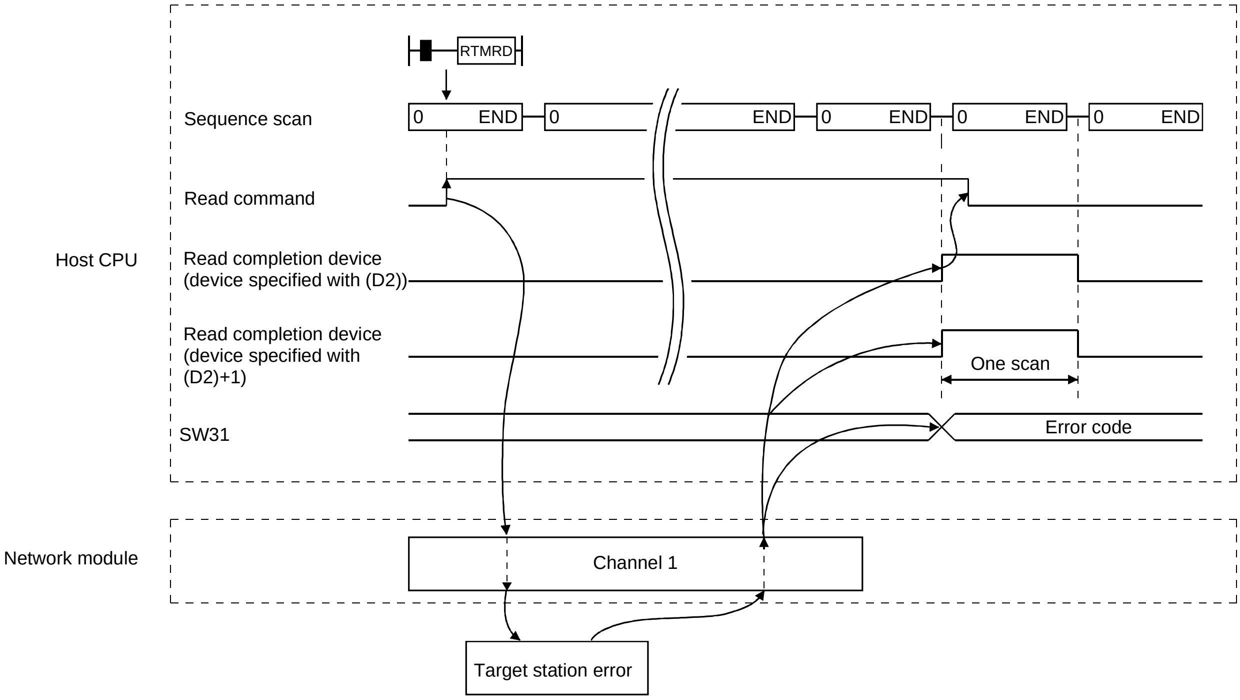


[RTMWR instruction]

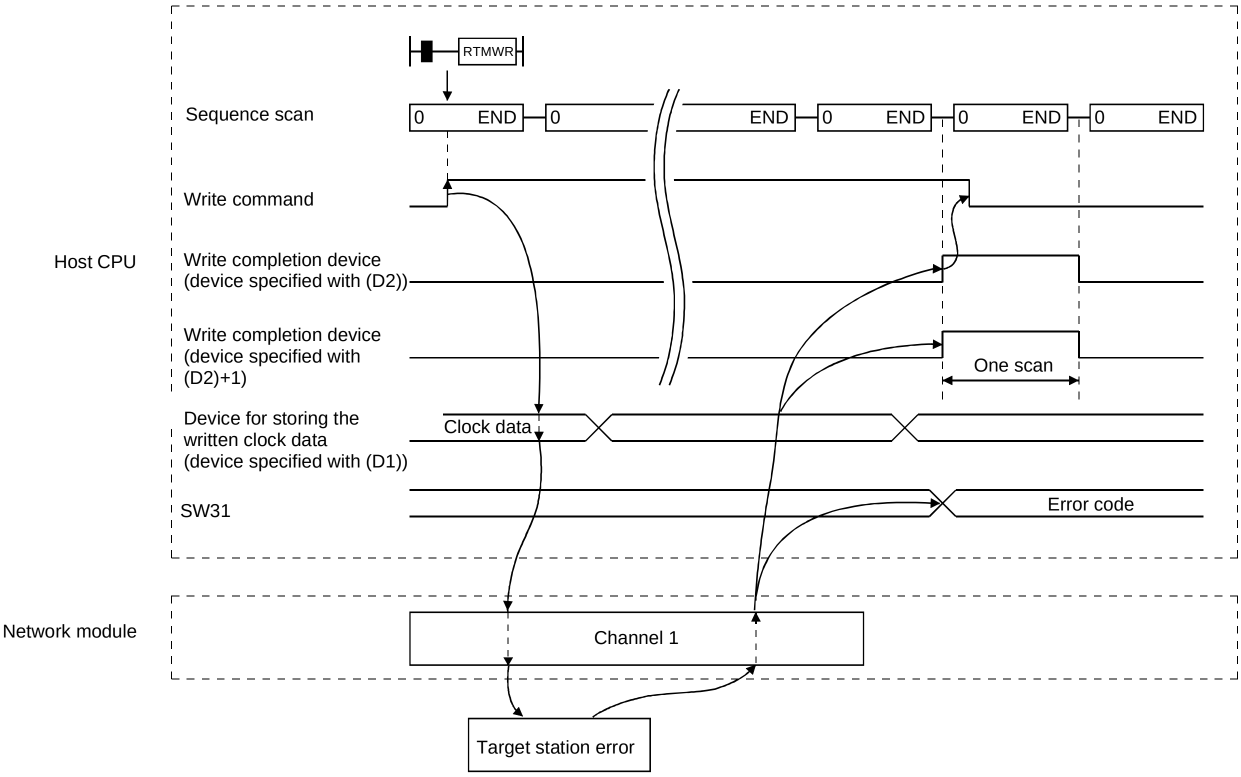


2) Abnormal completion

[RTMRD instruction]



[RTMWR instruction]



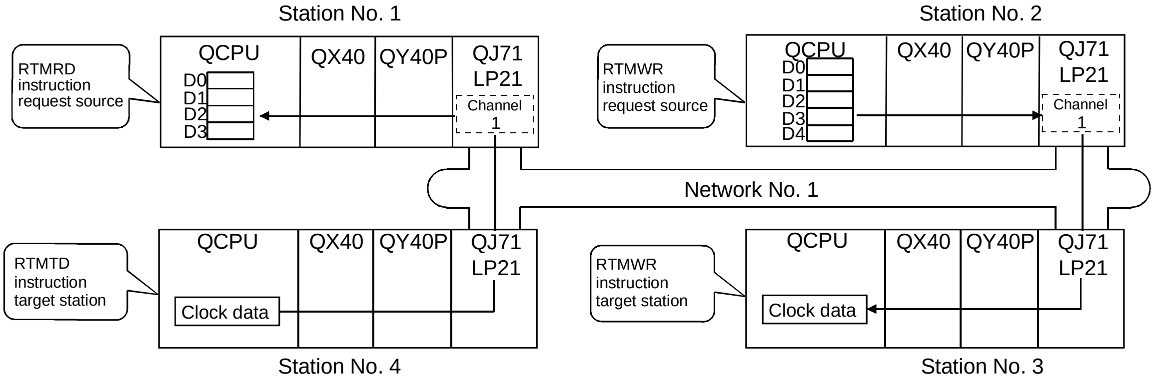
POINT

The error code will be stored in SW31 to SW3F depending on the channel number in use. Refer to section 8.3 (3) for further details.

(c) Program examples

The program examples shown below are programmed for the following system configuration.

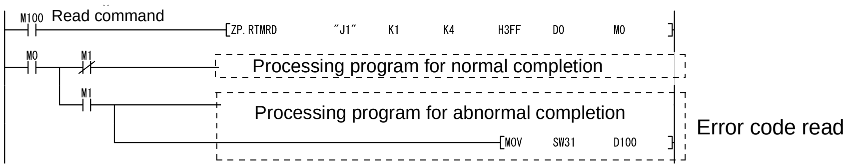
When actually using the programs below, interlock the programs by seeing Section 6.1.



1) RTMRD instruction

A program to execute the clock data read instruction with the use of channel 1 for the station No.4 control PLC and storing the result in D0 is shown below.

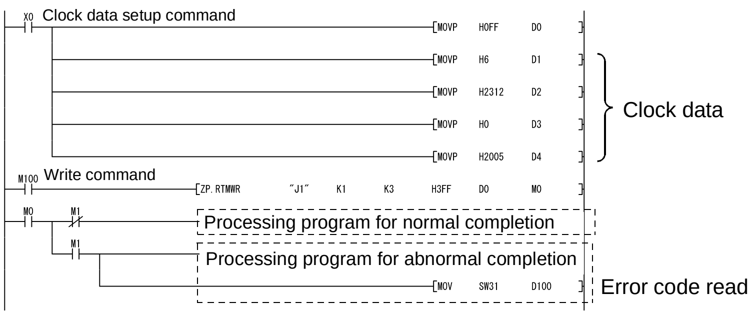
M0 is used as the completion device.



2) RTMWR instruction

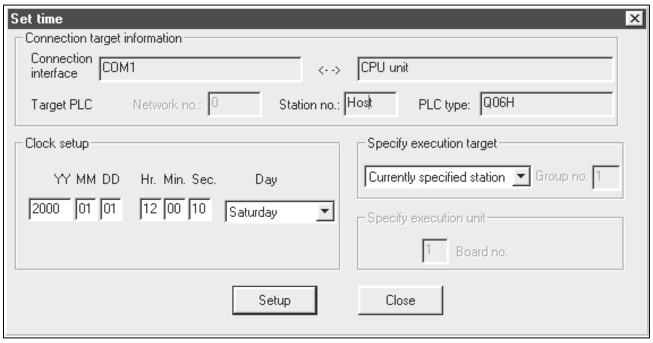
A program for writing the clock data stored in the host's D0 with the use of channel 1 into the station No.3 control PLC is shown below.

M0 is used as the completion device.



7.4.6 Setting the clock on the 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 designating 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.



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 designated as the connection destination.
   Designate all stations:
      Sets the clock on all stations on the network of the currently designated station.
      Select a card from Cards 1 to 4 in the Execution module designation.
   Designate group:
      Sets the clock on all stations in a specific group on the network of the currently designated station.
      Designate the Execution module (Cards 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.

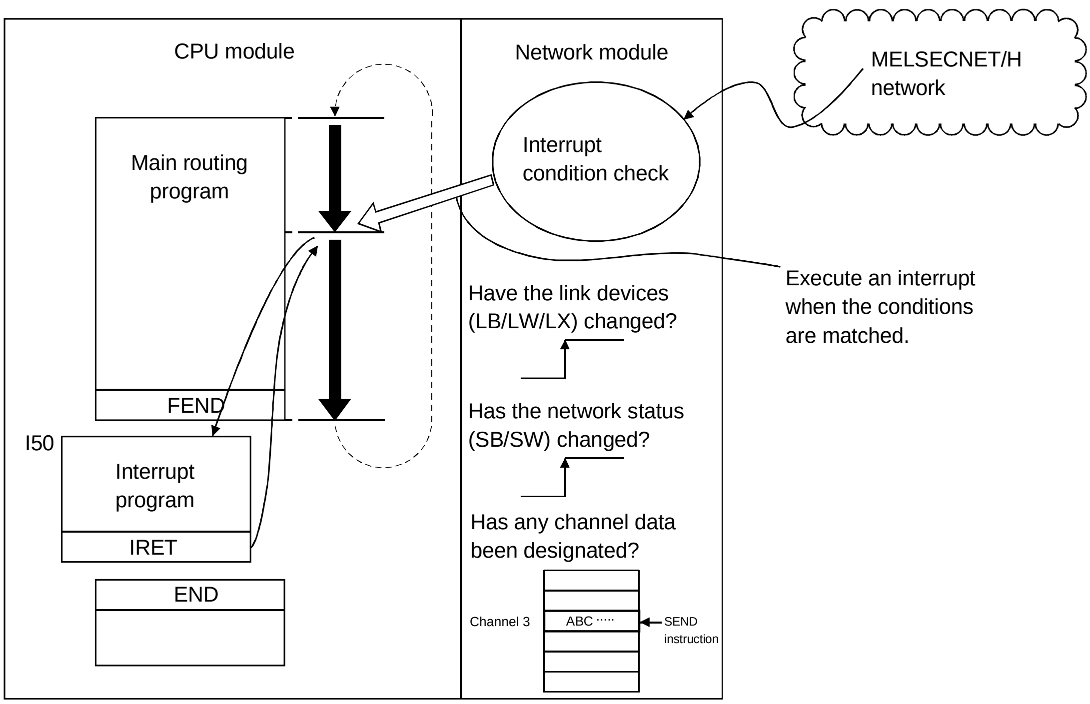
7.5 Starting the Interrupt Sequence Program

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]

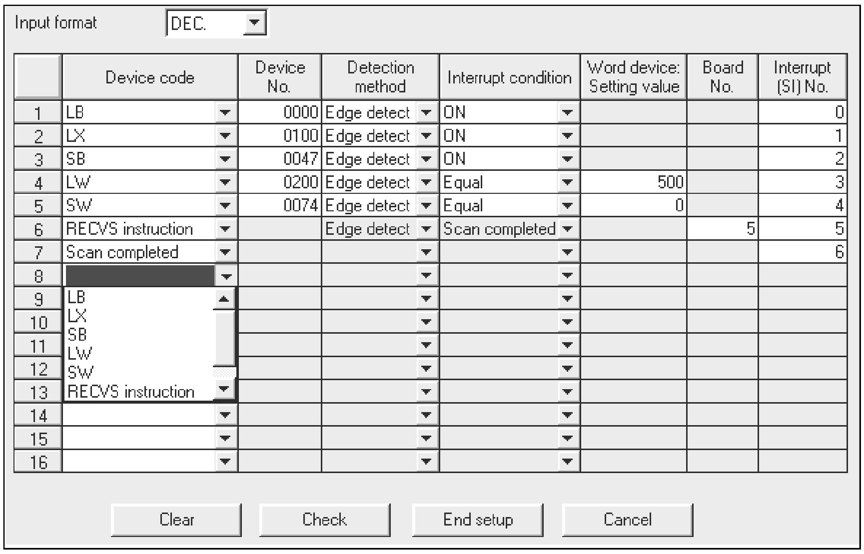


POINT
(1) The Q00J/Q00/Q01CPU of function version B or later allows the setting of the interrupt setting parameters. (2) When multiple interrupt conditions are set, the operation may be delayed if an interrupt request is issued from other stations at the same time because other interrupts have to wait to be processed. (3) When executing the interrupt sequence program, it is necessary to execute "EI" (Enable Interrupt) with the main 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.



[Selections of interrupt conditions for interrupt device codes and valid setting ranges]

<table>
<tr><th>Setting condition / Device code</th><th>Device No.</th><th>Detection method</th><th>Interrupt condition</th><th>Word device setting value</th><th>Board No.</th><th>Interrupt (SI) No.</th></tr>
<tr><td>RECVS</td><td>—</td><td>Edge detection fixed</td><td>Scan completion fixed
An interrupt occurs when the designated channel receives data.</td><td>—</td><td>1 to 8</td><td>0 to 15</td></tr>
<tr><td>LB</td><td>0 to 3FFF$_H$</td><td colspan="2" rowspan="3">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)</td><td>—</td><td>—</td><td>0 to 15</td></tr>
<tr><td>LX</td><td>0 to 1FFF$_H$</td><td>—</td><td>—</td><td>0 to 15</td></tr>
<tr><td>SB</td><td>0 to 1FF$_H$</td><td>—</td><td>—</td><td>0 to 15</td></tr>
<tr><td>LW</td><td>0 to 3FFF$_H$</td><td colspan="2" rowspan="2">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)</td><td>0 to 65535</td><td>—</td><td>0 to 15</td></tr>
<tr><td>SW</td><td>0 to 1FF$_H$</td><td>0 to 65535</td><td>—</td><td>0 to 15</td></tr>
<tr><td>Scan completion ＊2</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>0 to 15</td></tr>
</table>

＊1: When the level detection is selected as the detection method, an interrupt occurs after the designated 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.

REMARK

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□□)

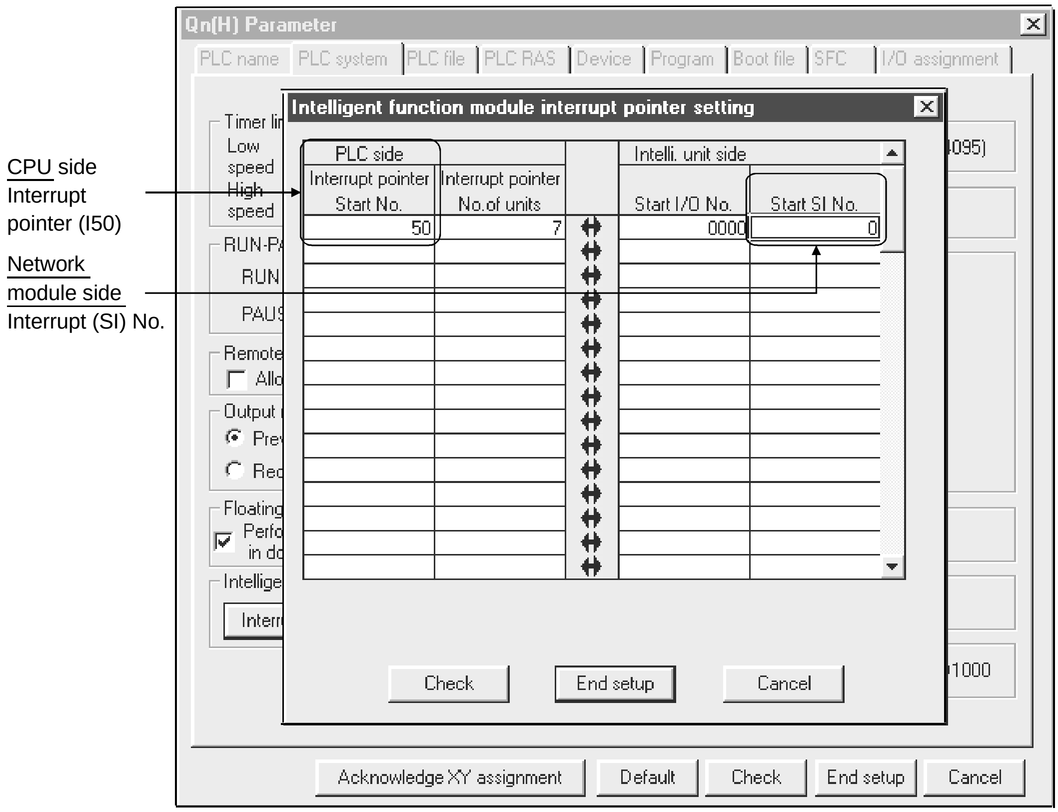
The following shows how to set these parameters on the PC system setting screen using the interrupt setting parameters shown on the previous page.
The interrupt (S1) No. (0 to 6) of the network module side are assigned to the interrupt pointers (I50 to I56) of the CPU side:

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

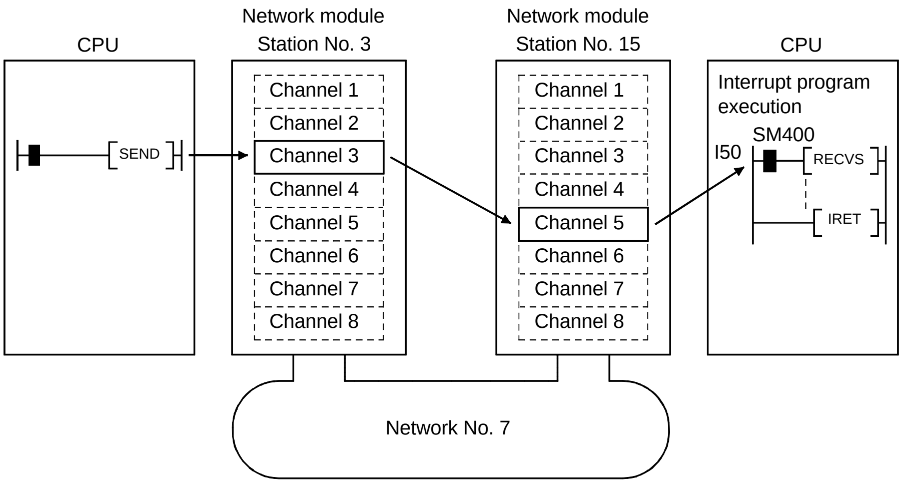
(1) Interrupt pointer start No.: 50 ···· Start No. (I50 to I56) of the interrupt program
(2) Interrupt pointer count: 7 ··········· Number of interrupt setting conditions



7.5.2 Interrupts using the RECVS instruction

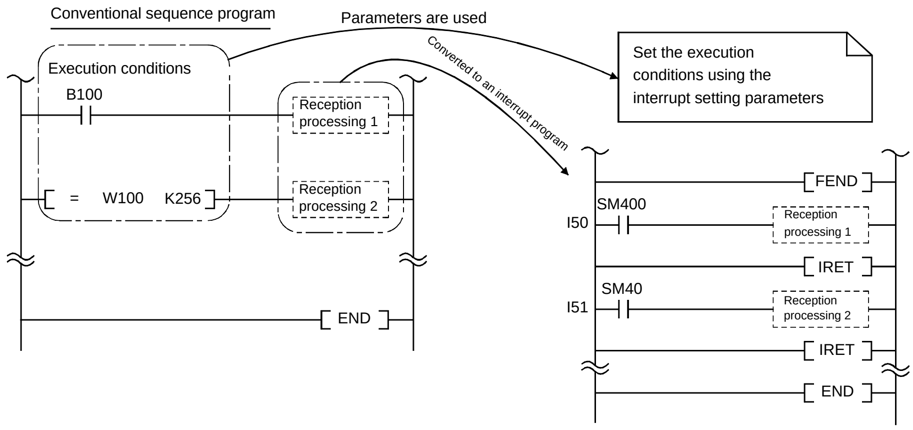
An interrupt program can be started when the SEND instruction is received at the channel whose parameters are designated with the RECVS instruction.
When "RECV instruction" is selected as the device code, the settings of "Channel No." and "Interrupt (SI) No." are enabled.

