Q Corresponding Ethernet Interface Module

User's Manual

(Application)

MITSUBISHI

Mitsubishi Programmable Controller

MELSEC-Q

QJ71E71-100
QJ71E71-B5
QJ71E71-B2

• SAFETY PRECAUTIONS •

(Always read before starting use.)

Before using this product, please read this manual 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 user's manual for the CPU module to use.
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

- For the operating status of each station after a communication failure, refer to relevant manuals for the network. Erroneous outputs and malfunctions may lead to accidents.
  Not doing so can cause an accident due to false output or malfunction.
- To prevent the malfunction of the programmable controller system due to harmful e-mails, take preventive measures (such as antivirus measures) so that the mail server for this module does not receive harmful e-mails.
- To maintain the safety of the programmable controller system against unauthorized access from external devices via the Internet, take appropriate measures.
- When changing data of the running programmable controller from a peripheral connected to the CPU module or from a personal computer connected to an intelligent function module or special function module, configure an interlock circuit in the sequence program to ensure that the entire system will always operate safely. For program modification and operating status change, read relevant manuals carefully and ensure the safety before operation.
  Especially in the above mentioned control operations that are performed from an external device to a remote programmable controller, any problems on the programmable controller side may not be dealt with promptly due to abnormal data communication. To prevent this, configure an interlock circuit in the sequence program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.

[Design Precautions]

⚠ DANGER

- Do not write any data in the "system area" of the buffer memory in the intelligent function module.
  Also, do not use any "use prohibited" signals as an output signal from the programmable controller CPU to the intelligent function module.
  Doing so may cause malfunction of the programmable controller system.

⚠ CAUTION

- Do not bundle the control wires and the communication cables with the main circuit and the power wires, and do not 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.
- When changing the operating status of the programmable controller CPU (such as remote RUN/STOP) from the external device, select "Always wait for OPEN (Communication possible at STOP time)" for the "Initial timing" setting in the network parameter. The communication line will be closed when "Do not wait for OPEN (Communications impossible at STOP time)" is selected and the remote STOP is executed from the external device. Consequently, the programmable controller CPU cannot reopen the communication line, and the external device cannot execute the remote RUN.

[Installation Precautions]

⚠ DANGER

- Use the programmable controller in an environment that meets the general specifications in the user's manual for the CPU module used. Using the programmable controller in any other operating environments may cause electric shocks, fires or malfunctions, or may damage or degrade the module.
- While pressing the installation lever located at the bottom of module, insert the module fixing tab into the fixing hole in the base unit until it stops. Then, securely mount the module with the fixing hole as a supporting point.
  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 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/dismounting the module, be sure to shut off all phases of external power supply used by the system.
  Failure to do so may cause product damage.
- Do not directly touch any conductive part or electronic component of the module.
  This may cause the module to malfunction or fail.

[Wiring Instructions]

⚠ CAUTION

- Connectors for external connection must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered.
  If the connection is incomplete, it may cause the module to short circuit, catch fire, or malfunction.
- Shut off the external power supply for the system in all phases before connecting the AUI cable.
- When connecting a cable with connector to the module, connect the connector part to the module securely.
- 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 be unstable or moved, and they may be pulled inadvertently.
  This may damage the module and the cables or cause the module to malfunction because of faulty cable connections.
- Tighten the terminal screws using the specified torque. If the terminal screws are loose, it may cause the module to short-circuit, malfunction or fall off. If the terminal screws are tightened excessively, it may damage the screws and cause the module to short-circuit, malfunction or fall off.
- 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 the cable.
- Be careful not to let any foreign matter such as wire chips get inside the module. They may cause fire, as well as breakdowns and malfunctions of the module.
- A protective sheet is pasted on the upper part of the module in order to prevent foreign matter such as wire chips to get inside the module while wiring.
  Do not remove this protective sheet during wiring work. However, be sure to remove the protective sheet before operating the module to allow heat radiation during operation.
- Correctly solder coaxial cable connectors. Incomplete soldering may result in malfunction.