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 designated 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.



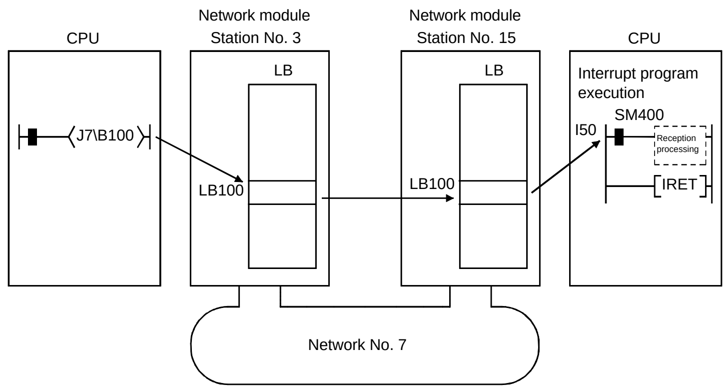
Interrupts generated by the link devices (LB/LW/LX) can be used for normal cyclic transmission and direct access destinations.
In the example below, the link device LB100 of station number 15 is turned on (1) using direct access (designate outside the set refresh range but within the host's send range) 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



REMARK

(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 designated 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 special link device (SB/SW)

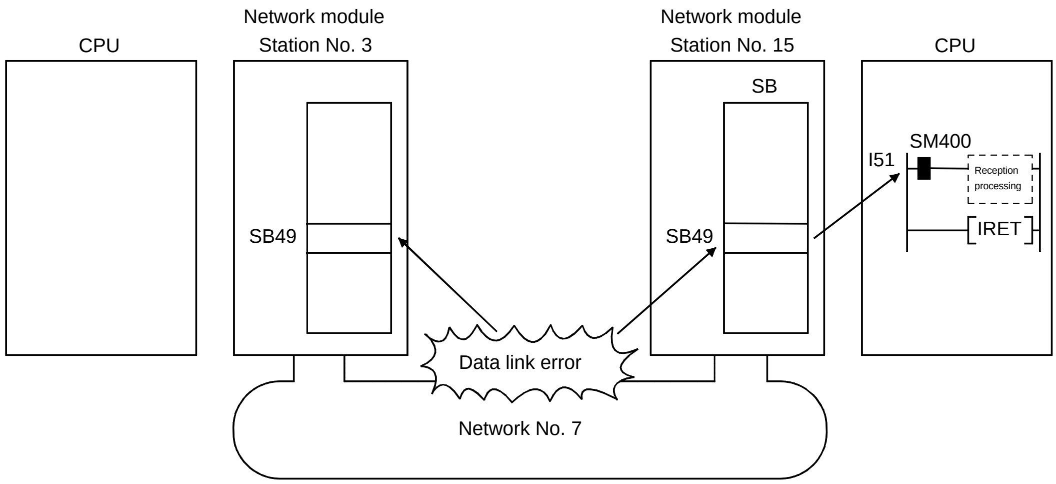
The designated interrupt sequence program can be executed when the conditions of the control information (SB/SW) during data linking match.
In the example below, designate the interrupt setting parameters for station number 15 so that the interrupt program is started when SB49 turns on (data link error 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



REMARK

(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 (RECVS instruction)

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

Execute command

Z.RECVS	"Un"	(S1)	(D1)	(D2)

Z: Executed when on

	Description of setting	Setting range	Device that can be used
Un	The start I/O number of the host's network module Designate the higher two digits of the 3-digit I/O number.	0 to FE$_H$	—
(S1)	Control data storage head device Designate the head device of the host that stores the control data.	Within the range of the designated devices	Word device ＊2
(D1)	Receive data storage head device Designate the head device of the host that stores the receive data.	Within the range of the designated devices	Word device ＊2
(D2)	Dummy	—	Bit device ＊1 Bit designation of word device ＊3

＊1: Bit device ··································· X, Y, M, L, F, V, and B
＊2: Word device ······························· T, C, D, W, ST, R, and ZR
＊3: Bit designation of word device ···· Word device, bit No.

[Control data configuration (S1)]

Device	Item	Data set	
		User (at execution) ＊1	System (upon completion) ＊2
(S1)	Execution/abnormal completion type	○	
(S1)+1	Completion status		○
(S1)+2	Host storage channel	○	
(S1)+3	Channel used by the sending station		○
(S1)+4	Sending station network No.		○
(S1)+5	Sending station number		○
(S1)+6	(Use prohibited)	—	—
(S1)+7	(Use prohibited)	—	—
(S1)+8	(Use prohibited)	—	—
(S1)+9	Receive data length		○
(S1)+10	(Use prohibited)	—	—

＊1: Items set in the sequence program

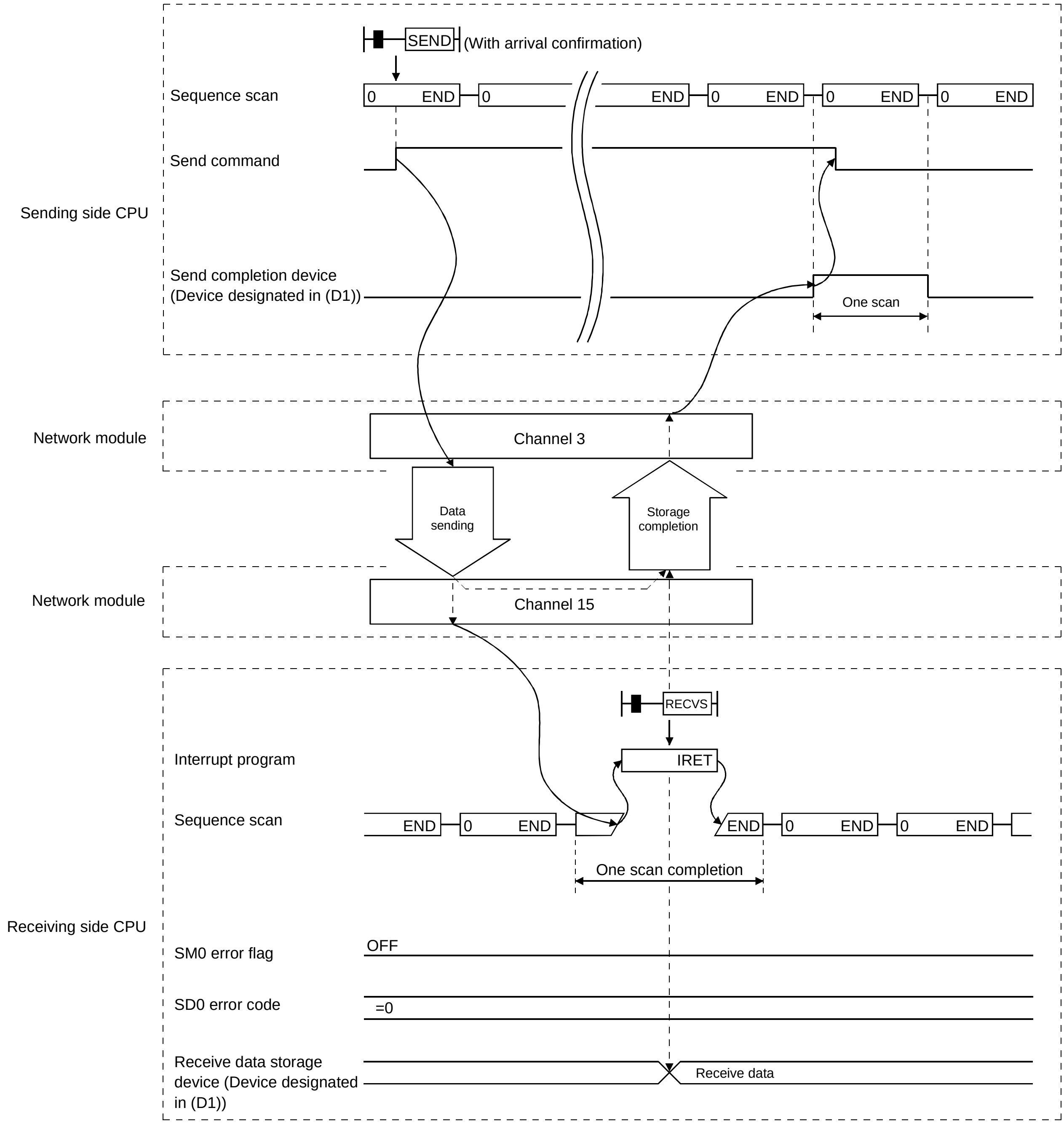
＊2: Items automatically stored at the completion of the instruction

Detailed description of the control data

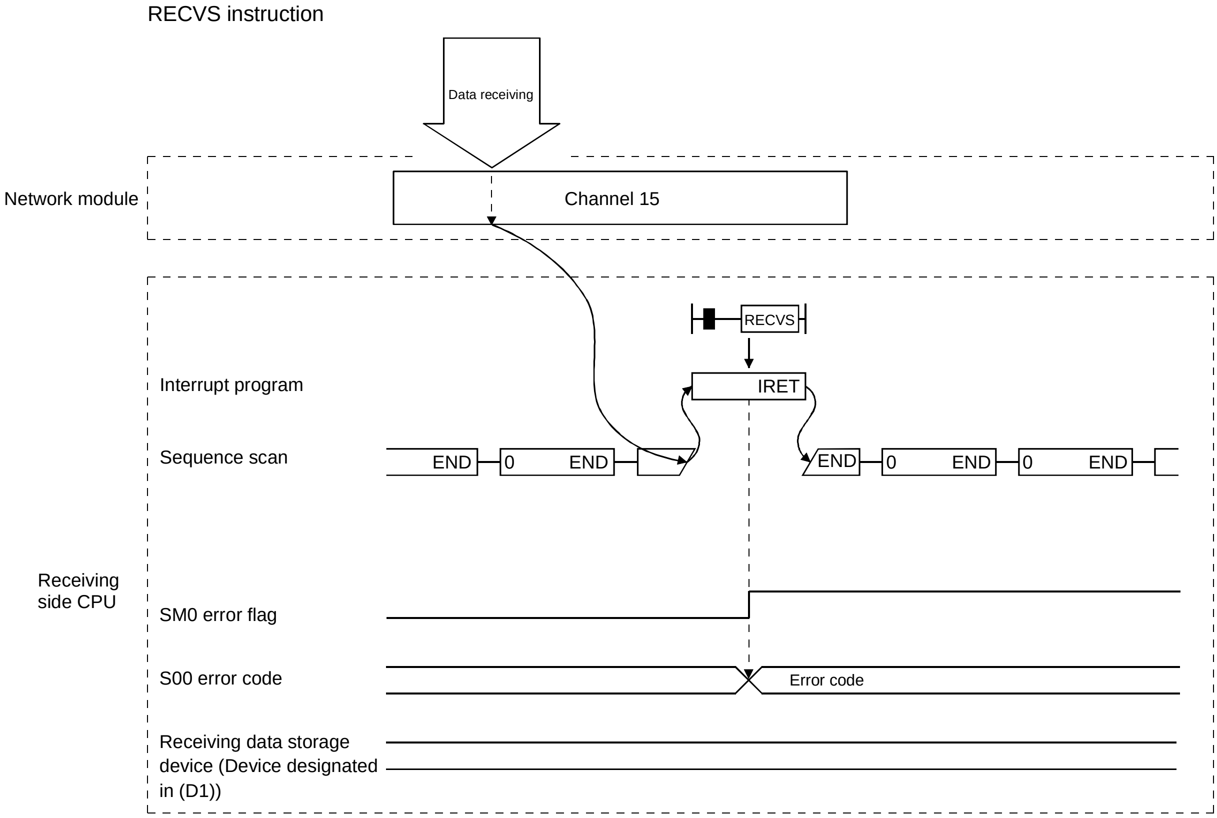
Device	Item	Description
(S1)	Execution/abnormal completion type	b15 to b8 b7 b6 to b0 0 0 1 0 0 1) Abnormal completion type (bit 7) Sets the clock data set status at abnormal completion. 0: Does not set clock data : Do not store the clock data at error occurrence in (S1) + 11 to (S1) + 15. 1: Sets clock data : Stores the clock data at error occurrence in (S1) + 11 to (S1) + 15.
(S1)+1	Completion status	Stores the status at the instruction completion. 0: Normal completion
(S1)+2	Host storage channel	Designates the channel that stores the data to be read. 1 to 8 (channels)
(S1)+3	Channel used by the sending station	Stores the channel used by the sending station. 1 to 8 (channels)
(S1)+4	Sending station network No.	Stores the station No. of the sending station. 1 to 239: Network No.
(S1)+5	Sending station number	Designates the station number of the target station. 1 to 64: Station number
(S1)+6	(Use prohibited)	—
(S1)+7	(Use prohibited)	—
(S1)+8	(Use prohibited)	—
(S1)+9	Receive data length	Stores the receive data count stored in (D1) to (D1) + n. 1 to 480 (words)
(S1)+10	(Use prohibited)	—

(2) Instruction execution timing

1) Normal completion

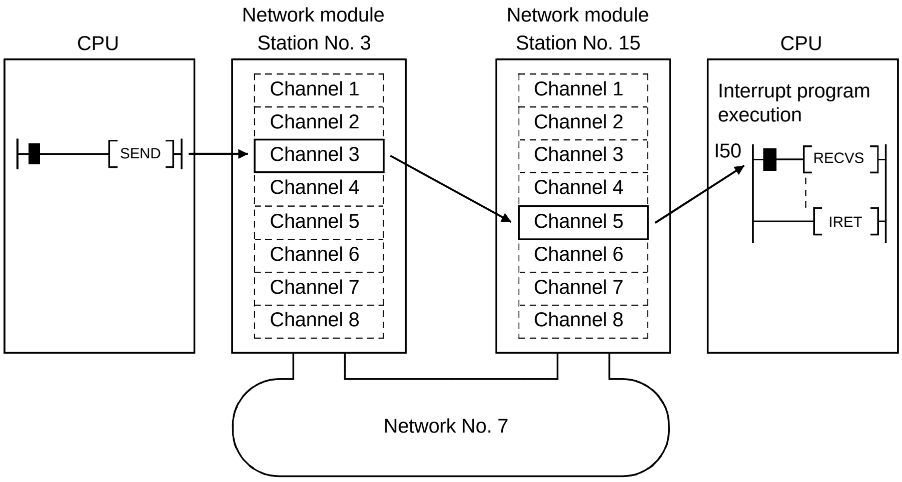


2) Abnormal completion



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. in such a way that an event is issued to the CPU side when data is received at channel 5 of station number 15's network module.

Device code	Device No.	Detection method	Event condition	Word device setting value	Channel No.	Interrupt (SI) No.
RECVS instruction		(Edge detection)	(Scan complete)		0005	0

(2) How to set the parameters on the interrupt pointer setting screen (PC parameters)

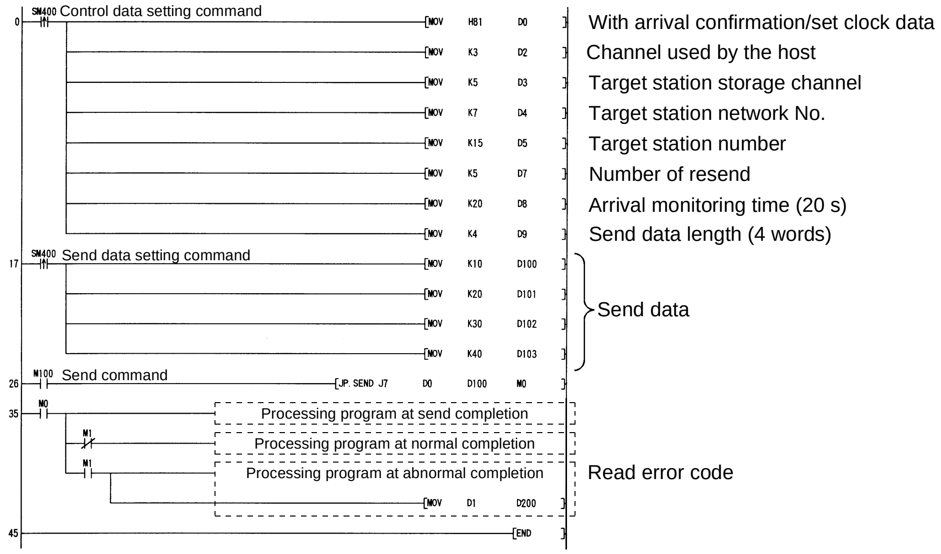
Set the start I/O No. (0000) of the I/O where the network module is loaded and the interrupt SI No. (0) on the intelligent module side, and the interrupt pointer (I50) that is used for even issue on the CPU side. It is also possible to start multiple interrupt programs by setting the interrupt pointer No. of units (setting count of interrupt conditions).

CPU side			Intelligent module side	
Interrupt pointer start No.	Interrupt pointer count		Start I/O No.	Start SI No.
50	1	⟷	0000	0

(3) Program examples

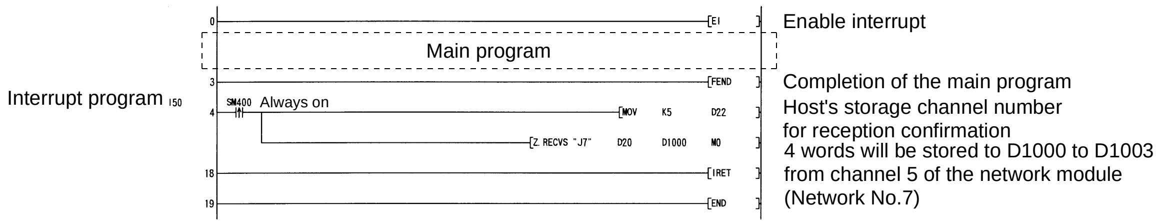
(a) Program for station number 3

When actually using the following program, interlock the program by referring to Section 6.1.



(b) Program for station number 15

When actually using the program below, interlock the program by seeing Section 6.1.



REMARK

(1) The link special relays (SB00A0 to SB00A7) used for the RECV instruction execution request flag that correspond to the channel numbers during data receiving are 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.

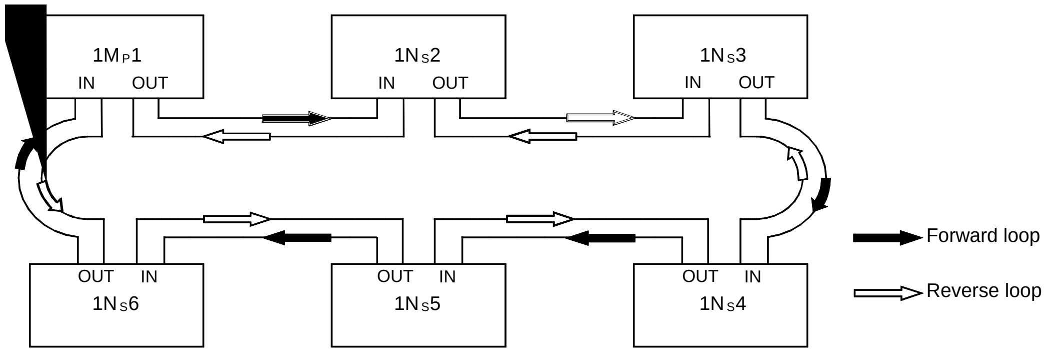
POINT

Since the RECVS instruction starts the interrupt program according to the parameter settings, it is necessary to execute "EI" (Enable Interrupt) with the main program. If the enable interrupt has not been executed at the data receiving, the status of "channel being used" is maintained.

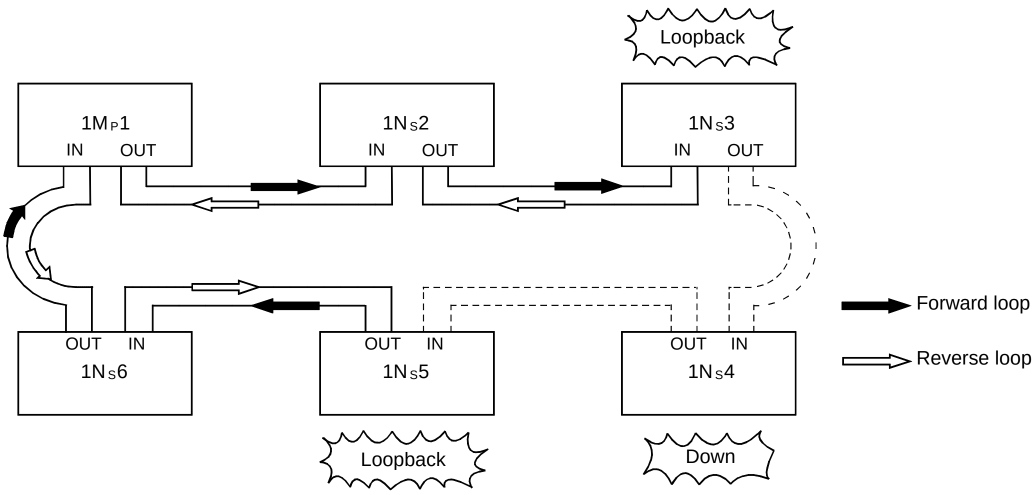
7.6 Multiplex Transmission Function (Optical Loop System)

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 "Supplemental 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 Mdps.



REMARK

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.

7.7 Simple Dual-Structured Network (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

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

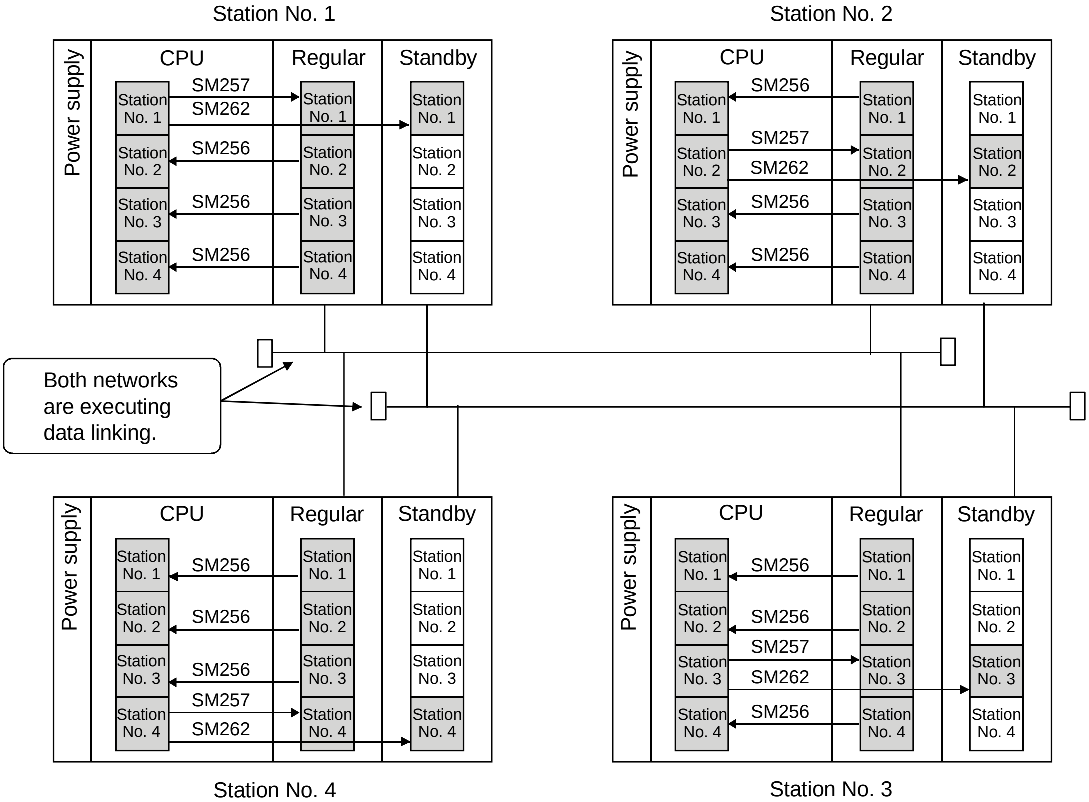
The Q00J/Q00/Q01CPU accepts only one network module.
Hence, you cannot increase the number of send points by installing multiple modules on the same network.

(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 (SB74, SW74 to 77) 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.

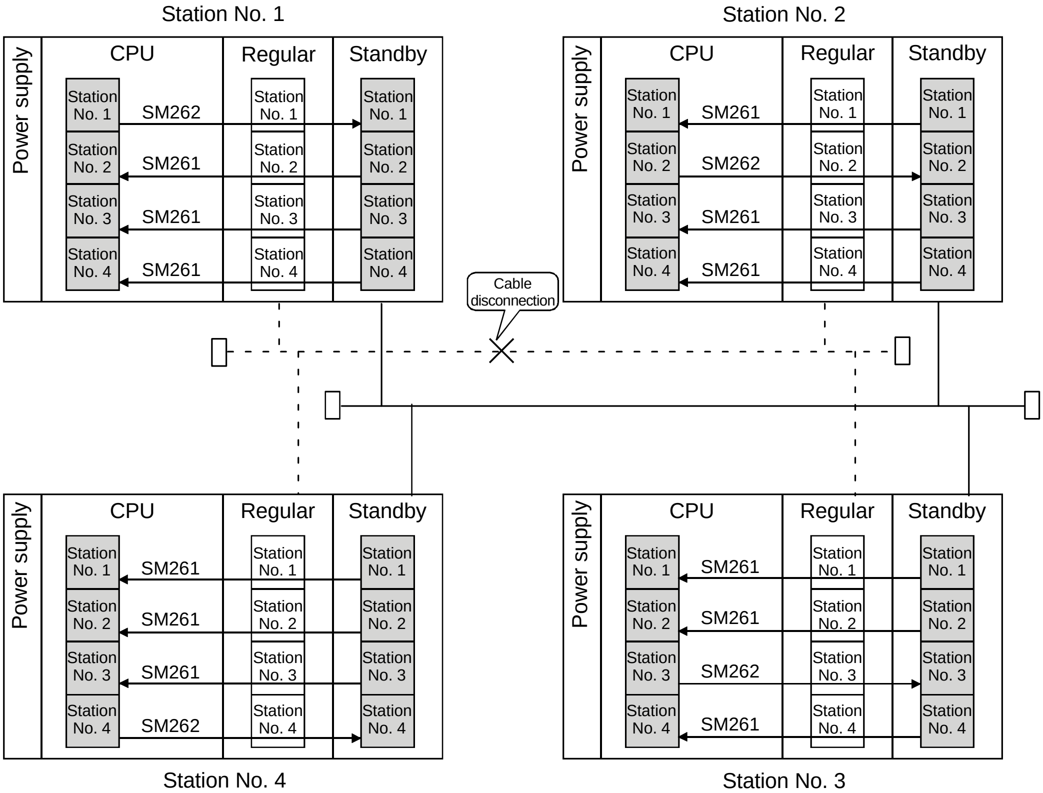
[When the regular network is normal]
At the initial startup, the CPU module controls the on/off status of the special relay (SM).

Signal		Status	Remarks
Card 1	SM255 (distinction between regular/standby network)	Off (Regular)	Controlled by the CPU.
	SM 256 (Refresh from the network modules to the CPU)	Off (Refreshes)	Controlled by the user. (Initially controlled by the CPU)
	SM 257 (Refresh from the CPU to the network modules)	Off (Refreshes)	
Card 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)	



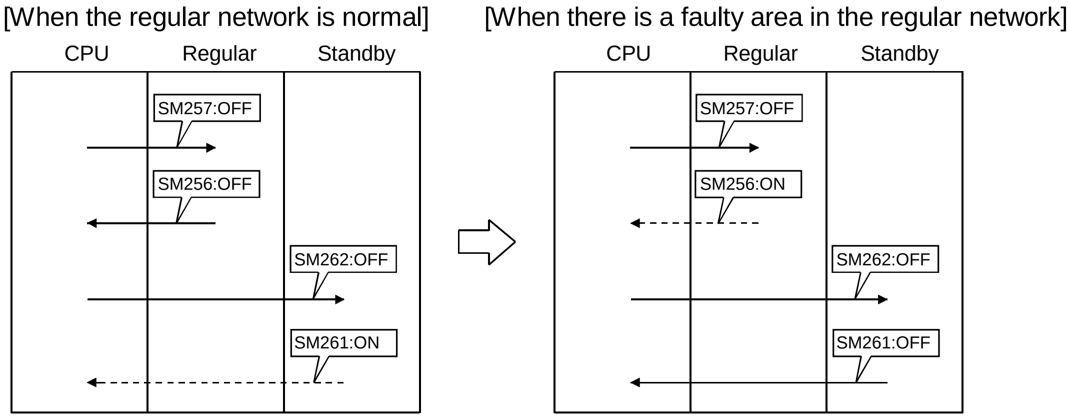
[When the regular network is faulty]
The CPU module does not control the special relay (SM) automatically; thus, must be controlled by the sequence program.

Signal		Status	Remarks
Card 1	SM255 (distinction between regular/standby network)	Off (Regular)	Controlled by the CPU.
	SM 256 (Refresh from the network modules to the CPU)	Off (Does not refresh)	Controlled by the user. (Initially controlled by the CPU)
	SM 257 (Refresh from the CPU to the network modules)	Off (Does not refresh)	
Card 2	SM260 (distinction between regular/standby network)	On (Standby)	Controlled by the CPU.
	SM261 (Refresh from the network modules to the CPU)	On (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.



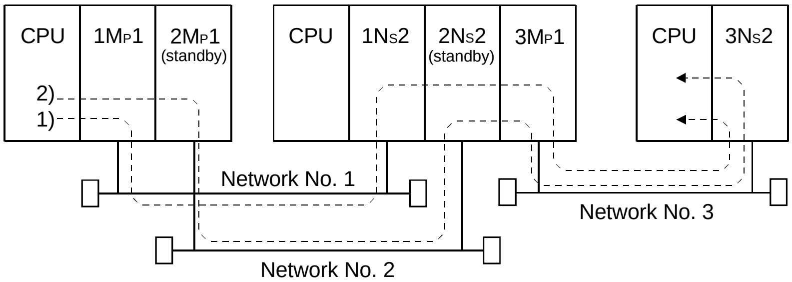
(a) The following shows the program that switches to refresh the standby side when a faulty station is detected in the regular network. It is necessary to write the same program to all of the stations in the network.

(b) The following table lists the refresh setting devices (SM) for each network.

	Card 1	Card 2	Card 3	Card 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 Transfer to network number in the routing parameters must be rewritten with the RTWRITE instruction because the same number cannot be set twice.

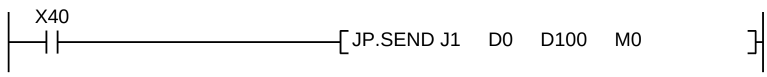
1) When the regular network is normal
2) When the regular network is faulty



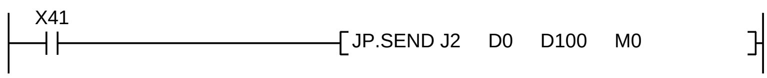
	Transfer to network No.	Intermediate network No.	Intermediate station No.
1)	3	1	2
2)	3	2	2

(d) The network No. (Jn) of the dedicated link instruction must be changed as follows.

1) When the regular network is normal

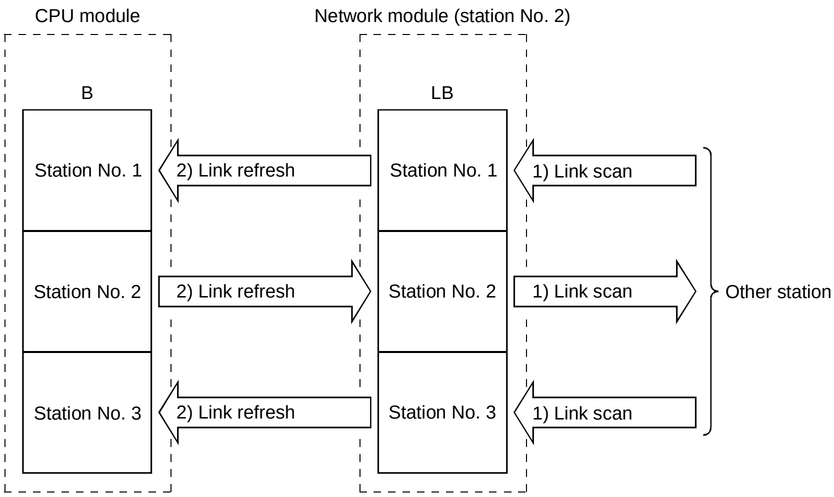


2) When the regular network is faulty



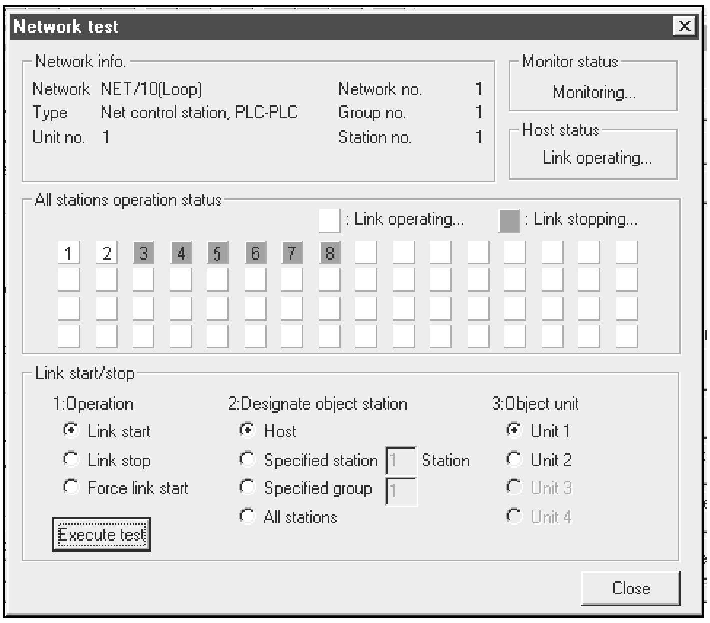
7.8 Stopping/Restarting the Cyclic Transmission and Stopping Link Refreshing (Network Test)

The cyclic transmission can be stopped or restarted using the "Network test" function of GX Developer.
This function is useful when other station's data should not be received or when the host's data should not be sent at system startup (when debugging), etc.

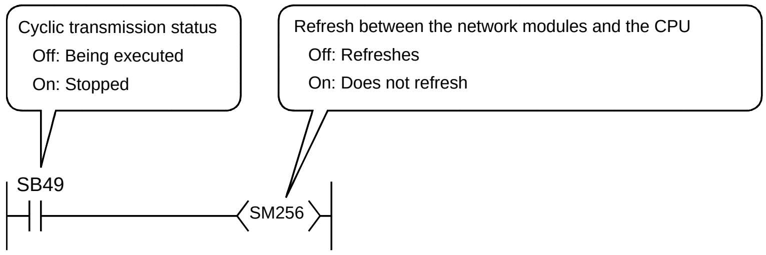


1) Stopping/restarting the cyclic transmission stops or restarts the data receiving (link scan) between the network modules of the applicable station. However, the data receiving (link refresh) between the CPU module and network modules cannot be stopped or restarted by this processing.

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 on the network testing methods, see the GX Developer Operating Manual.



3) Execution using the sequence program (Not allowed for the Q00J/Q00/Q01CPU)
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 can be stopped or restarted according to the host's cyclic transmission status (SB49) as shown in the program below.



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	Designated station	All stations
Stop link by designating host	○	×	×	○	○	○
Stop link by designating specified station	×	○	×	○	○	○
Stop link by designating all the stations	×	×	○	×	×	○

○: Startup possible ×: Startup not possible

POINT

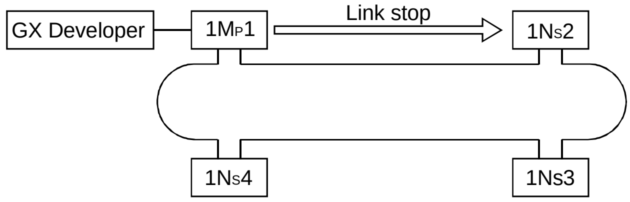
Performing the link startup operation on a station in the offline mode (disconnected station) cannot start the data link. If the startup operation is performed on the offline target station, an error will not occur on the startup requesting station because there is no response from the target station.

(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 data link of 1Ns2 with GX Developer.

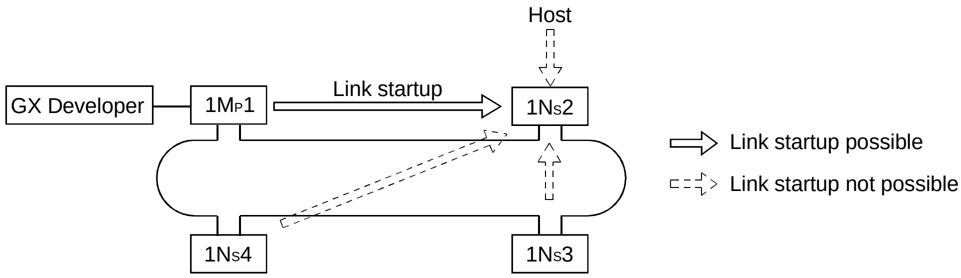


(b) Restart

There are two methods to restart the link of the stopped station: "Link startup" and "Forced link startup."

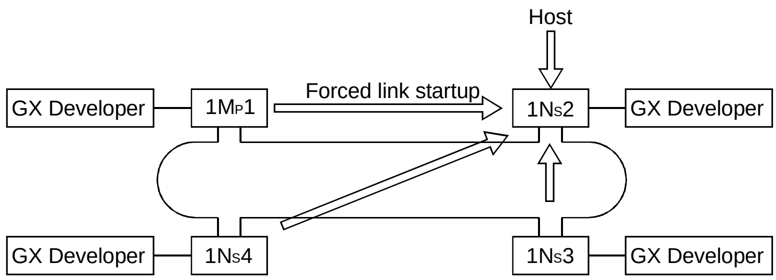
1) In case of "Link startup"

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"

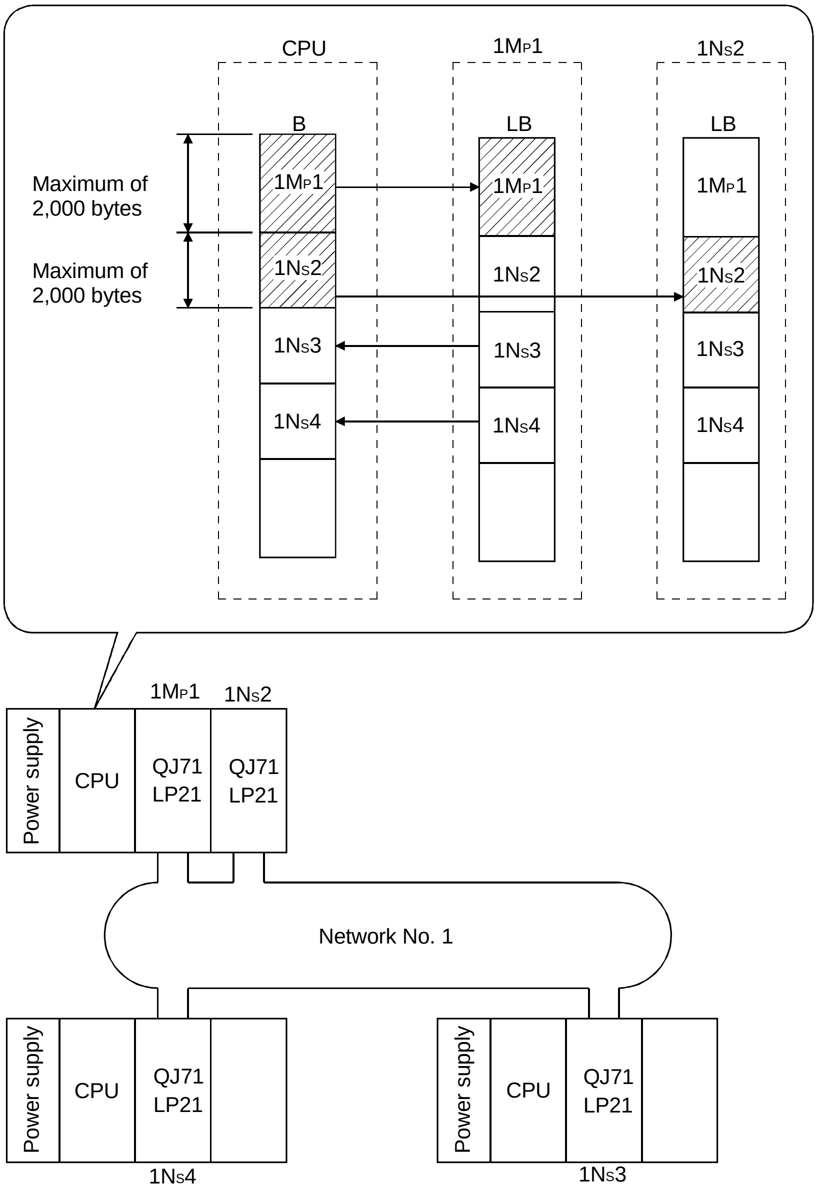
The link of the stopped station (1NS2) can also be started from stations (including the host) other than the stop requesting station.
This startup method is used when the stop requesting station is down.
The startup can be executed from the host as well as other stations regardless of the stopped station.
However, the forced startup cannot be executed per station while the link is stopped by designating all stations at the same time (designating the host or one station).