[Setup and Maintenance Precautions]

⚠ CAUTION
• Never disassemble or modify the module. This may cause breakdowns, malfunctions, injuries or fire. • Before mounting/dismounting the module, be sure to shut off all phases of external power supply used by the system. Failure to do so may cause module failure or malfunctions. • Do not mount/remove the module onto/from base unit more than 50 times (IEC 61131-2 compliant), after the first use of the product. Failure to do so may cause the module to malfunction due to poor contact of connector. • Do not touch the terminals while the power is on. Doing so may cause electric shocks or malfunctions. • Before cleaning up and retightening terminal screws and module fixing screws, be sure to shut off all phases of external power supply used by the system. Not doing so may cause failure or malfunction of the module. If the screws are loose, it may cause the module to fallout, short circuits, or malfunction. If the screws are tightened too much, it may cause damages to the screws and/or the module, resulting in the module falling out, short circuits or malfunction. • Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module. Failure to do so may cause a failure or malfunctions of the module.

[Operating Precautions]

⚠ CAUTION
• When changing data and operating status, and modifying program of the running programmable controller from a personal computer connected to an intelligent function module, read relevant manuals carefully and ensure the safety before operation. Incorrect change or modification may cause system malfunction, damage to the machines, or accidents.

[Precautions When Disposing of This Product]

⚠ CAUTION
• Dispose of this product as an industrial waste.

REVISIONS

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

Print Date	* Manual Number	Revision
Dec., 1999	SH(NA)-080010-A	First edition
Oct., 2000	SH(NA)-080010-B	Reflect the contents of the function version B. Put Windows® base software products together from Mitsubishi Programmable Controller MELSEC series to Mitsubishi integrated FA software MELSOFT series. Standardize the name from software package (GPP function) to product name (GX Developer). [Correction] Entire manual (change MELSECNET/10H to MELSECNET/H), Contents, About Manuals, About the Generic Terms and Abbreviations, Chapter 1 (entire), Section 1.2 (POINT), Section 2.1, 2.5 (2), 2.6.1, 2.6.2, 2.7.1, 2.7.2, Section 3.2.1 (2). 3.3.3 (4), Section 4.1, 4.3, 4.5.2, Section 5.1.1, 5.2, 5.3, 5.4, 5.5, 5.6.1, 5.6.1 (2) 2), 5.6.2, 5.6.4, Section 6.2 to 6.8, 6.9 (POINT before the function), 6.10 to 6.14 [Addition] Entire manual (add the explanation on MELSECNET/H remote I/O station), Section 4.3 (4), Chapter 5 POINT
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Japanese Manual Version SH-080005-P

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INTRODUCTION

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

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ABOUT MANUALS

The following manuals are also related to this product.

If necessary, order them by quoting the details in the tables below.

Related Manuals

Manual name	Manual number (Model code)
Q Corresponding Ethernet Interface Module User's Manual (Basic) This manual explains the specifications of the Ethernet module, data communication procedures with external devices, line connections (open/close), fixed buffer communication, random access buffer communication, and troubleshooting. (Sold separately)	SH-080009 (13JL88)
Q Corresponding Ethernet Interface Module User's Manual (Web function) This manual explains how to use the Web function of the Ethernet module. (Sold separately)	SH-080180 (13JR40)
Q Corresponding MELSEC Communication Protocol Reference Manual This manual explains the communication methods and control procedures through the MC protocol for the external devices to read and write data from/to the programmable controller CPU using the serial communication module/Ethernet module (Sold separately)	SH-080008 (13JF89)

● How to use this manual

In this manual, explanations are given for each special function of the Ethernet modules (QJ71E71-100, QJ71E71-B5 and QJ71E71-B2). Please use this manual using the following key items below as a reference.

(1) To learn about an overview of the special functions

- Chapter 1 provides an overview of each of the special functions available for the Ethernet modules.

(2) To use the e-mail transmission/reception function and the programmable controller CPU monitoring function

- Section 2.2 describes the environment in which e-mails can be used.
- Section 2.6 illustrates the screens for parameter settings using GX Developer in order to use the e-mail function.
- Section 2.9 describes the parameter settings in order to monitor the status of the programmable controller CPU.

(3) To communicate with programmable controller CPUs of other stations via the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 and Ethernet module

- Section 3.2 describes the accessible range and accessible stations when accessing other stations via the Ethernet modules.
- Section 3.3 describes the parameter settings using GX Developer in order to perform data communication with the programmable controller CPUs of other stations.
- Section 3.3.2 provides an overview of the processing for Station No. <-> IP information conversion.

(4) To use the file transfer (FTP) function

- Section 5.3 describes the parameter settings using GX Developer in order to perform the file transfer.
- Section 5.6 describes the FTP operation command on the FTP client (external device) side that is supported by the Ethernet module.

POINT

To know about the following items, see the Ethernet Interface Module User's Manual (Basic).