7.9 Increasing the Number of Send Points by Installing Multiple Modules with the Same Network (Q02/Q02H/Q06H/Q12H/Q25H/Q12PH/Q25PHCPU only)

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

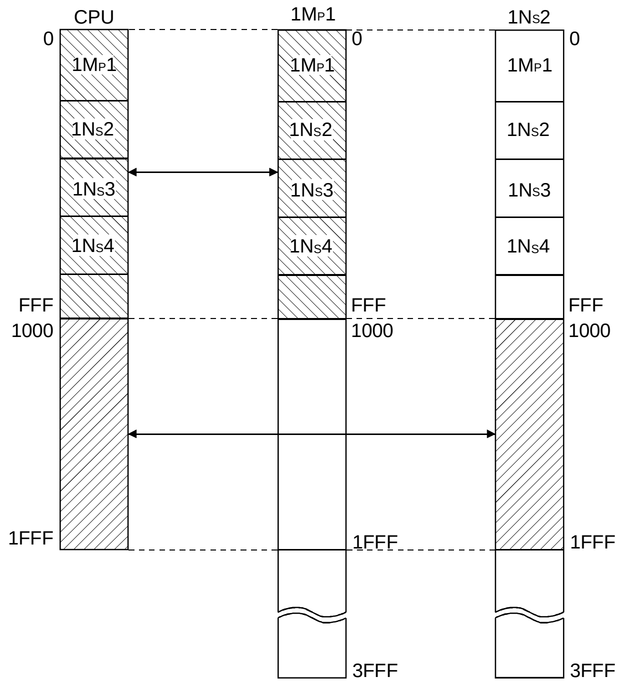
The Q00J/Q00/Q01CPU accepts only one network module.
Hence, you cannot increase the number of send points by installing multiple modules on the same network.

POINT

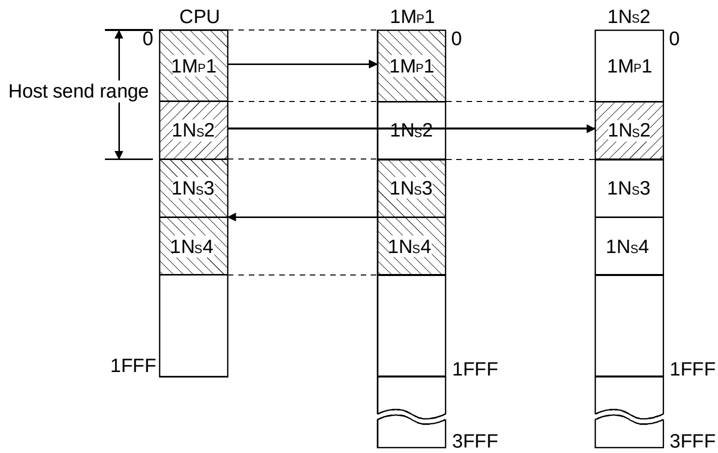
The following precautions should be observed when installing multiple network modules with the same network No. to one CPU module:

(1) They cannot be set to the same station number.
(2) Multiple stations cannot be set as control stations.
(3) The "youngest number" of the I/O numbers is used for the transient transmission.
(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.



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) Line monitor (see 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 (see 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, designated stations and all stations: Network test

(2) Confirmation by error code: See 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 special link 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 (see 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.

8

REMARK

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
    - 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
    - External power supply operating status of each station
    - Local station error detection status
- Network monitor details
  - [Network information]
    - Network type
    - Network No.
    - Group No.
    - Station No
  - [Control station information]
    - Designated control station
    - Current control station
    - Communication information
    - Sub-control station communication
    - Remote I/O master station No. (block 1, block 2)
    - LX/LY assignment
  - [Data link information]
    - Total number of link stations
    - Maximum normal communication station
    - Maximum data link stations
    - Communication status
    - Cause of communication interruption
    - Cause of communication stop

To next page

From previous page

[Host status]
- Parameter settings
- Reserved station designation
- Communication mode
- Multiplex transmission designation
- Multiplex transmission status

Error history monitor

[Network information]
- Network type
- Network No.
- Group No.
- Station No.

[Loop switch count] Number of occurrences
[Transient transmission error] Number of occurrences
[Forward loop]
- Number of retries
- Line trouble
- Number of communication errors (UNDER, CRC, OVER, etc.)

[Reverse loop]
- Number of retries
- Line trouble
- Number of communication errors (UNDER, CRC, OVER, etc.)

Error history details

[Network information]
- Network type
- Network No.
- Group No.
- Station No.

[Loop switch]
Station number, cause, status after switch
[Transient transmission error]
Error code, error type

Error history clear

[Clear item]
Clearing number of retries, etc,

POINT

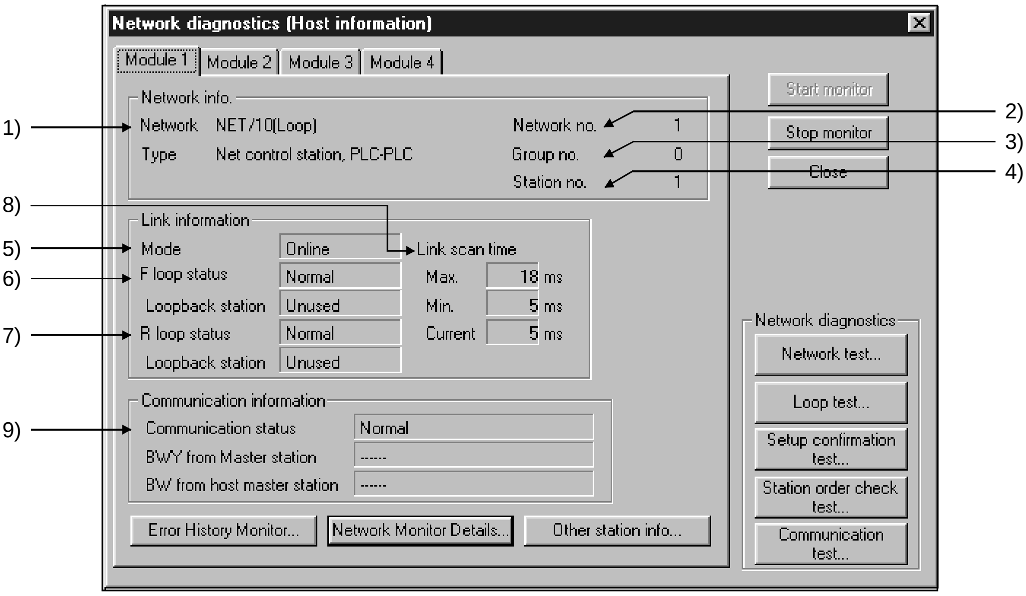
(1) The target of the network diagnostics is the host's network designated as the connection destination.
(2) When other station is designated as the connection destination, the network monitor can check only the host information and the information of that particular station (other station).
(3) The network monitor cannot display correctly while the network module is executing offline tests.
(4) When the dedicated link instruction is used to access the other station PLC during network diagnosis, the execution of the dedicated link instruction may be delayed.
After taking the following measures, perform network diagnosis processing and execute the dedicated link instruction.
- Execute the COM instruction.
- Using special register SD315, secure 2 to 3ms as the communication processing time.

REMARK

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

With the local station information, the information of the entire network of the connection destination and the status of the host can be checked.



[Network info.]

1) Network type (SB0040, SB0044, SB0057, 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 (bus) PLC to PLC network control station
   - MELSECNET/H (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 number 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.

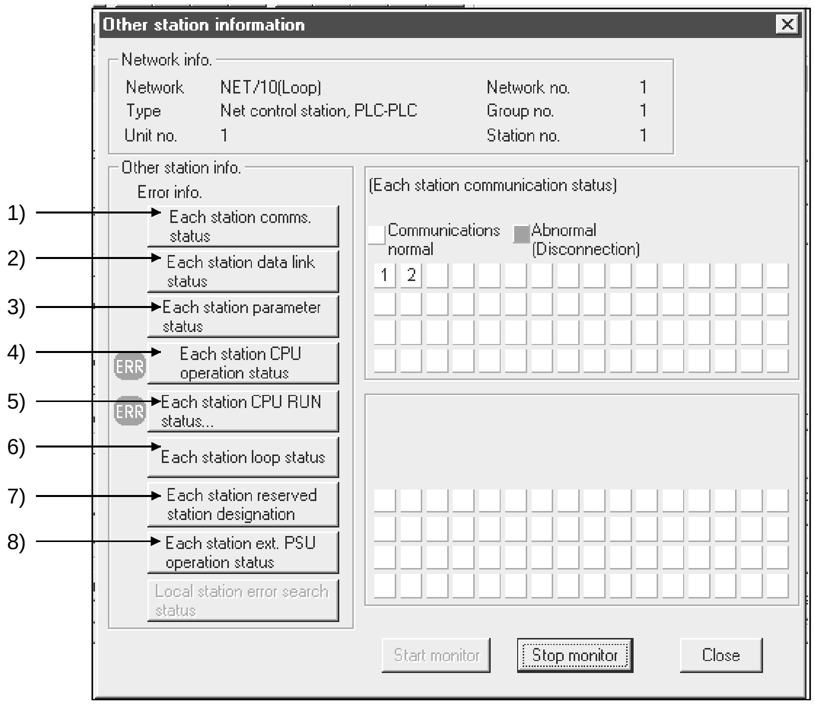
Constant link scan \ Station type	Control station	Normal station
No	Measured value (Displays the maximum/minimum/current value the link scan actually took.)	
Yes	Measured value (Displays the maximum/minimum/current value the link scan actually took. However, if the setting values are small, the values are obtained from the equation described in Appendix 4.)	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

With the other station information, the status of the communication, data link, parameters, CPU, loop and reserved station status of each station can be checked.



[Network info.]

This area displays the same information as the host information in Section 8.1.1.

[Other station info.]

"ERR" is displayed for stations for which the following station is detected in each item: a faulty station, a station in the STOP status, a reserved station, and a station to which external power is being supplied.
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) Each station comms. status (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 abnormal station (disconnected status)
2) Each station data link status (SW0074 to 77)
   Displays the status of the cyclic transmission.
   - Normal display : Normal station or reserved station
   - Highlighted display : Abnormal station (data link not executed)

3) Each station parameter status
Displays the parameter communication status of each station (SW0078 to 7B).
- Normal display : During parameter communication
- Highlighted display : Other than during parameter communication or reserved station

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) Each station CPU operation status (SW0080 to 83, SW0088 to 8B)
Displays the operation status of the CPU.
- Normal display : CPU normal, reserved station or unconnected station
- Highlighted display : CPU abnormal, Minor: Minor error
  Serious: Serious
  (WDT error, etc.)
  fatal (hardware error, etc.)

5) Each station CPU RUN status (SW0084 to 87)
Displays the RUN/STOP status of the CPU.
- RUN : RUN or STEP RUN
- STOP : STOP, PAUSE, ERROR or unconnected station
  "---" is displayed for a reserved station.

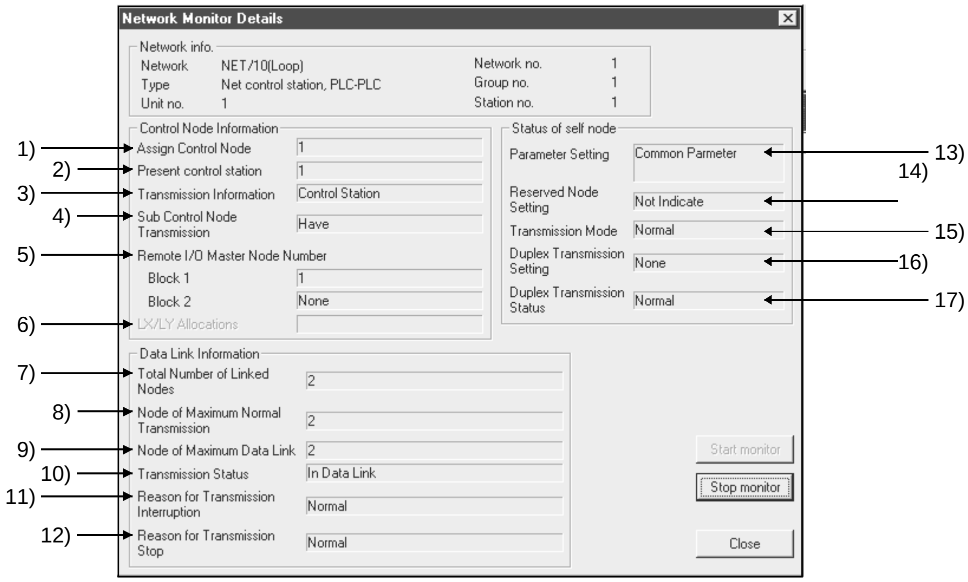
6) Each station loop status (SW0091 to 94, SW0095 to 98)
Displays the status of the forward/reverse loops in case of the optical loop system.
- Normal display : Normal or reserved station
- Highlighted display : Abnormal or unconnected station

7) Each station reserved station designation (SW0064 to 67)
Displays the setting status of a reserved station.
- Normal display : Unreserved station
- Highlighted display : Reserved station

8) Each station ext. PSU operation status (SW008C to 8F) (for future expansion)
Displays the supply status of the external power 24 V DC of the network module.
- Normal display : Not powered by 24 V DC or network module without supply terminal
- Highlighted display : 24 V DC powered

8.1.3 Line monitor details

With the line monitor details information, the control station information, data link information and the parameter status of the host can be checked.



[Network info.]
This area displays the same information as the host information in Section 8.1.1.

[Control station information]

1) Designated control station (SW0057)
   Displays the number of the control station designated with the parameter.

2) Current control station (SW0056)
   Displays the number of the station that actually controls the network.

3) Communication 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 communication (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 assignment
   Nothing is displayed

[Data link information]

7) Total number of link stations (SW0059)
Displays the total number of link stations set with the parameter.

8) Maximum normal communication station (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) Maximum data link station (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) Communication status (SW0047)
Displays the communication status of the host.
- Data linking is being executed
- Data linking stopped (other):
  Other station stopped the cyclic transmission.
- Data linking stopped (self):
  The host stopped the cyclic transmission.
- Baton pass execution (no area):
  No assignment of the host's B/W transmission.
- Baton pass execution (abnormal param.):
  There is an error in the host's parameters.
- Baton pass execution (param. not received):
  The common parameters have not been received.
- Being disconnected (no baton pass):
  Duplicate station numbers, cable not connected
- Being disconnected (line error): Cable not connected
- Test being executed: Online/offline test being executed

11) Causes of communication interruption (SW0048)
Displays the causes why the host cannot communicate (transient transmission).
For details on actions to take, see Section 8.3, "Error Codes."
- Normal
- Baton duplication : Multiple batons are received.
- Baton pass timeout : The baton does not return on time.
- Online test being executed
- Baton pass at other station : Baton pass being executed on stations other than the host
- Same station number : Duplicate station number
- Control station duplication : Duplicate control station
- Offline test being executed
- Others (error code)

12) Causes of communication stop (SW0049)
Displays the causes why the host's data linking (cyclic transmission) was disabled.
- Normal
- Instructed by other station (□ station):
  Other station transmission (□ station) stopped the cyclic.
- Instruction by the host:
  The host stopped the cyclic transmission.
- Instructed for all stations (□ station):
  The cyclic transmission of all stations was stopped from □ station.
- No parameters : The parameter cannot be received.
- Abnormal parameter : The parameter set is abnormal.
- Specific parameter : Parameter mismatch error between the common parameters and station inherent parameters
- Others (error code) : See Section 8.3, "Error Codes."

[Host status]

13) Parameter settings (SB0054, SW0054)
Displays the parameter setting status of the host.
- Common parameters
- Common + specific
- Default parameters
- Default + specific

14) Reserved station designation (SB0064)
Displays the designation status of reserved stations.
- Yes/No

15) Communication mode (SB0068)
Displays the link scan status.
- Normal mode
- Constant link scan

16) Multiplex transmission designation (SB0069)
Displays the designation status of the multiplex transmission.
- Normal transmission
- Multiplex transmission

"----" is displayed for the bus type system.

17) Multiplex transmission status (SB006A)
Displays the status of the multiplex transmission.
- Normal transmission
- Multiplex transmission

"----" is displayed for the bus type system.

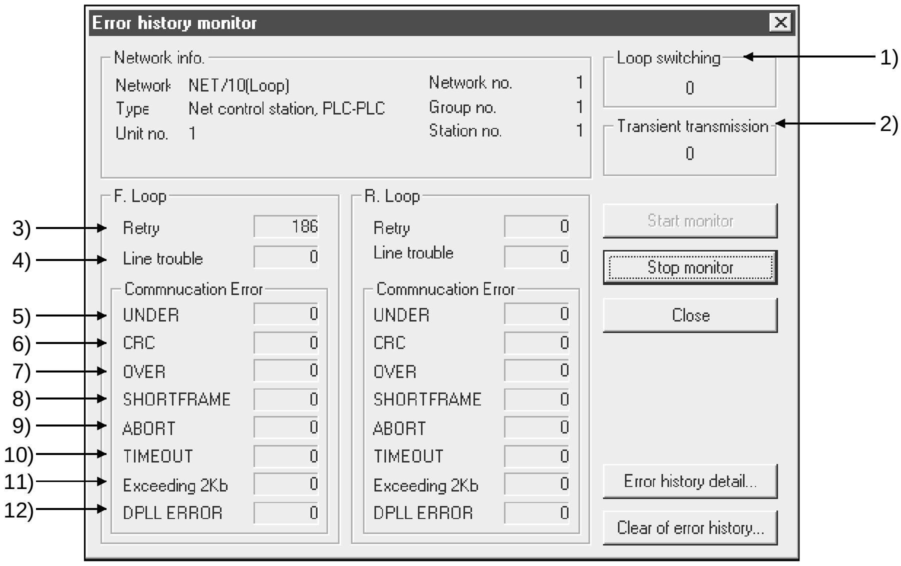
REMARK

(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 that have occurred 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.]

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> See 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> See 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> See 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> See 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> See the following POINT.

7) OVER (SW00BA, SW00C2)
Displays how many OVER errors have occurred.
<Error Cause> Faulty cable, hardware failure, noise, etc.
<Corrective Action> See 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> See 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> See 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> See the following POINT.

11) Exceeding 2 kb (SW00BE, SW00C6)
Display how many times messages exceeding 2k bytes were received.
<Error Cause> Faulty cable, hardware failure, noise, etc.
<Corrective Action> See the following POINT.

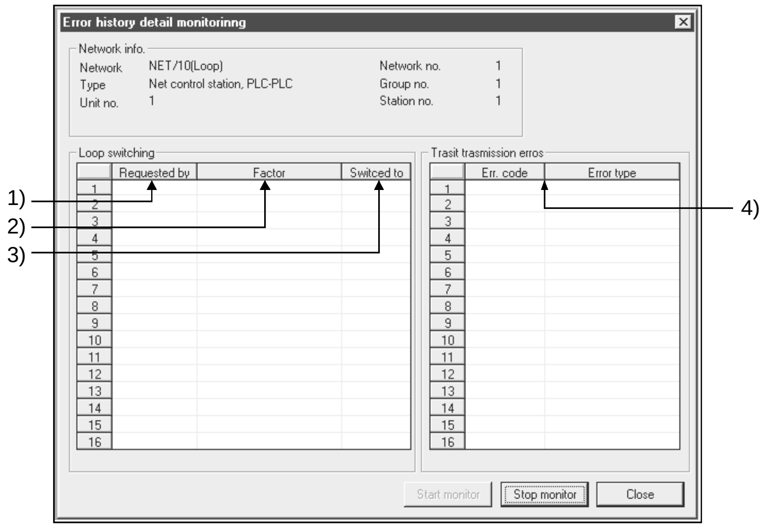
12) DPLL ERROR (SW00BF, SW00C7)
Displays how many times the DPLL errors occurred.
<Error Cause> Faulty cable, hardware failure, noise, etc.
<Corrective Action> See the following POINT.

POINT

The number of each error occurrence does not necessarily mean a problem unless the count value rises frequently during opeatoin. If it rises frequently, observe the following.

1) Check the power-ON/OFF status of the pertinent 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) Peform the station-to-station test, forward/reverse loop test.
5) Referring to the user's manual (for hardware) of the network nodule, perform the wiring again. Also, set the system again referring to the user's manual of the CPU module.

(2) Error history monitor details
Displays the causes of loop switches and the history of the transient transmission errors.



[Loop switching]

1) Requested by (SW00E0 to E7)
Displays the number of the station (not necessarily an adjacent station) that requested the loop switch and loopback.