(1) Detailed descriptions of the error codes
Chapter 11 describes troubleshooting, how to check for errors, and detailed descriptions of error codes for the Ethernet modules.

(2) Storage locations of the error codes for the Ethernet module
Section 11.3 lists the error code storage locations in the buffer memory in the beginning of the section.

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● Structure of this manual

(1) Setting Parameters with GX Developer

(a) By setting parameters with GX Developer, the sequence programs for communicating with external devices can be simplified in the Ethernet module.

(b) In this manual, parameter settings using GX Developer are explained in detail for each item displayed on the setting screens.

＊ For details on the types of the setting screens, objectives of the settings, the setting items and an outline of the setting operation using GX Developer, see Section 4.5 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

(c) Set the required parameters by referring to chapters that explain the functions to be used, and load the set parameters to the programmable controller CPU of the Ethernet module installed station.

(2) Setting screen of GX Developer

This manual explains the parameter settings with GX Developer in the following format:

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2.6 E-mail Setting from GX Developer

This section explains the setting required by GX Developer to send and receive e-mails.
For details on how to display each screen, refer to the GX Developer Operating Manual.

1) Shows how to start the setting screen.

(1) DNS setting

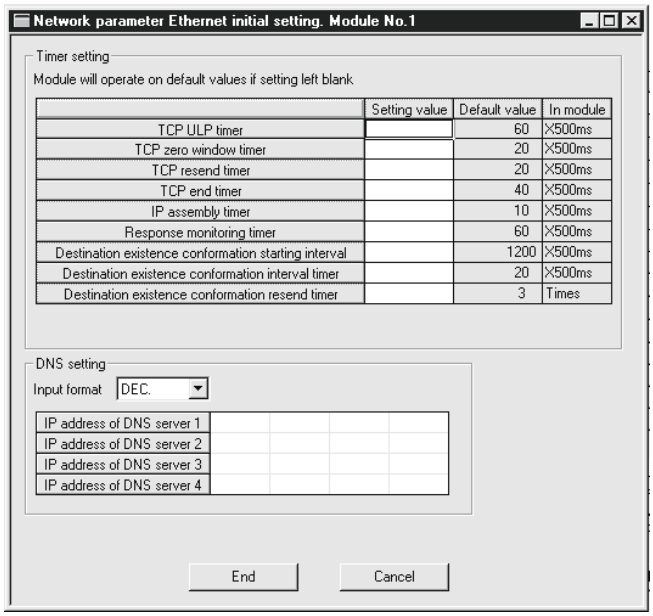
[Purpose of setting]

Specify the IP address of the DNS server when setting the mail server name using the domain name by the e-mail setting (see (2)).

[Start procedure]

[Network parameter setting the number of Ethernet/CC IE/MELSECNET cards] → Initial setting

[Setting screen]



2) Shows the setting screen of GX Developer.

(a) DNS Setting

Designate the internet service provider used by the local station's Fthernet module and the IP addresses of the domain name servers (DNS) designated by a system administrator.

1) Select the input format of the IP addresses (decimal/hexadecimal).
2) Designate the IP addresses of the DNS server to DNS servers 1 to 4.

3) Shows a description of the setting.

* Depending on the function used, "(Address: □□□□H)" may be indicated after some function names. This address indicates the buffer memory address of the Ethernet module in which the setting values from GX Developer are stored.
For more details on the buffer memory, see Section 3.8 of the Q Corresponding Ethernet Interface Module User's Manual (Basic).

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About the Generic Terms and Abbreviations

This manual uses the following generic terms and abbreviations to describe the Model QJ71E71-100, QJ71E71-B5 and QJ71E71-B2 Ethernet interface modules, unless otherwise specified.