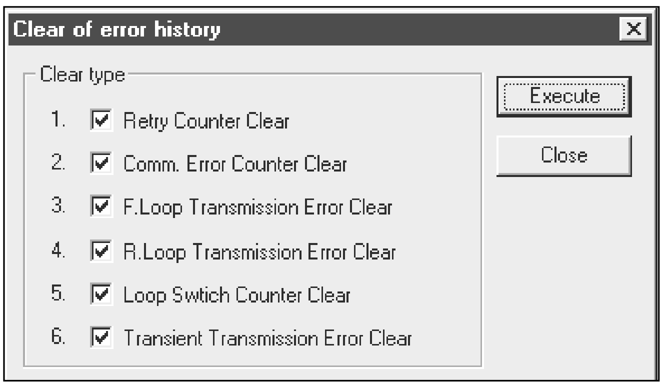
2) Factor (SW00D0 to DF)
Displays the reason why the loop switch and loop back are executed.
- Normal return
- Forward loop hardware error : Cable or optical module error
- Reverse loop hardware error : Cable or optical module error

3) Switched to (SW00D0 to DF)
Displays the data link status after the loop switch.
- Multiplex transmission: Forward loop/reverse loop normal
- Forward loop transmission
- Reverse loop transmission
- Loopback transmission

[Trasit transmission error]

4) Error code, error type (SW00F0 to FF)
Displays the error code.
See Section 8.3

(3) Clear of error history
Select the check box of the items whose error history should be cleared from the list of clear items. The error history can be cleared for each clear item.

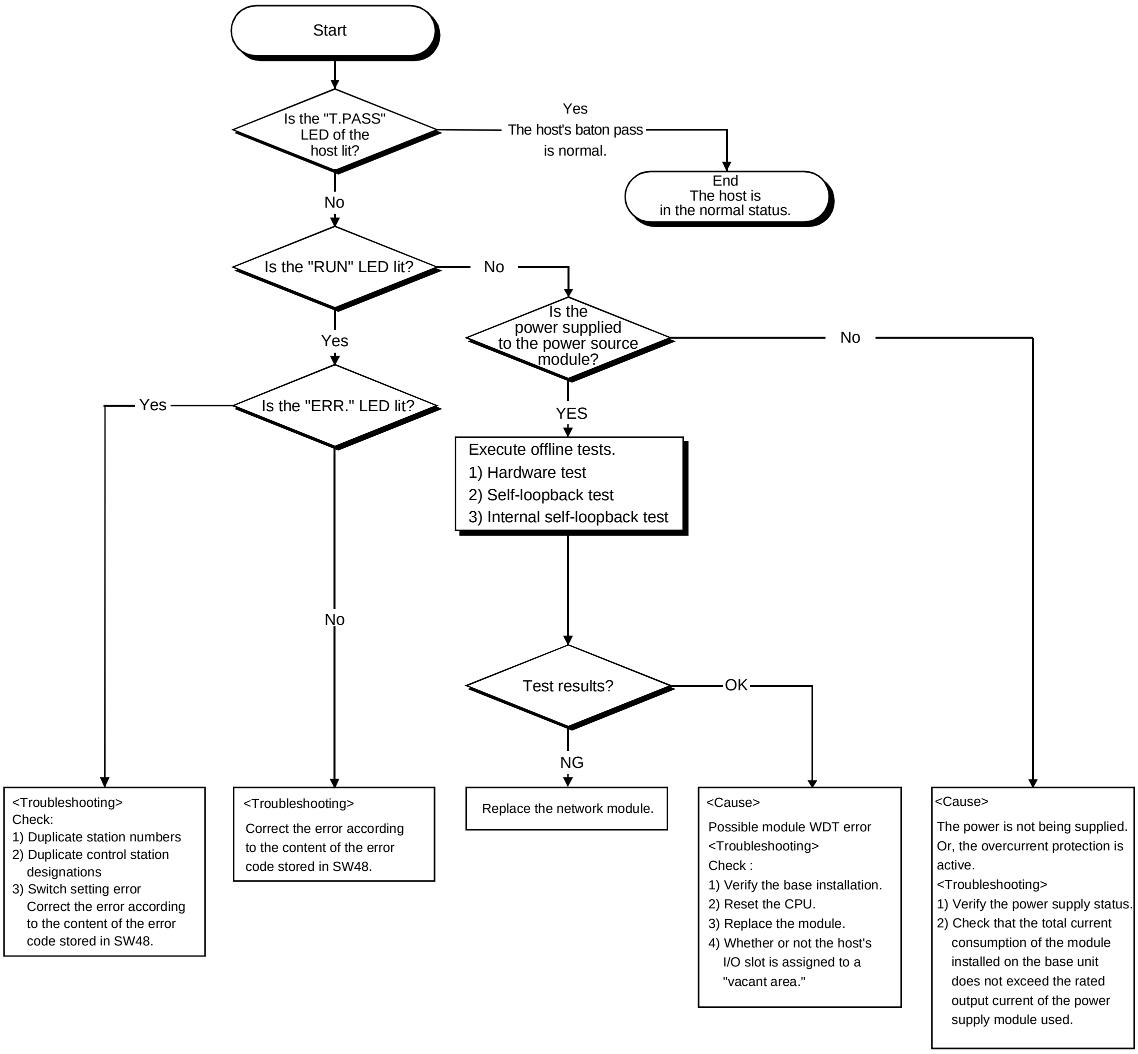


8.2 Troubleshooting

The following flowchart illustrates a simple troubleshooting flow.

(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).



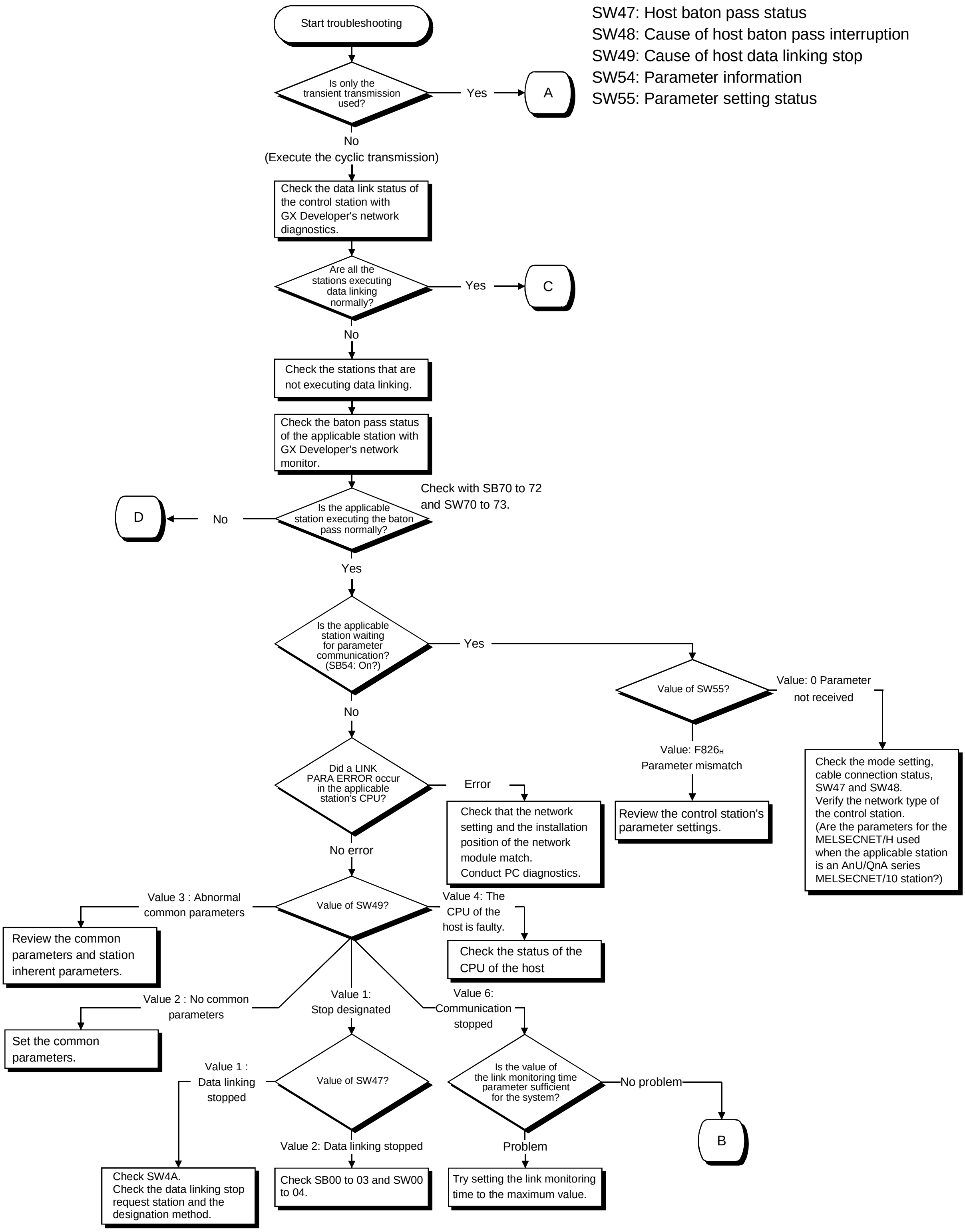
POINT

If the "T. PASS" LED turns on and off and looks instable, refer to the following.
<Cause>
The line status is assumed to be instable.
<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 interstation distance conform to the specifications. (Refer to Section 4.6 Cable Connection.).

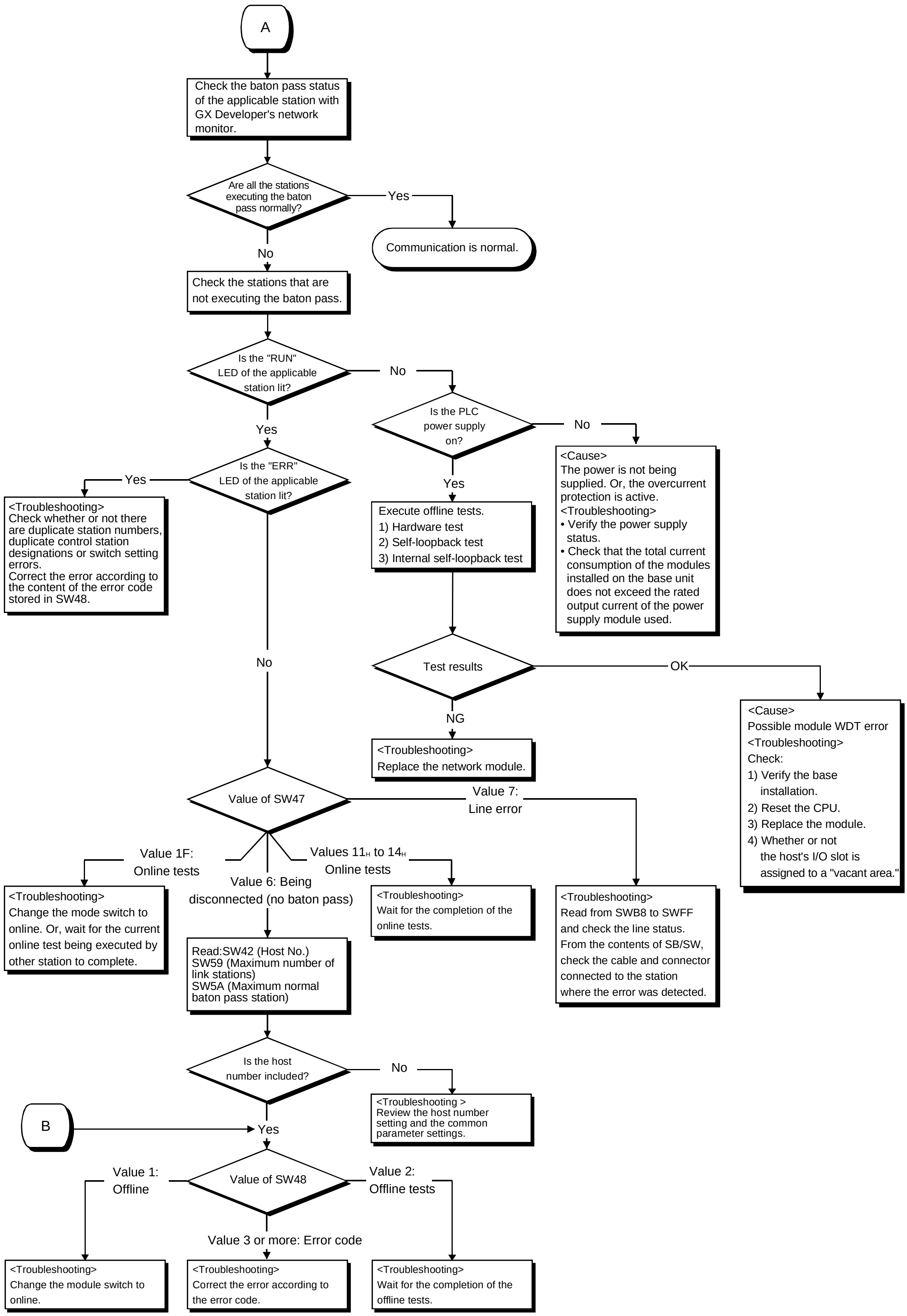
(2) From monitoring the network status to troubleshooting of a faulty station

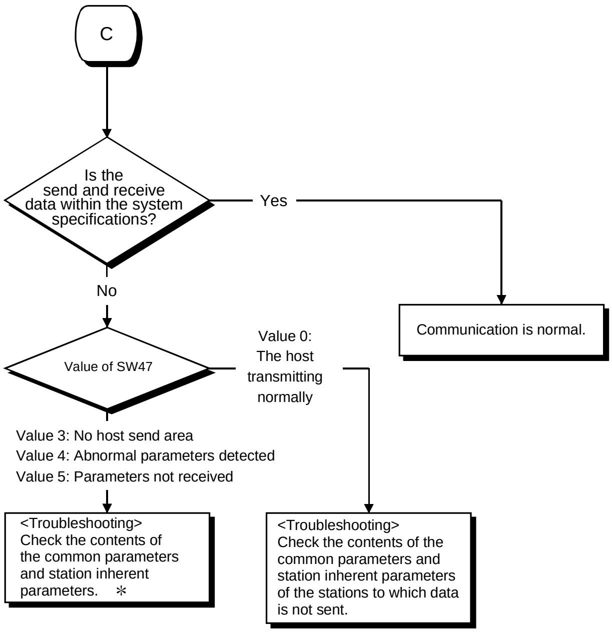
The following flowchart illustrates the procedure for monitoring the status of the entire network, detecting a faulty station, and then performing troubleshooting for the applicable station.

The status of the entire network is monitored with GX Developer.



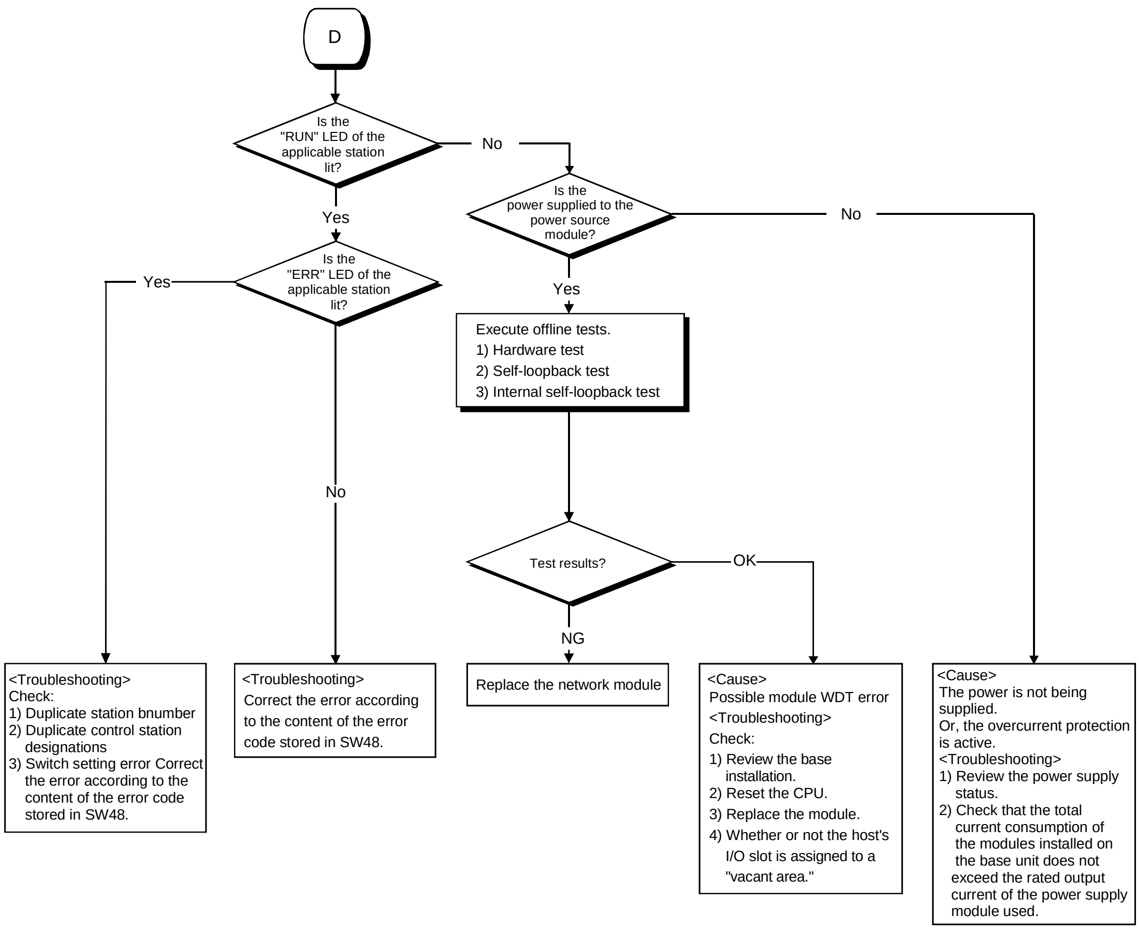
SW47: Host baton pass status
SW48: Cause of host baton pass interruption
SW49: Cause of host data linking stop
SW54: Parameter information
SW55: Parameter setting status


A
Check the baton pass status of the applicable station with GX Developer's network monitor.
Are all the stations executing the baton pass normally?
Yes
Communication is normal.
No
Check the stations that are not executing the baton pass.
Is the "RUN" LED of the applicable station lit?
No
Is the PLC power supply on?
No
<Cause>
The power is not being supplied. Or, the overcurrent protection is active.
<Troubleshooting>
• 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.
Yes
Execute offline tests.
1) Hardware test
2) Self-loopback test
3) Internal self-loopback test
Test results
OK
<Cause>
Possible module WDT error
<Troubleshooting>
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 "vacant area."
NG
<Troubleshooting>
Replace the network module.
Yes
Is the "ERR" LED of the applicable station lit?
Yes
<Troubleshooting>
Check whether or not there are duplicate station numbers, duplicate control station designations or switch setting errors.
Correct the error according to the content of the error code stored in SW48.
No
Value of SW47
Value 7: Line error
<Troubleshooting>
Read from SWB8 to SWFF 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.
Value 1F: Online tests
<Troubleshooting>
Change the mode switch to online. Or, wait for the current online test being executed by other station to complete.
Values 11H to 14H Online tests
<Troubleshooting>
Wait for the completion of the online tests.
Value 6: Being disconnected (no baton pass)
Read:SW42 (Host No.)
SW59 (Maximum number of link stations)
SW5A (Maximum normal baton pass station)
Is the host number included?
No
<Troubleshooting >
Review the host number setting and the common parameter settings.
B
Yes
Value of SW48
Value 1: Offline
<Troubleshooting>
Change the module switch to online.
Value 2: Offline tests
<Troubleshooting>
Wait for the completion of the offline tests.
Value 3 or more: Error code
<Troubleshooting>
Correct the error according to the error code.



✻ In case of SW47 = 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.



8.2.1 Items to be checked first

Check item	Checking procedure
Monitor the communication status of each station with GX Developer's network monitor.	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 "RUN" LED of the CPU module lit?	If the "RUN" LED is not lit or flashes, read the error code with GX Developer and correct the error. (For details on error handling, see the CPU module's User's Manual (Hardware Design/Maintenance and Inspection).)
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. (See Section 4.2.) If the "T. PASS" LED turns on and off and looks instable, the line status is assumed to be instable. 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 interstation distance conform to the specifications. (Refer to Section 4.6 Cable Connection.)

8.2.2 When data link cannot be executed 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 switch and mode setting switch.
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.
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.

8.2.3 When data link is disabled because of 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. (See Section 4.8.1.)
Are the cables 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.
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.

8.2.4 When a specific-station's data link cannot be executed

Check item	Checking procedure
Monitor the communication status of each station.	Perform line 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 designated 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 switch and the mode setting switch.

8.2.5 When the transmission and reception data are abnormal

(1) The cyclic transmission data is abnormal

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.

(2) The transient transmission is abnormal

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.
Are the routing parameter settings correct?	Check the routing parameters with the communication test of GX Developer's online 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..