Generic Term/Abbreviation	Description
ACPU	Generic term for AnNCPU, AnACPU, and AnUCPU.
AnACPU	Generic term for A2ACPU, A2ACPU-S1, A2ACPUP21/R21, A2ACPUP21/R21-S1, A3ACPU, A3ACPUP21/R21.
AnNCPU	Generic term for A1NCPU, A1NCPUP21/R21, A2NCPU, A2NCPU-S1, A2NCPUP21/R21, A2NCPUP21/R21-S1, A3NCPU, A3NCPUP21/R21.
AnUCPU	Generic term for A2UCPU, A2UCPU-S1, A2ASCPU, A2ASCPU-S1, A3UCPU, A4UCPU.
BUFRCV	Abbreviation for ZP.BUFRCV.
BUFRCVS	Abbreviation for Z.BUFRCVS.
BUFSND	Abbreviation for ZP.BUFSND.
CLOSE	Abbreviation for ZP.CLOSE.
ERRCLR	Abbreviation for ZP.ERRCLR.
ERRRD	Abbreviation for ZP.ERRRD.
Ethernet Address	A machine-specific address that is also referred to as the MAC (Media Access Control) address. This is used to identify the addresses of external devices over a network. The Ethernet address of the Ethernet module can be verified on the MAC ADD column of the rating plate.
Ethernet module E71 module	Abbreviation for Model QJ71E71-100, QJ71E71-B5 and QJ71E71-B2 Ethernet Interface Modules. (Indicated as the Ethernet module or E71 in the diagrams)
Ethernet network system	Abbreviation for 10BASE2,10BASE5, 10BASE-T and 100BASE-TX network systems.
GX Developer	Generic product name for SWnD5C-GPPW-E, SWnD5C-GPPW-EA, SWnD5C-GPPW-EV, and SWnD5C-GPPW-EVA. ("n" means version 4 or later.) "-A" and "-V" mean "volume license product" and "version-upgrade product" respectively.
MELSECNET/10	Abbreviation for the MELSECNET/10 network system.
MELSECNET/H	Abbreviation for the MELSECNET/H network system.
MRECV	Abbreviation for ZP. MRECV.
MSEND	Abbreviation for ZP.MSEND.
Network module (N/W module)	Abbreviation for interface modules compatible with the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network system.
OPEN	Abbreviation for ZP.OPEN.
Opossit device External device	Generic term for personal computers, computers, work station (WS) and Ethernet module etc. that are connected by the Ethernet for data communication.
Personal computer	Generic term for IBM PC/AT (or 100% compatible) personal computer.
QCPU	Generic term for Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q12PRHCPU, Q25PRHCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q13UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q13UDEHCPU and Q26UDEHCPU.
Basic model QCPU	Generic term for Q00JCPU, Q00CPU, and Q01CPU.
High Performance model QCPU	Generic term for Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, and Q25HCPU.
Process CPU	Generic term for Q02PHCPU, Q06PHCPU, Q12PHCPU, and Q25PHCPU.

Generic Term/Abbreviation	Description
Redundant CPU	Generic term for Q12PRHCPU and Q25PRHCPU.
Universal model QCPU	Generic term for Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q13UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q13UDEHCPU and Q26UDEHCPU.
Built-in Ethernet port QCPU	Generic term for Q03UDECPU,Q04UDEHCPU,Q06UDEHCPU, Q13UDEHCPU, and Q26UDEHCPU.
Safety CPU	Generic term for QS001CPU.
QCPU station	Abbreviation for the programmable controller mounted QCPU.
QnACPU	Generic term for Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, QA3ACPU, Q4ACPU and Q4ARCPU.
Q/QnA	Generic term for QCPU and QnACPU.
READ	Abbreviation for JP.READ and GP.READ.
RECV	Abreviation for JP.RECV and GP.RECV.
RECVS	Abbreviation for Z.RECVS.
Reference Manual	Abbreviation for the Q Corresponding MELSEC Communication Protocol Reference Manual.
REQ	Abbreviation for J.REQ, JP.REQ, G.REQ and GP.REQ.
SEND	Abbreviation for JP.SEND and GP.SEND.
SREAD	Abbreviation for JP.SREAD and GP.SREAD.
SWRITE	Abbreviation for JP.SWRITE and GP.SWRITE.
UINI	Abbreviation for ZP.UINI.
User's Manual (Application)	Abbreviation for the Q Corresponding Ethernet Interface Module User's Manual (Application).
User's Manual (Basic)	Abbreviation for the Q Corresponding Ethernet Interface Module User's Manual (Basic).
User’s Manual (Web function)	Abbreviation for the Q Corresponding Ethernet Interface Module User’s Manual (Web function)
WRITE	Abbreviation for JP.WRITE and GP.WRITE.
ZNRD	Abbreviation for J.ZNRD and JP.ZNRD.
ZNWR	Abbreviation for J.ZNWR and JP.ZNWR.