8.2.6 When the dedicated link instruction is not completed

Check item	Checking procedure
Is the dedicated link instruction issuing station online?	Place the dedicated link instruction issuing station online and execute the dedicated link instruction. Use SB43 as an interlock to confirm the online status in the sequence program.

8.3 Error Codes

When data linking cannot be performed using the cyclic transmission, or when communication cannot be performed normally using the transient transmission with an instruction of a sequence program or GX Developer, the error codes (hexadecimal) are stored in the special link register or displayed on the GX Developer's system monitor.

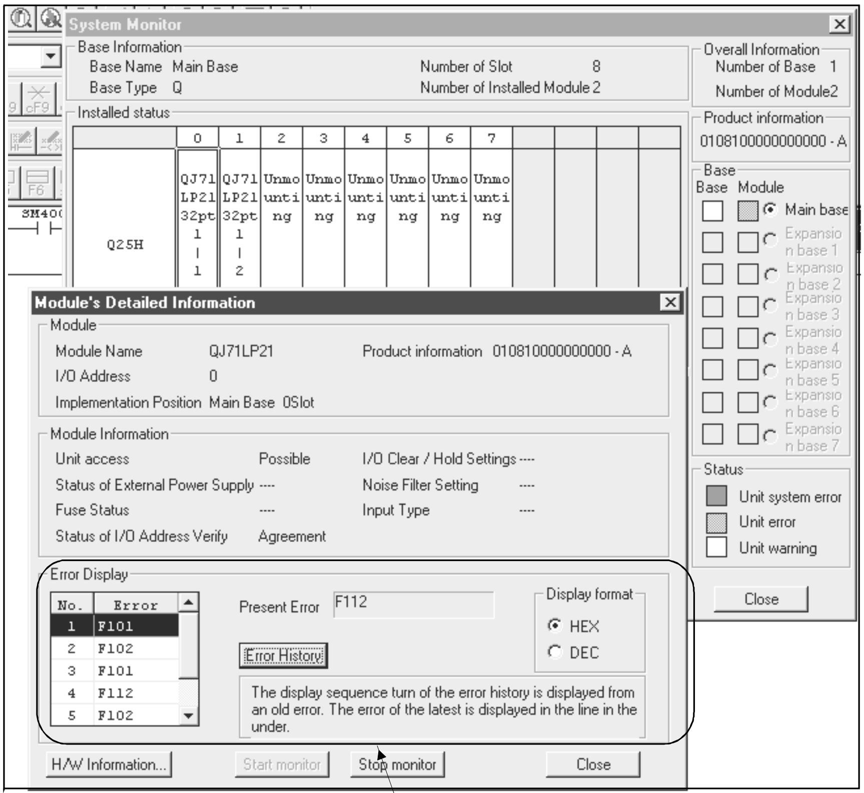
(1) Error code storage when data linking cannot be performed

When data linking cannot be performed in the cyclic transmission, the following link special registers should be checked.

1) SW0048: Cause of baton pass interruption
2) SW0049: Cause of data link transmission stop
3) SW0055: Parameter (2)

(2) Checking error codes with GX Developer

Errors occurring in the target PLC are displayed at the bottom of the system monitor screen. Change the designation of the connection destination to check other PLCs on the network.
Check the device data described in item (3) on the next page to see the error codes of the transient instructions by the sequence programs.



Check the module's error code and error history

(3) Transient instruction error code storage location

The error codes generated during the transient instruction execution are stored in the following device data.
The error codes of the transient transmission are also stored in the link special registers SW00EE to SW0FF.
For details on the instructions, see the programming explanations for the transient transmission 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 : SW31 (When channel 1 is used.)
   SW33 (When channel 2 is used.)
   SW35 (When channel 3 is used.)
   SW37 (When channel 4 is used.)
   SW39 (When channel 5 is used.)
   SW3B (When channel 6 is used.)
   SW3D (When channel 7 is used.)
   SW3F (When channel 8 is used.)

(4) Table 8.1 lists the descriptions of error codes.

Table 8.1 Error code list

Error No.	Error description	Corrective action
F101	Initial status	Set so that SB0047 (baton pass status) and SB0049 (data link status) are set to off (normal). The error number automatically turns off when the baton pass and data link return to normal.
F102	Initial status	
F103	Initial status (during online test)	
F104	Control station/sub-control station shift status	
F105	Initial status	
F106	Control station/sub-control station shift status	Check the power supply, cable and CPU status of the control station.
F107	Baton pass error (baton lost)	Check the line status, such as if a cable is faulty or a terminal resistor is not installed, as well as the stations that are not powered on.
F108	Baton pass error (duplicate baton)	Check for duplicate station numbers and control stations with the setting check test (Section 4.8.2). Check for faulty cables, wire breakage, poor connector connections, connection errors, uninstalled or loose terminal resistors, etc.
F109	Initial status (during online test)	Switch to the online mode or abort the test.
F10A	Initial status (online test/offline loop test)	
F10B	Duplicate station number error	Correct the station number.
F10C	Duplicate control station error	Correct the control station settings.
F10D	Offline status	Switch to online.
F10E	Number of receive error retries exceeded	Check for faulty cables, hardware errors, noise, wiring errors, uninstalled terminal resistors (when a bus is used), and duplicate station numbers and control stations.
F10F	Number of send error retries exceeded	
F110	Timeout error	
F111	Corresponding station error	Review the corresponding station's status as well as the parameter and switch settings (check whether or not there are parameter setting errors and whether or not the corresponding station is set properly on the control station.).
F112	Faulty loop status	Check for faulty cables, hardware errors, noise, wiring errors, and duplicate station numbers and control stations. Are the MELSECNET/H mode and the MELSECNET/10 network module used together? (Check the control station type.)
F113	Send failure	Wait for a while and execute again. If an error occurs at a retry, check for faulty cables, hardware errors, noise, wiring errors, uninstalled terminal resistors (when a bus is used), and duplicate station numbers and control stations. Review the parameter and switch settings. (Check whether or not there are parameter setting errors and whether or not the corresponding station is set properly on the control station.)
F114	Send failure	Wait for a while and execute again. If an error occurs at a retry, check for faulty cables, hardware errors, noise, wiring errors, uninstalled terminal resistors (when a bus is used), and duplicate station numbers and control stations.
F117	Send failure	Check for faulty cables, hardware errors, noise, wiring errors, and uninstalled terminal resistors (when a bus is used).
F118	Initial status (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. (Check whether or not there are parameter setting errors and whether or not the corresponding station is set properly on the control station.) Check for faulty cables, hardware errors, noise, wiring errors, and duplicate station numbers and control stations.

Table 8.1 Error code list (Continued)

Error No.	Error description	Corrective action
F11F	Initial status (no baton addressed to host)	Review the parameter and switch settings. (Check whether or not there are parameter setting errors and whether or not the corresponding station is set properly on the control station.) Are the MELSECNET/H mode and the MELSECNET/10 network module used together? (Check the control station type.)
F122	Send failure (when a bus is used)	Check for the following: the coaxial cable is not connected or loose, terminal resistors are not connected, or the cable is faulty.
F222	No free area in the receive buffer (buffer-full error)	Wait for a while and execute again. If an error occurs at a retry, check the amount of transient communication in the entire system, review the communication interval, or the send destination CPU may be abnormal (no receive processing (END processing), etc.).
F224	Receive data size error	Set the send data size to 2k byte or less.
F226	Channel number error	Set the corresponding channel number properly (setting range: 1 to 8).
F701	Designated station number error 1) At data sending: Attempted to send to station number 0. At data receiving: Received a message not addressed to the host. 2) Attempted to send to the designated control station, but it is down.	Correct the send destination number.
F702	Send destination number error (The send destination number is outside the range, or 65 or more send destination stations are designated.)	Correct the send destination number.
F703	Send group number error (The send group number is outside the range, or 33 (control data A1H) or more send groups are designated.)	Correct the send destination group number.
F705	Send destination CPU error (Send destination hardware error)	Check the send destination's CPU.
F707	Relay station count error (Designation outside the range that can be relayed, or 8 or more relay transmission destination stations are designated).	Designate a station to send. Review the system.
F709	Receive network number error (The network number received is incorrect.)	Review the network No. parameter. If the parameter is not set, the network No. has been set to 1 (default); so check the network No. of other stations.
F70B	Response wait timeout	Wait for a while and execute again.
F7C1	Attempted to use a channel being used (host)	The same channel cannot be used at the same time. Change the channel number or do not use the same channel at the same time.
F7C2	Channel of the target station is being used	Wait for a while and execute again. Check whether or not multiple requests are made to the same channel of the target station from the host or multiple stations.
F7C3	Arrival monitoring time has elapsed (When the number of retries is 0.)	If this error occurs with the RECV instruction, set a larger value for the arrival monitoring time when other station is executing a SEND instruction. When the host is executing the instruction, set a larger value for the arrival monitoring time. If the error still occurs, check the network and target station. The RECV was executed when the RECV instruction execution request flag was not on.
F7C4	Failed to communicate after resending for the designated number of retries.	Set a larger value for the arrival monitoring time. If the error still occurs, check the network and target station.

Table 8.1 Error code list (Continued)

Error No.	Error description	Corrective action
F7C6	The channel number was outside the setting range.	Set the channel number of the host and target station within the range from 1 to 64.
F7C7	The host is designated as the target station number.	Designate a target station number that is different from the host.
F7C8	An execution type with either "all stations" or "group" designation is set to "With arrival confirmation."	When either the "all stations" designation or the "group" designation is used, the execution type should be set to "No arrival confirmation."
F7C9	The number of resends was outside the setting range.	Set within the range from 0 to 15 (times).
F7CA	The arrival monitoring time was outside the setting range.	Set within the range from 0 to 32767 (s).
F7CB	The send data length of the SEND instruction is outside the setting range.	Set within the range from 1 to 480 (words).
F7E1	• The execution type of the dedicated link instruction having control data is abnormal. • The target station channel in the SEND instruction is outside the range. • The target station number, target station device or data size in the ZNRD/ZNWR instruction is abnormal. • The operation mode in the RSTOP/RRUN instruction is abnormal. • The clear mode or signal flow in the RRUN instruction is abnormal.	Set a normal value.
F800	Mode switch error	Correct the hardware setting switch and parameter settings.
F801	Network No. error	
F803	Station number error	
F804	DIP switch error	
F820	Link parameter error (The contents of the parameters are incorrect.)	Correct the common parameters or each station inherent parameters.
F823	Parameter mismatch error	Correct the common parameters or each station inherent parameters. Correct the parameter size as follows: Word count of the specific parameters ≤ Word count of the common parameters
F826	Parameter mismatch (The parameters of the control station when it started as a normal station are different from the parameters received from the sub-control station.)	Review the control station's parameters and reset the host.
F827	No automatic return	Execute processing according to the setting of "No automatic return shift."
F828	No control station shift setting	Execute processing according to the setting of "No control station shift."
F832	Startup rejected (Attempted to start up in conditions in which startup cannot be performed.)	Start up all stations after data linking is stopped by designating all stations. Do not start up automatically when data linking is stopped by designating other stations.
F833	Keyword error (Started up from a station different from the station that executed the stop.)	Start up from the station that executed the stop. Execute forced startup.
F837	Exceeded number of retries	Check the status of the control station. (Whether or not it was reset or an error occurred.)
F838	Applicable timer timeout	Check the status of the control station. (Whether or not it was reset or an error occurred.)
F839	Communication disabled because there are no link parameters (SW0056 is set to 0)	Review the cause for why the station is being disconnected.
F83A	SW0000 request is outside the range.	Correct the contents of SW0000.
F842	Low-speed mismatch error	Correct the low-speed data link parameters or the low-speed specific parameters of each station. Correct the parameter size as follows: Word count of the specific parameters ≤ Word count of the common parameters
F-902	Faulty routing number	When multiple networks are connected by routing function, the target station should be within 8 network systems from the request source. (7 relay stations or less)
F906	Intermediate CPU error	Check the intermediate's CPU.

Table 8.1 Error code list (Continued)

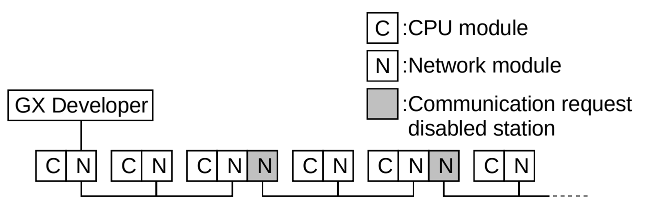
Error No.	Error description	Corrective action
F982	The received data cannot be processed	Check to see if the targeted station or relay station's number is incorrect. (The targeted station or relay station's CPU module that requested the transient transmission function, and the function requested by the network module are not supported.)
FD01	CRC error (test in offline)	Conduct the test again. (If these errors occurs frequently, check for faulty cables, hardware errors, noise, uninstalled terminal resistors (when a bus is used), and wiring errors.)
FD02	Overrun error (test in offline)	
FD03	AB. IF error (test in offline)	
FD04	TIME error (test in offline)	
FD05	Data error (test in offline)	
FD06	Under error (test in offline)	
FD07	Send failure	
FD08	Send failure (when a bus is used)	Check for the following: the coaxial cable is not connected or loose, terminal resistors are not connected, or the cable is faulty.
FD09	Loop status change during the test (offline loop test)	Conduct the test again (do not change the loop while testing (If this error occurs frequently, check the status of line and wiring.)
FD0A	Unstable communication (offline loop test)	Conduct the test again. (If this error occurs frequently, check for faulty cables, hardware errors, noise, uninstalled terminal resistors (when a bus is used), and wiring errors.)
FD0B	Wiring error (offline loop test)	Check the wiring.
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	Station number error The online diagnostics was executed by designating parameters when the parameters were not received. The online diagnostics was executed and a station number that was smaller than the host number was designated.	Set the total number of link stations with a common parameter. Set a station number that is equal to the host number or larger.
FD1A	Station with duplicated station number	Check and correct the station with a duplicate station number.
FD1B	Test abort error	The test was aborted during the execution because the test executing station was reset, etc. Fix the faulty station on the line.
FD1C	Abort error because of loop switching during test	Conduct the test again. (Do not switch the loop during the test.) (However, if this error occurs frequently, check the status of line and wiring.)
FD1E	Bus type, test disabled error	Conduct a test that can be executed with the bus type.
FD31	Duplicate online diagnostics request error (Two online diagnostics errors occurred at the same time.)	Execute again after one online diagnostics is completed.
FD35	Response wait timeout	Wait for a while and execute again. Check the applicable station and line status.
FD36	Timeout occurred while waiting for an action	
FD38	Duplicate message error	
FD39	The host was requested to be tested (communication test)	Change the test request destination.
FD3A	Test request destination is a request disabled station (communication test)	A station to which a test request cannot be made was designated. 

Table 8.1 Error code list (Continued)

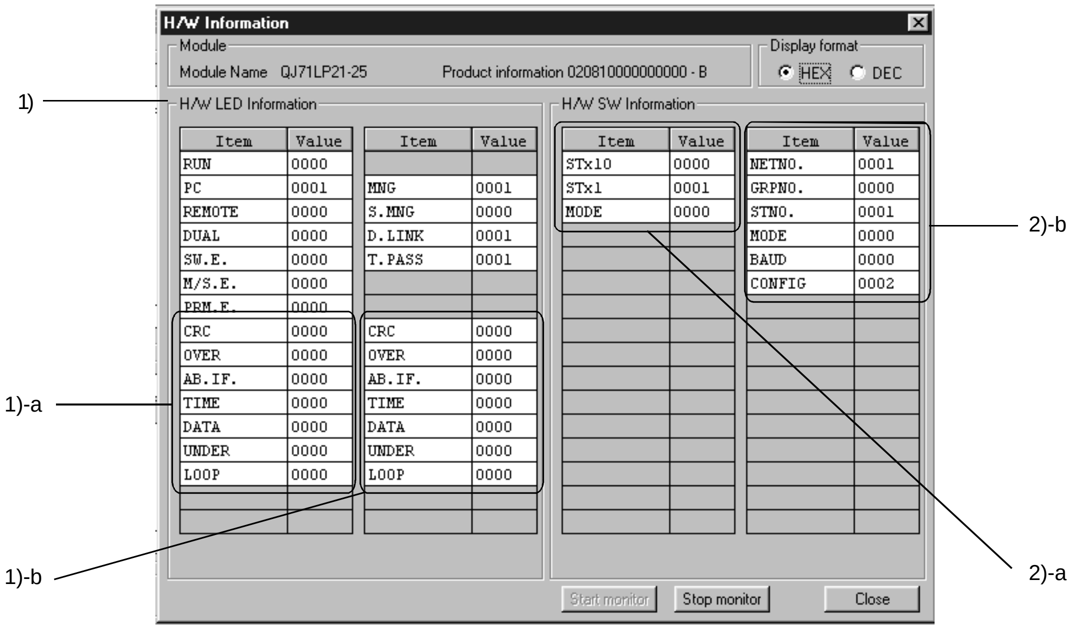
Error No.	Error description	Corrective action
FE20	Abnormal data (Cannot process received data, designated a relay station that is not an AnUCPU.)	Correct the routing parameters or change the relay station to an AnUCPU.
FE21	ZNRD/ZNWR device range error	Check the device range of the opposite CPU module.
FE22	Request content error	Data length error of general data, etc.
FE23	Send message error	Conduct the test again. (If this error occurs frequently, check for faulty cables, hardware errors, noise, uninstalled terminal resistors (when a bus is used), and wiring errors.)
FE24	CPU error occurred	Check the connection of the CPU module and network module, and try again.
FE25	Base power supply error	Check the power supply status (insufficient voltage, instantaneous power loss, power surge, etc.) of the target station and relay station of the transient transmission.
FE26	CPU error occurred	Check the operating statuses (WDT ERROR, etc.) of the target station and relay station CPUs.

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



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
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: on
T.PASS	During baton-pass participation: 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.

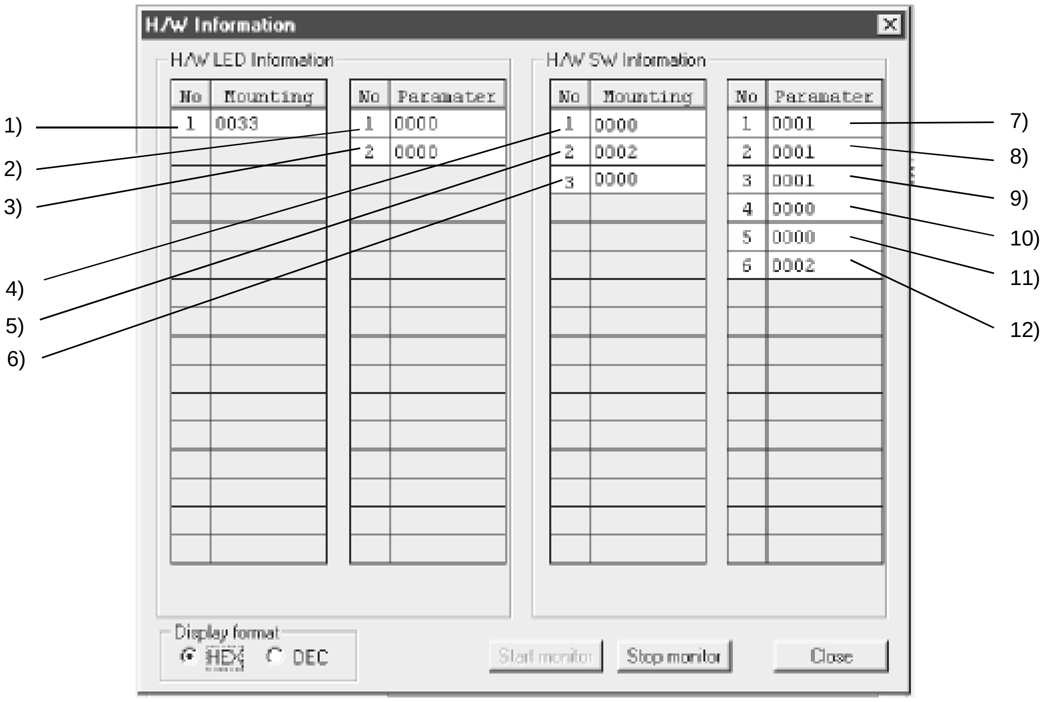
2)-a: Displays the switch settings for the H/W mounted on the network module.

Item	Description
STx10	Position 10 of the station number's setting switch
STx1	Position 1 of the station number's setting switch
MODE	Mode setting switch

2)-b: Displays the switch information actually set up on the network module.