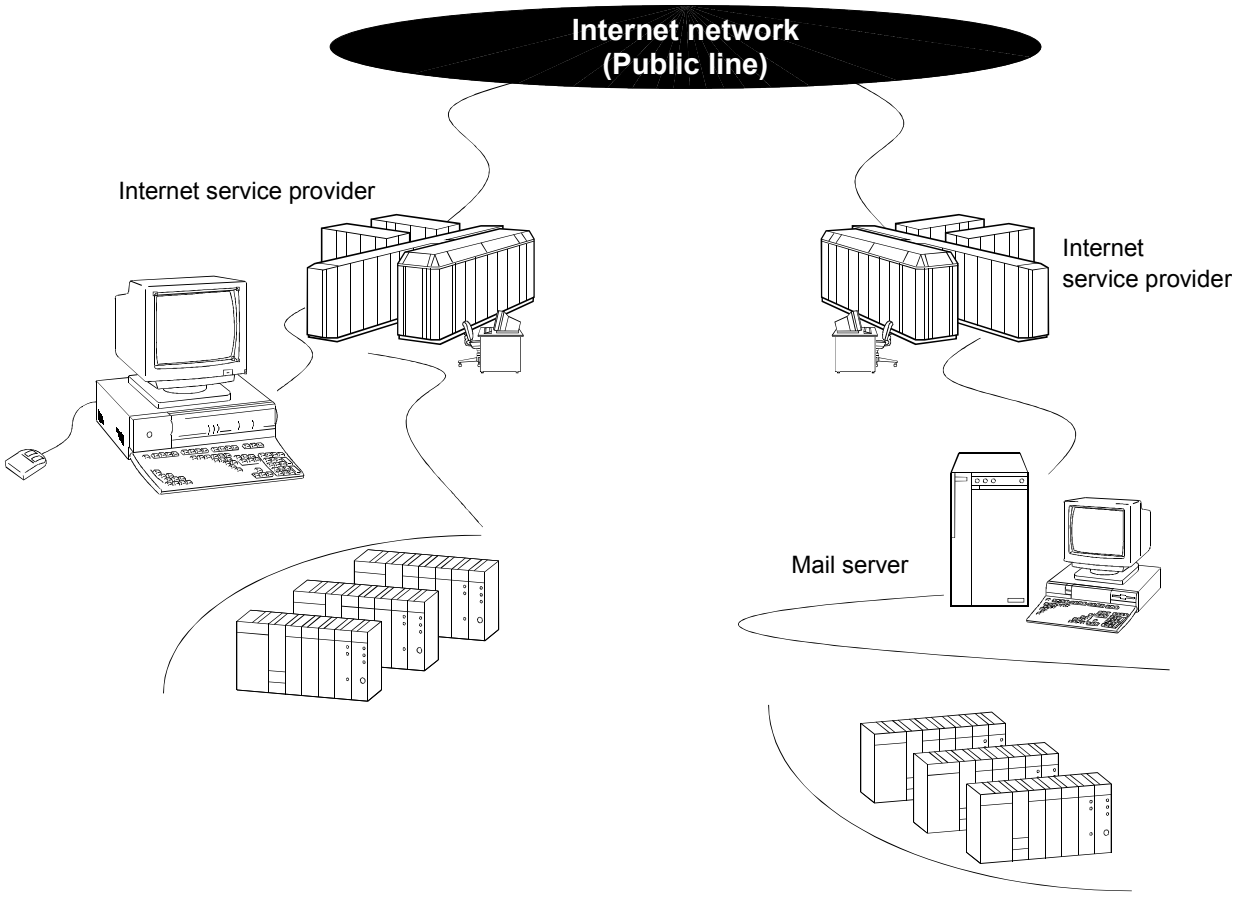
1 OVERVIEW

This manual provides information on the special functions of the MELSEC-Q Series Ethernet Interface Modules (hereinafter called the Ethernet module).
When applying the following program examples to the actual system, make sure to examine the applicability and confirm that it will not cause system control problems.
This chapter describes an overview of the special functions that are available for the Ethernet module.

1.1 Overview

(1) Send/receive e-mails (Details are explained in Chapter 2)

This function allows the transmission and reception of a maximum of 6k words of CPU information as the main text or attached file of e-mail to/from computers and programmable controller CPUs via the Internet.
Furthermore, by setting the automatic notification, the Ethernet module sends e-mail when the notification conditions set by the user match for the transmission from programmable controllers.