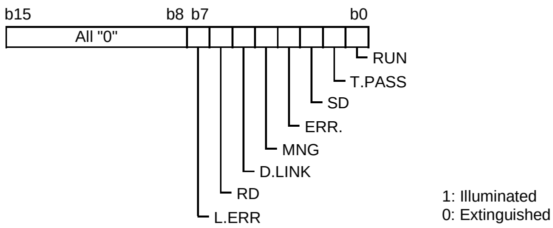
Item	Description	Display range
NETNO.	Network number setting	0 to 239
GRPNO.	Group number setting	0 to 9
STNO.	Station number setting	1 to 64
MODE	Operation mode setting	0: On-line 7: Self loop-back test 8: Internal self loop-back test 9: Hardware test
BAUD	Supporting 25Mbps	0: 10 Mbps 1: 25 Mbps
CONFIG	Station type, controlled station operations during recovery, transmission mode settings	b15–b8: All "0"; b7: Transmission mode; b6: Controlled station operations; b5–b1: Vacant; b0: Station type Controlled station operations 0: Switched 1: Not switched Transmission mode 0: On-line mode (start) 1: Debug mode (stop) Station type 0: Normal station 1: Controlled station

(2) When the network module: function version B and the GX Developer: prior to SW5D5C-GPPW are combined

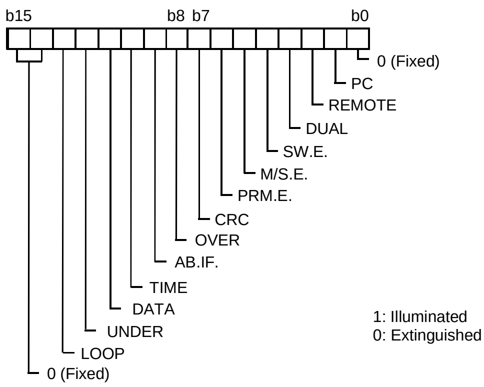


The following details will be displayed for each item.

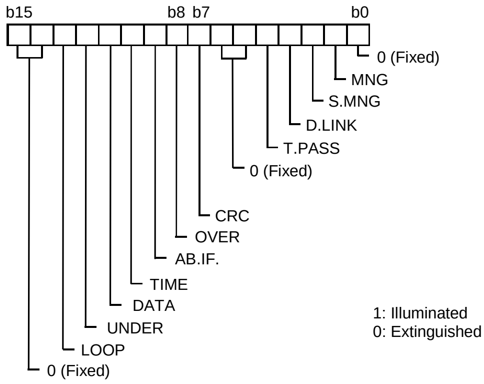
1) Actual LED1 information
Displays the illumination status of LEDs actually mounted onto the network module.



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 on 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 on 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.

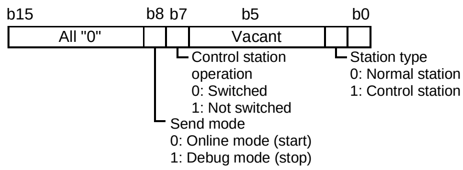
8) Group number switch information
Displays the number of the group actually set on the network module.
Display range: 0 to 32.

9) Station number switch information
Displays the number of the station actually set on the network module.
Display range: 0 to 64.

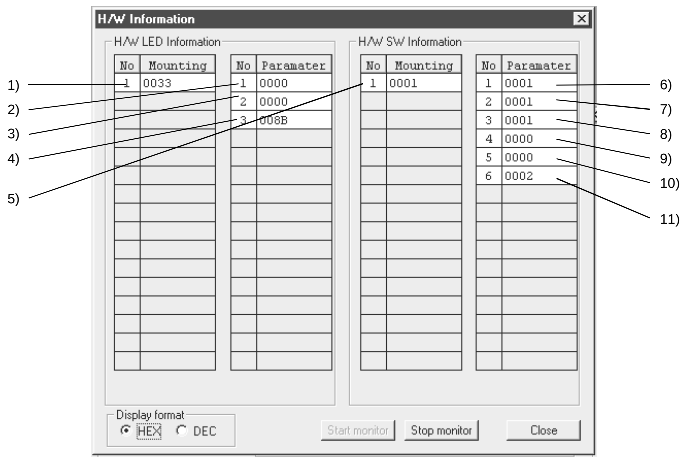
10) Mode number switch information
Displays the number of the mode actually set on the network module.
Display range: 0 to F.

11) For future expansion purposes

12) Dip number switch information
Displays the station type, the controlled station operations during recovery, and the transmission mode set up in the network module.

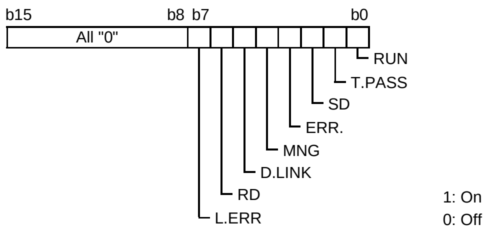


(3) When the network module: function version A and the GX Developer: prior to SW5D5C-GPPW are combined

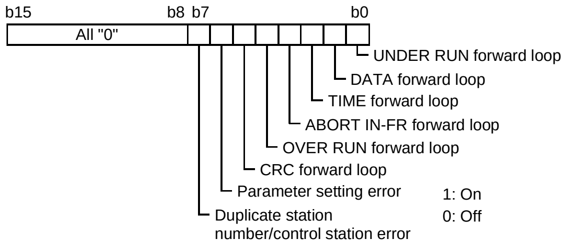


Each item displays the following information.

1) Actual LED1 information
Displays the on/off status of the LEDs that are used in the network module.



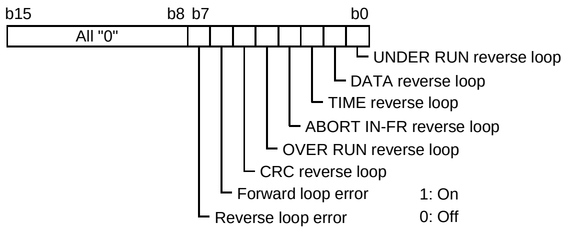
2) LED1 information
Displays the information of the LEDs that are turned on by the network module. The contents are displayed in the following manner:
- "UNDER RUN forward loop" to "CRC forward loop" display the information of errors that have occurred on the forward loop side. The "L. ERR" of 1) Actual 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:

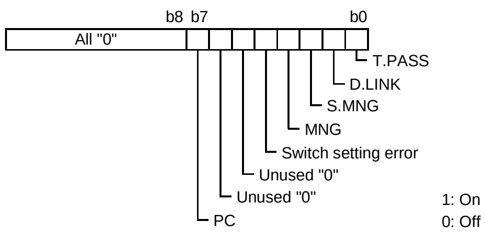
- "UNDER RUN reverse loop" to "CRC reverse loop" display information of errors that have occurred on the reverse loop side. The "L. ERR" of 1) Actual LED1 information turns on if either one of these errors have occurred (corresponding LED information turns on) or the "UNDER RUN forward loop" to "CRC 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.



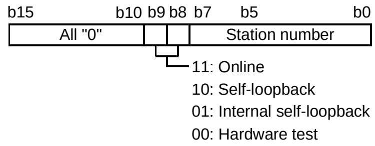
4) LED3 information

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 an inter-PC network. (1: fixed)



5) Acutal 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

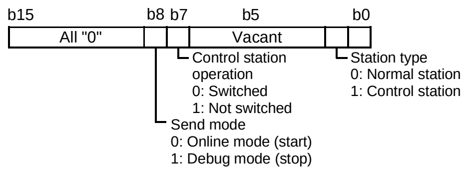
7) Group number switch information
Displays the group number set for the network module.
Display range: 0 to 32

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.



APPENDIX

Appendix-1 Comparison of network module specifications, and compatibility

Appendix 1.1 The MELSECNET/10 Mode and Specifications of the MELSECNET/H Mode: Comparison List

The MELSECNET/H supports both the MELSECNET/H mode (high functionality/high-speed mode) and the MELSECNET/10 mode (functional compatibility/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.
Moreover, this manual is written assuming that the MELSECNET/H is used in the MELSECNET/H mode. To use the MELSECNET/H in the MELSECNET/10 mode, see the QnA/Q4AR Corresponding MELSECNET/10 Network System Reference Manual.

Table 1

Specification item \ Selected mode		MELSECNET/H network system: MELSECNET/H mode	MELSECNET/H network system: MELSECNET/10 mode
Transmission type		Coaxial bus type/optical (SI) loop type	
Maximum number of link points	I/O (LX, LY)	8,192 points	
	Link relay (LB)	16,383 points	8,192 points
	Link register (LW)	16,383 points	8,192 points
Maximum number of link points per station		LB + LW + LY ≤ 2,000 bytes	
Transient transmission data size		Maximum 1,920 bytes/frame	Maximum 960 bytes/frame
Communication speed		25 Mbps/10 Mbps (from switch setting)	10 Mbps
Link scan time		[Communication speed 10 Mbps] KB + (0.45 × total number of stations) + (total number of bytes used in the 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		[coaxial bus type] 500 m (1640.5 ft.) : 5C-2V 300 m (984.3 ft.) : 3C-2V	/[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
Maximum number of networks		239	
Maximum number of groups		32	9
Maximum number of connected stations		32 stations (1: control station1, 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	
32 bits data guarantee		Supported	Not supported
Block guarantee per station		Supported	Not supported
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
Low-speed cyclic transmission function		Yes	No
Maximum number of refresh parameters that can be set (excluding SB, SW)		64/module	3/module
Network connection applicable CPU		QCPU (Q mode)	QCPU (Q mode) QCPU-A (A mode) QnACPU ACPU

App.

Appendix 1.2 Compatibility between function version B and function version A

This section provides explanations on the compatibility between function version B and function version A QJ71LP21/QJ71BR11 network modules.

Compatibility exists within the range of function version B and function version A.
There is no necessity to amend the parameters, the programs or the switch settings when overwriting function version A for function version B on the network module.

The following functions have been added or amended with function version B over function version A.

1) Supports multiple PLC systems
2) Special link instructions added (four instructions)
3) Data length of the special link instructions amended (480 words → 960 words)

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

Item \ Model name	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 H × W × D (mm (in.))	98 (3.86) × 27.4 (1.08) × 90 (3.54)	AJ71QLP21, AJ71QLP21G : 250 (9.84) × 37.5 (1.48) × 111 (4.37) AJ71QBR11: 250 (9.84) × 37.5 (1.48) × 113 (4.45)		A1SJ71QLP21: 130 (5.12) × 34.5 (1.36) × 93.6 (3.69) A1SJ71QBR11: 130 (5.12) × 34.5 (1.36) × 104.6 (4.12)	
Weight (kg)	0.11	0.45		0.3	

∗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 parameters 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 use 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 turns on/off by various factors that occur during data linking. Thus, by monitoring or using it in the sequence program, the abnormal status of the data link can be checked.
Moreover, the link special relay (SB) 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, see Section 8.1, "Network Diagnostics (Line Monitor)."
When multiple network modules are installed, the SB of each network module is refreshed to the corresponding SB of the CPU module if each network module's refresh parameters are not set. If the refresh parameters are set for at least one network module, the refresh parameters of all the network modules should be reviewed.

Module installing position	Module 1	Module 2	Module 3	Module 4
Device number	SB000 to 1FF	SB200 to 3FF	SB400 to 5FF	SB600 to 7FF

In the link special relay, 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 unit mounting position is unit 1.)

Table 3 Special link relay (SB) list

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
SB0000 (0)	Link startup (host) ＊1	Restarts the host's cyclic transmission. Off: Start not instructed On: Start instructed (valid at rise) ＊2	○	○	○	○	○	○	○	○
SB0001 (1)	Link stop (host) ＊1	Stops the host's cyclic transmission. Off: Stop not instructed On: Stop instructed (valid at rise) ＊2	○	○	○	○	○	○	○	○
SB0002 (2)	System link startup ＊1	Restarts the cyclic transmission according to the contents of SW000 to SW004. Off: Start not instructed On: Start instructed (valid at rise) ＊2	○	○	○	○	○	○	○	○
SB0003 (3)	System link stop ＊1	Stops the cyclic transmission according to the contents of SW000 to SW004. Off: Stop not instructed On: Stop instructed (valid at rise) ＊2	○	○	○	○	○	○	○	○
SB0005 (5)	Clear retry count	Clears the retry count (SW0C8 to SW0C9) to 0. Off: Clear not instructed On: Clear instructed (valid when on) ＊2	○	○	○	○	○	○	○	○
SB0006 (6)	Clear communication error count ＊1	Clears the communication error (SW0B8 to SW0C7) to 0. Off: Clear not instructed On: Clear instructed (valid when on) ＊2	○	○	○	○	○	○	○	○

[Availability column] Optical: optical loop, Coaxial: coaxial bus
○: Available, ×: Not available

＊1: Used in the network tests of peripheral devices.
＊2: SB0000 to SB0003 become valid when only one point turns on.

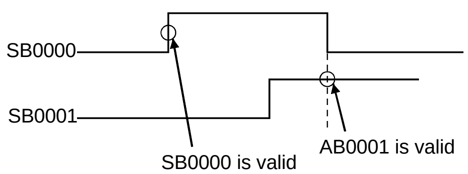
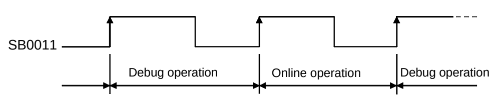


Table 3 Special link relay (SB) list (Continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
SB0007 (7)	Clear forward loop transmission errors	Clears the line abnormal detection (SW0CC) of the forward loop side to 0. Off: Clear not instructed On: Clear instructed (valid when on) *2	○	×	○	×	○	×	○	×
SB0008 (8)	Clear reverse loop transmission errors	Clears the line abnormal detection (SW0CD) 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 (SW0CE to 0E7) to 0. Off: Clear not instructed On: Clear instructed (valid when on)	○	×	○	×	○	×	○	×
SB000A (10)	Clear transient transmission errors	Clears the transient transmission errors (SW0EE, SW0EF) 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 (SW0F0 to SW0FF). Off: Overwrite On: Retain	○	○	○	○	○	○	○	○
SB00011 (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). 	○	○	○	○	○	○	○	○
SB00020 (32)	Module status	Indicates the network module status. Off: Normal On: Abnormal	○	○	○	○	○	○	○	○
SB00040 (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	○	○	○	○	○	○	○	○
SB0042 (66)	Power supply status of host	Indicates the external power supply status to QJ71LP21S-25. (When using QJ71LP21-25, 0 is ON.) 0: Not supplied 1: Supplied	○	×	○	×	○	×	×	×
SB00043 (67)	Online switch (host)	Indicates the mode set by the switch of the host's network module. Off: Online (mode setting is 0 or 4); "Parameter setting mode becomes valid" On: Other than online (mode setting is other than 0)	○	○	○	○	○	○	○	○
SB00044 (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 On: Remote master station	×	×	×	×	○	○	○	○
SB00045 (69)	Setting information (host)	Indicates the switch setting information (including parameter settings) of the host's network module. Off: Normal On: Abnormal setting	○	○	○	○	○	○	○	○
SB00046 (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	○	○	○	○	○	○	○	○

*6: The SB0009 should be kept on until the SW00CE becomes "0."

Table 3 Special link relay (SB) list (Continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
SB00047 (71)	Baton pass status (host)	Indicates the host's baton pass status (transient transmission enabled). Off: Normal On: Abnormal	○	○	○	○	○	○	○	○
＊3 SB0048 (72)	Control station status (host)	When PLC to PLC network Indicates the host's status. (Valid when the SB0047 is off.) 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 (Enabled when SB0047 is off.) Off: Remote I/O station On: Remote master station	×	×	×	×	○	○	○	○
＊3 SB0049 (73)	Host data link status	Indicates the host's data link operation status. Off: Normal On: Abnormal (Set after refreshing completes.)	○	○	○	○	○	○	○	○
＊3 ＊4 SB004A (74)	Host CPU status (1)	Indicates the host's CPU status. Off: Normal On: Minor error occurred	○	○	○	○	○	○	—	—
＊3 ＊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	Indicates the startup acknowledgment status of the cyclic transmission. Off: Not acknowledged (SB0000 is off) On: Stop acknowledged (SB0000 is on)	○	○	○	○	○	○	○	○
＊3 SB004D (77)	Cyclic transmission start completion status	Indicates the completion status of the cyclic transmission. Off: Not completed (SB0000 is off) On: Start completed (SB0000 is on)	○	○	○	○	○	○	○	○
＊3 SB004E (78)	Cyclic transmission stop acknowledgment status	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	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	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	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	Indicates the stop acknowledgment status of the cyclic transmission. Off: Not acknowledged (SB0003 is off) On: Start acknowledged (SB0003 is on)	○	○	○	○	○	○	○	○
＊3 SB0053 (83)	Cyclic transmission stop completion status	Indicates the stop completion status of the cyclic transmission. Off: Not completed (SB0003 is off) On: Stop completed (SB0003 is on)	○	○	○	○	○	○	○	○
＊3 SB0054 (84)	Parameter receive status	Indicates the parameter receive status. Off: Receive completed On: Not received	○	○	○	○	○	○	○	○
＊3 SB0055 (85)	Received parameter error	Indicates the status of the received parameters. Off: Parameters normal On: Parameters abnormal	○	○	○	○	○	○	○	○

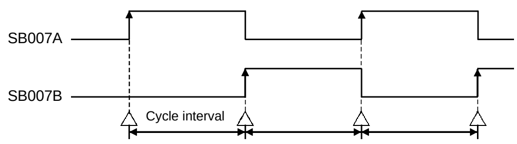
＊3: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.
＊4: Minor errors (battery error, etc.) are the type of errors that do not affect the CPU operation.
＊5: Serious errors (WDT error, etc.) are the type of errors that stop the CPU operation.
Fatal errors (RAM error, etc.) are also the type of errors that stop the CPU operation (error code 11□ □).

Table 3 Special link relay (SB) list (Continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
∗3 SB0056 (86)	Communication status	Indicates the status of the transient transmission. (Valid when the SB0047 is off.) 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)	Sub-control station link	Indicates the cyclic transfer status when the control station is down. Off: Cyclic transmission by the sub-control station On: No cyclic transmission by the sub-control station	○	○	○	○	×	×	×	×
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	○	○	○	○	○	○	○	○
∗3 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 Turns off when the SW0064 to SW0067 are all "0."	○	○	○	○	○	○	○	○
∗3 SB0068 (104)	Communication mode	Indicates the link scan mode (status of supplemental settings of the common parameters). (Valid when the SB0049 is off.) Off: Normal mode On: Constant scan mode	○	○	○	○	○	○	○	○
∗3 SB0069 (105)	Multiplex transmission designation	Indicates the transmission designation status (status of supplemental 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	○	×	○	×	○	×	○	×
∗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 Turns off when the SW0070 to SW0073 are all "0."	○	○	○	○	○	○	○	○
∗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 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 Turns off when the SW0074 to SW0077 are all "0."	○	○	○	○	○	○	○	○
∗3 SB0075 (120)	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 transimission error.	×	×	×	×	○	○	○	○
∗3 SB0078 (120)	Parameter 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 Turns off when the SW0078 to SW007B are all "0."	○	○	×	×	○	○	×	×

∗3: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.

Table 3 Special link relay (SB) list (Continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
＊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)	Low-speed cyclic communication status									
＊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 Turns off when the SW007C to SW007F are all "0."	○	○	×	×	○	○	×	×
＊5 SB0080 (128)	CPU operation status of each station	Indicates the CPU operation status of each station (including the host). Off: No serious or fatal errors On: Stations with serious or fatal errors exist Turns off when the SW0080 to SW0083 are all "0."	○	○	○	○	×	×	×	×
＊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) Turns off when the SW0084 to SW0087 are all "0."	○	○	○	○	×	×	×	×
＊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	×	×	×	×	○	○	○	○
＊4 SB0088 (136)	CPU operation status of each station	Indicates the CPU operation status of each station (including the host). Off: No minor error stations On: Stations with minor errors exist Turns off when the SW0088 to SW008B are all "0."	○	○	○	○	×	×	×	×
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 Turns off when the SW008C to SW008F are all "0."	○	×	○	×	×	×	×	×
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	○	○	○	○	×	×	×	×
＊3 SB0090 (144)	Host loop status	Indicates the host's loop status. Off: Normal On: Abnormal Turns off when the SW0090 is all "0."	○	×	○	×	○	×	○	×
＊3 SB0091 (145)	Forward loop status	Indicates the status of stations connected to the forward loop. Off: All stations normal On: Faulty stations exist Turns off when the SW0091 to SW0094 are all "0."	○	×	○	×	○	×	○	×
＊3 SB0092 (146)	Forward loop status of the remote master station	Indicates the status of stations connected to the forward loop. Off: All stations normal On: Faulty stations exist Turns off when the SW0091 to SW0094 are all "0."	○	×	○	×	○	×	○	×

＊3: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.
＊4: Minor errors (battery error, etc.) are the type of errors that do not affect the CPU operation.
＊5: Serious errors (WDT error, etc.) are the type of errors that stop the CPU operation.
Fatal errors (RAM error, etc.) are also the type of errors that stop the CPU operation (error code 11□□).

Table 3 Special link relay (SB) list (Continued)

No.	Name	Description	Use permitted/prohibited: Control station Optical	Control station Coaxial	Normal station Optical	Normal station Coaxial	Remote master station Optical	Remote master station Coaxial	Remote I/O station Optical	Remote I/O station Coaxial
＊3 SB0095 (149)	Reverse loop status	Indicates the status of stations connected to the reverse loop. Off: All stations normal On: Faulty stations exist Turns off when the SW0095 to SW0098 are all "0".	○	×	○	×	○	×	○	×
＊3 SB0096 (150)	Reverse loop status of the remote master station	Indicate 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)	○	×	○	×	○	×	○	×
＊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	○	○	○	○	○	○	○	○
＊3 SB00A0 (160)	RECV instruction execution request flag (1)	Indicates the RECV instruction's execution request status. (Channel 1) Off: No execution request On: Execution requested	○	○	○	○	×	×	×	×
＊3 SB00A1 (161)	RECV instruction execution request flag (2)	Indicates the RECV instruction's execution request status. (Channel 2) Off: No execution request On: Execution requested	○	○	○	○	×	×	×	×
＊3 SB00A2 (162)	RECV instruction execution request flag (3)	Indicates the RECV instruction's execution request status. (Channel 3) Off: No execution request On: Execution requested	○	○	○	○	×	×	×	×
＊3 SB00A3 (163)	RECV instruction execution request flag (4)	Indicates the RECV instruction's execution request status. (Channel 4) Off: No execution request On: Execution requested	○	○	○	○	×	×	×	×
＊3 SB00A4 (164)	RECV instruction execution request flag (5)	Indicates the RECV instruction's execution request status. (Channel 5) Off: No execution request On: Execution requested	○	○	○	○	×	×	×	×
＊3 SB00A5 (165)	RECV instruction execution request flag (6)	Indicates the RECV instruction's execution request status. (Channel 6) Off: No execution request On: Execution requested	○	○	○	○	×	×	×	×
＊3 SB00A6 (166)	RECV instruction execution request flag (7)	Indicates the RECV instruction's execution request status. (Channel 7) Off: No execution request On: Execution requested	○	○	○	○	×	×	×	×
＊3 SB00A7 (167)	RECV instruction execution request flag (8)	Indicates the RECV instruction's execution request status. (Channel 8) Off: No execution request On: Execution requested	○	○	○	○	×	×	×	×
＊3 SB00A8 (168)	Online test instruction	Indicates the online test instruction status. Off: Not instructed On: Instructed	○	○	○	○	○	○	○	○

＊3: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.

Table 3 Special link relay (SB) list (Continued)

No.	Name	Description	Use permitted/prohibited							
			Control station		Normal station		Remote master station		Remote I/O station	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
＊3 SB00A9 (169)	Online test completion	Indicates the online test completion status. Off: Not completed On: Completed	○	○	○	○	○	○	○	○
＊3 SB00AA (170)	Online test response instruction	Indicates the online test response status. Off: No response On: Responded	○	○	○	○	○	○	○	○
＊3 SB00AB (171)	Online test response completion	Indicates the online test response completion status. Off: Response not completed On: Response completed	○	○	○	○	○	○	○	○
＊3 SB00AC (172)	Offline test instruction	Indicates the offline test instruction status. Off: Not instructed On: Instructed	○	○	○	○	○	○	○	○
＊3 SB00AD (173)	Offline test completion	Indicates the offline test completion status. Off: Not completed On: Completed	○	○	○	○	○	○	○	○
＊3 SB00AE (174)	Offline testing Response designation	Indicates the response status for offline test. Off: No response On: Response	○	○	○	○	○	○	○	○
＊3 SB00AF (175)	Offline testing Response end	Indicates the response status for offline test end. Off: No response end On: Response end	○	○	○	○	○	○	○	○
＊3 SB00EE (238)	Transient error	Indicates the transient transmission error status. Off: No error On: Errors exist	○	○	○	○	○	○	○	○

＊3: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.

Appendix 4 Link Special Register (SW) List

In the link special register, 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, see Section 8.1, "Network Diagnostics (Line Monitor)."
When multiple network modules are installed, the SW of each network module is refreshed to the corresponding SW of the CPU module if each network module's refresh parameters are not set. If the refresh parameters are set for at least one network module, the refresh parameters of all the network modules should be reviewed.

Module installing position	Module 1	Module 2	Module 3	Module 4
Device number	SW000 to 1FF	SW200 to 3FF	SW400 to 5FF	SW600 to 7FF

Table 4 Link special register (SW) list

<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>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th></tr>
<tr><td>SW0000
(0)</td><td>∗1
Link stop/startup direction content</td><td>Sets the station that stops/restarts data linking.
00H: Host
01H: All stations
02H: Designated station
80H: Host (forced stop/restart)
81H: All stations (forced stop /restart)
82H: Designated station (forced stop /restart)</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>SW0001
(1)/
SW0002
(2)/
SW0003
(3)/
SW0004
(4)</td><td>∗1
Link stop/startup direction content</td><td>Sets whether the designated station should execute data linking. (When the SW0000 is 02H or 82H.)
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
<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>SW0001</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>SW0002</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>SW0003</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>SW0004</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>
The 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>SW0008
(8)</td><td>Logical channel setting (channel 1)</td><td>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.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>SW0009
(9)</td><td>Logical channel setting (channel 2)</td><td>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.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>SW000A
(10)</td><td>Logical channel setting (channel 3)</td><td>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.</td><td>○</td><td>○</td><td>○</td><td>○</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
</table>

[Availability column] Optical: optical loop, Coaxial: coaxial bus
○: Available, ×: Not available

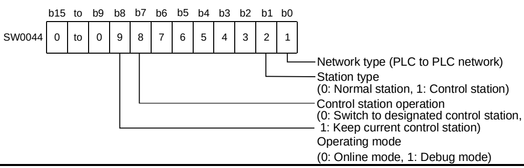
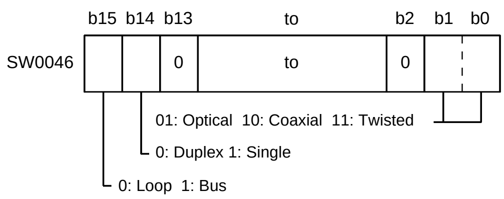
∗1: Used in the network test of GX Developer.

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	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
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.	○	○	○	○	×	×	×	×
SW0020 (32)	Module status	Stores the status of the network module. 0 : Normal Other than 0 : Abnormal (see the error codes in Section 8.3) FF : Module error	○	○	○	○	○	○	×	×
SW0031 (49)	ZNRD instruction processing result	Indicates the processing result of the ZNRD instruction. 0 : Normal completion Other than 0 : Abnormal completion (see 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 (see 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 (see 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 (see 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 (see the error codes in Section 8.3)	○	○	○	○	○	○	×	×

＊2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is 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	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
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 (see the error codes in Section 8.3)	○	○	○	○	○	○	×	×
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 (see 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 (see 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 (see 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 (see 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 number of the host. Range: 1 to 64	○	○	○	○	○	○	○	○
SW0043 (67)	Mode status	Stores the mode status of the host. 0 : Online 2 : Offline 3 or more : Applicable test	○	○	○	○	○	○	○	○
SW0044 (68)	Station setting	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. 	○	○	○	○	○	○	○	○

＊2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is 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	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
SW0047 (71)	Baton pass status	Stores the baton pass status of the host. 0 : Executing data linking 1 : Data linking stopped (instructed by other station) 2 : Data linking stopped (instructed by host) 3 : Executing baton pass (parameter received) 4 : Executing baton pass (parameter received) 5 : Executing baton pass (parameter not received) 6 : Being disconnected (no baton pass) 7 : Being disconnected (line error) 11H: Loop test 12H: Setup confirmation test 13H: Station order check test 14H: Communication test 1FH: 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 (see the error codes in Section 8.3)	○	○	○	○	○	○	○	○
＊2 SW0049 (73)	Cause of data link transmission 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.) b15 b14 to b7 b6 b5 b4 b3 b2 b1 b0 SW004A | | 0 | to | 0 | | | | | | | | b0 to b6 → 0: Host 1 to 64: Station numbe b15 → 0: Station number designated 1: All stations designated	○	○	○	○	○	○	○	○
＊2 SW004B (75)	Host CPU status	Indicates the CPU status of the host. 0 : Normal Other than 0 : Abnormal (For the error codes, see Section 8.3 of this manual or the "Error Code" chapter of QCPU User's Manual (Hardware Design/Maintenance Inspection).)	○	○	○	○	○	○	×	×
＊2 SW004D (77)	Data linking start status (host)	Stores the result of the data linking start. 0 : Normal Other than 0 : Abnormal (see the error codes in Section 8.3)	○	○	○	○	○	○	○	○
＊2 SW004F (79)	Data linking stop status (host)	Stores the result of the data linking stop. 0 : Normal Other than 0 : Abnormal (see the error codes in Section 8.3)	○	○	○	○	○	○	○	○
＊2 SW0051 (81)	Data linking start status (entire system)	Stores the result of the data linking start. 0 : Normal Other than 0 : Abnormal (see the error codes in Section 8.3)	○	○	○	○	○	○	○	○

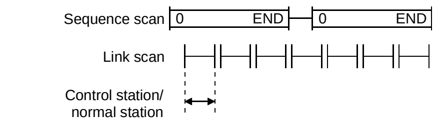
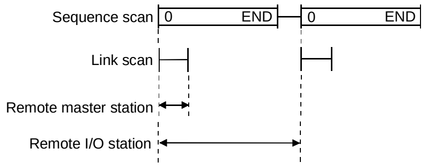
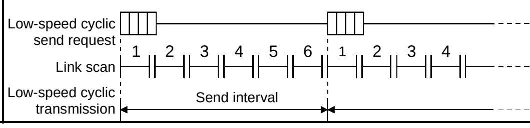
＊2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.

Table 4 Link special register (SW) list (Continued)

No.	Name	Description	Use permitted/prohibited: Control station Optical	Control station Coaxial	Normal station Optical	Normal station Coaxial	Remote master station Optical	Remote master station Coaxial	Remote I/O station Optical	Remote I/O station Coaxial
∗1 SW0053 (83)	Data linking stop status (entire system)	Stores the result of the data linking stop. 0 : Normal Other than 0 : Abnormal (see the error codes in Section 8.3)	○	○	○	○	○	○	○	○
∗2 SW0054 (84)	Parameter information	At the PLC to PLC network. Stores the parameter information. (When the SB0054 and SB0055 are off.) b15 b14 to b2 b1 b0 [| 0 | to | 0 | |] 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.) b15 b4 b3 b2 b1 b0 [0 to 0 | 0 | 1 | 1 | 1 | 1] = 0FH: Parameter error Check the error code in the SW055.	○	○	○	○	—	—	—	—
		When remote I/O netork Stores the parameter information. (When the SB0054 and SB0055 are off.) b15 to b3 b2 b1 b0 [0 | to | 0 | | 0 | 0] Intelligent function module parameter 0: No 1: Yes	—	—	—	—	×	×	○	○
∗2 SW0055 (85)	Parameter setting status	Stores the status of the parameters. 0 : Normal parameter 1 or more : Abnormal parameter (see the error codes in Section 8.3)	○	○	○	○	○	○	○	○
∗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. 7DH : Remote master station Other than 7DH : Controller station number	×	×	×	×	○	○	○	○
∗2 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. 7DH : Remote master station Other than 7DH : Remote master station error.	×	×	×	×	○	○	○	○
∗2 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	○	○	○	○	○	○	○	○
∗2 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.	○	○	○	○	×	×	×	×
∗2 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.	○	○	○	○	×	×	×	×

∗2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is 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	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
*2 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.	○	○	○	○	○	○	○	○
*2 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.	○	○	○	○	○	○	○	○
*2 SW006B (107)	Maximum link scan time	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 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) 	○	○	○	○	○	○	○	○
*2 SW006C (108)	Minimum link scan time		○	○	○	○	○	○	○	○
*2 SW006D (109)	Current link scan time		○	○	○	○	○	○	○	○
*2 SW006E (110)	Low-speed cyclic scan time	Stores the number of link scans in the send interval of the low-speed cyclic transmission. 	○	○	○	○	×	×	×	×

*2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is 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>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th></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><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>to</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></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>
<tr><td>*2
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><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>to</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></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.</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><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>to</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></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><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>to</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></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>

*2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is 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>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th></tr>
<tr><td>＊2
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 SW70 to SW73.
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).
Valid only for stations registered as normal in the SW70 to SW73.
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
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 SW70 to SW73.
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>
<tr><td>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.)
0: Without external power supply (Including stations reserved or numbered greater than the maximum)
1: With external power supply</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>＊2
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>
</table>

＊2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is 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>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th></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>
<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 number of stations executing the loopback on the forward loop side.
Range: 1 to 64</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 number of stations executing the loopback on the reverse loop side.
Range: 1 to 64</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>SW009C
(156)/
SW009D
(157)/
SW009E
(158)/
SW009F
(159)</td><td>Loop usage status of each station</td><td>Stores the loop usage status during transmission at each station, separately for each of the forward and reverse loops.
0: Using the forward loop side (including the stations with the maximum station number and smaller numbers as well as reserved stations)
1: Using the reverse loop side
<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>
</table>

＊2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is 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	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
*2 SW00A8 (168)	Online test execution item/faulty station (requesting side)	Stores both the online test item requested by the requesting station and the faulty station. Valid when the SB00A9 is on. SW00A8: b15 to b8: Faulty station number; b7 to b0: Test item number (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	○	○	○	○	○	○	○	○
*2 SW00A9 (169)	Online test result (requesting side)	Stores the online result on the requesting side. (Valid when the SB00A9 is on.) 0 : Test normal Other than 0 : Test error content (see the error codes in Section 8.3)	○	○	○	○	○	○	○	○
*2 SW00AA (170)	Online test execution item (responding side)	Stores the online test items on the responding side. (Valid when the SB00AB is on.) SW00AA: b15 = 0, to, b8 = 0; b7 to b0: Item number 10H: Loop test 20H: Setup confirmation test 30H: Station order check test 40H: Communication test	○	○	○	○	○	○	○	○
*2 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 (see the error codes in Section 8.3)	○	○	○	○	○	○	○	○
*2 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. SW00AC: b15 to b8: Maximum faulty station number; b7 to b0: Item number 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	○	○	○	○	○	○	○	○
*2 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 (see the error codes in Section 8.3)	○	○	○	○	○	○	○	○

*2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is 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>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th></tr>
<tr><td>＊2
SW00AE
(172)</td><td>Off-line testing Execution item (Response side)</td><td>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.
<table><tr><td></td><td>b15</td><td>to</td><td>b8</td><td>b7</td><td>to</td><td>b0</td></tr><tr><td>SW00AA</td><td>0</td><td>to</td><td>0</td><td></td><td>to</td><td></td></tr></table>Item number
3: Loop test (forward loop)
4: Loop test (reverse loop)</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊2
SW00AF
(173)</td><td>Off-line testing results (Response side)</td><td>Stores results of request-side offline test.
(Enabled when SB00AF is on.)
0 : Test normal
Other than 0 : Test error content (see 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>
<tr><td>＊2
SW00B0
(176)/
SW00B1
(177)/
SW00B2
(178)/
SW00B3
(179)</td><td>Multiplex transmission status (1)</td><td>Stores each station's forward loop usage status during multiplex transmission.
0: Uses other than the forward loop
1: Uses the forward loop
<table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>to</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW00B0</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>SW00B1</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>SW00B2</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>SW00B3</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
SW00B4
(180)/
SW00B5
(181)/
SW00B6
(182)/
SW00B7
(183)</td><td>Multiplex transmission status (2)</td><td>Stores each station's reverse loop usage status during multiplex transmission.
0: Uses other than the reverse loop
1: Uses the reverse loop
<table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>to</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW00B4</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>SW00B5</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>SW00B6</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>SW00B7</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 ＊3
SW00B8
(184)</td><td>UNDER on the forward loop side</td><td>Accumulates and stores the number of "UNDER" errors on the forward loop side.
Other than 0: Number of errors</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊2 ＊3
SW00B9
(185)</td><td>CRC on the forward loop side</td><td>Accumulates and stores the number of "CRC" errors on the forward loop side.
Other than 0: Number of errors</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊2 ＊3
SW00BA
(186)</td><td>OVER on the forward loop side</td><td>Accumulates and stores the number of "OVER" errors on the forward loop side.
Other than 0: Number of errors</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>＊2 ＊3
SW00BB
(187)</td><td>Short frame on the forward loop side</td><td>Accumulates and stores the number of "Short frame" errors on the forward loop side.
Other than 0: Number of errors</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
</table>

＊2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.
＊3: Turn on the SB0006 to reset from the SW00B8 through SW00C7.
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	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
＊2 ＊3 SW00BC (188)	Abort on the forward loop side (AB, IF)	Accumulates and stores the number of "AB.IF" errors on the forward loop side. Other than 0: Number of errors	○	○	○	○	○	○	○	○
＊2 ＊3 SW00BD (189)	Timeout on the forward loop side (TIME)	Accumulates and stores the number of "TIME" errors on the forward loop side. Other than 0: Number of errors	○	○	○	○	○	○	○	○
＊2 ＊3 SW00BE (190)	Receiving 2k bytes or more on forward loop side (DATA)	Accumulates and stores the number of "DATA" errors on the forward loop side. Other than 0: Number of errors	○	○	○	○	○	○	○	○
＊2 ＊3 SW00BF (191)	DPLL error on the forward loop side	Accumulates and stores the number of "DPLL" errors on the forward loop side. Other than 0: Number of errors	○	○	○	○	○	○	○	○
＊2 ＊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	○	○	○	○	○	○	○	○
＊2 ＊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	○	○	○	○	○	○	○	○
＊2 ＊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	○	○	○	○	○	○	○	○
＊2 ＊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	○	○	○	○	○	○	○	○
＊2 ＊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	○	○	○	○	○	○	○	○
＊2 ＊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	○	○	○	○	○	○	○	○
＊2 ＊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	○	○	○	○	○	○	○	○
＊2 ＊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	○	○	○	○	○	○	○	○
＊2 ＊4 SW00C8 (200)	Number of retries on the forward loop side	Accumulates and stores the number of retries on the forward loop side. Other than 0: Number of errors	○	○	○	○	○	○	○	○
＊2 ＊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	○	○	○	○	○	○	○	○
＊2 ＊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	○	×	○	×	○	×	○	×
＊2 ＊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	○	×	○	×	○	×	○	×

＊2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.
＊3: Turn on the SB0006 to reset from the SW00B8 through C7.
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: Turn on the SB0007 to reset the SW00CC.
＊6: Turn on the SB0008 to reset the SW00CD.

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>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th><th>Optical</th><th>Coaxial</th></tr>
<tr><td>＊2 ＊7
SW00CE
(206)</td><td>Number of loop switches</td><td>Accumulates and stores the number of loop checks conducted.
Other than 0: Number of loop switches</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>＊2 ＊7
SW00CF
(207)</td><td>Loop switch data pointer</td><td>Stores the pointer that indicates the next loop switch data.</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>＊2 ＊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 should be overwritten or retained is set in the common parameters.
<table><tr><td></td><td>b15</td><td>to</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SW00D0
to
SW00DF</td><td></td><td>to</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td colspan="3">Status after switching</td><td colspan="8">Cause</td></tr></table><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</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>＊2 ＊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.
<table><tr><td></td><td>b15 to b8</td><td>b7 to b0</td></tr><tr><td>SW00E0
to
SW00E7</td><td></td><td></td></tr><tr><td></td><td>Odd numbered switch station</td><td>Even numbered switch station</td></tr></table></td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>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/10H module
<table><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>to</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></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
(235)</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 (see 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>

＊2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.
＊7: Turn on the SB0009 to reset from the SW00CE through to SW00E7.
＊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.
＊9: Turn on the SB000A to reset from the SW00EE through SW00EF.

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	
			Optical	Coaxial	Optical	Coaxial	Optical	Coaxial	Optical	Coaxial
∗9 SW00EE (238)	Transient transmission error	Accumulates and stores the number of transient transmission errors. Other than 0: Number of errors	○	○	○	○	○	○	○	○
∗9 SW00EF (239)	Transient transmission error pointer	Stores the pointer that sets the data for the next transient transmission error.	○	○	○	○	○	○	○	○
∗2 SW00F0 (240) to SW00FF (255)	Transient transmission error history	Stores the error codes of the transient transmission errors (see the error codes in Section 8.3).	○	○	○	○	○	○	○	○

∗2: Valid only when the SB0047 is off. When it becomes on (abnormal), the previous data is retained.
∗9: Turn on the SB000A to reset from the SW00EE through SW00EF.

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WARRANTY

Please confirm the following product warranty details before starting use.

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 dealer or Mitsubishi Service Company.
Note that if repairs are required at a site overseas, on a detached island or remote place, expenses to dispatch an engineer shall be charged for.

[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 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 possible 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 chance loss and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to damages caused by any cause found not to be the responsibility of Mitsubishi, chance losses, lost profits incurred to the user by Failures of Mitsubishi products, damages and secondary damages caused from special reasons regardless of Mitsubishi's expectations, compensation for accidents, and compensation for damages to products other than Mitsubishi products and other duties.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

(1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.

(2) The Mitsubishi general-purpose programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or National Defense purposes shall be excluded from the programmable logic controller applications.
Note that even with these applications, if the user approves that the application is to be limited and a special quality is not required, application shall be possible.
When considering use in aircraft, medical applications, railways, incineration and fuel devices, manned transport devices, equipment for recreation and amusement, and safety devices, in which human life or assets could be greatly affected and for which a particularly high reliability is required in terms of safety and control system, please consult with Mitsubishi and discuss the required specifications.

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