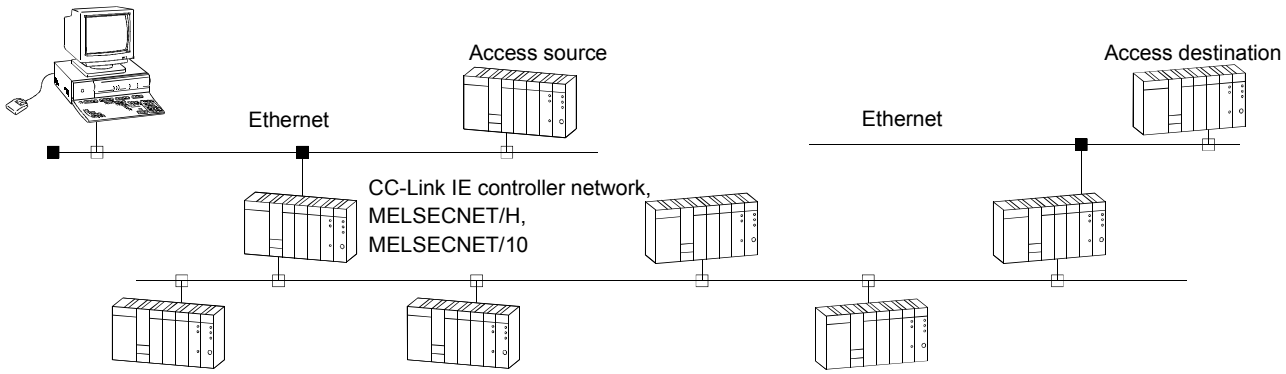
1

(2) Communicate with other stations' programmable controllers via the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network system (Details are explained in Chapter 3)

This function enables accessing other stations via multiple networks in the network system shown below.

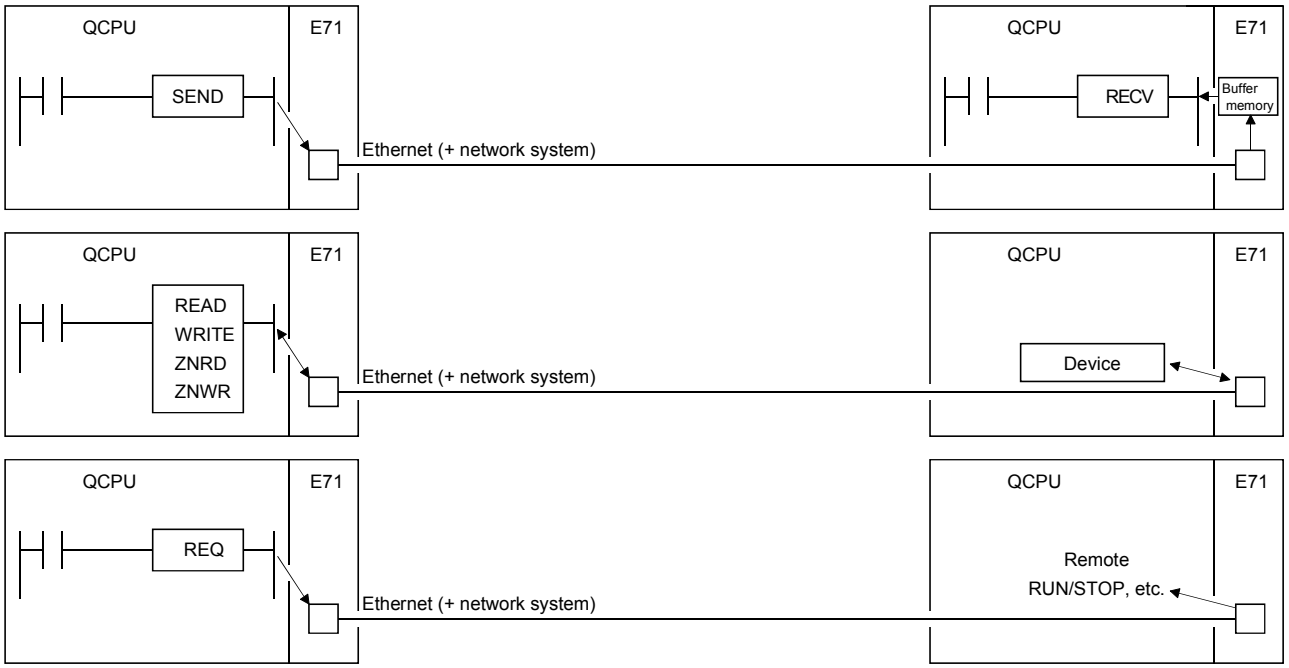
This function is used for multiple relays through a network in which the Ethernet and CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network systems coexist as well as through a network in which multiple Ethernet network systems are connected.

Using this function, another station's programmable controller can be accessed via the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 and Ethernet network systems.



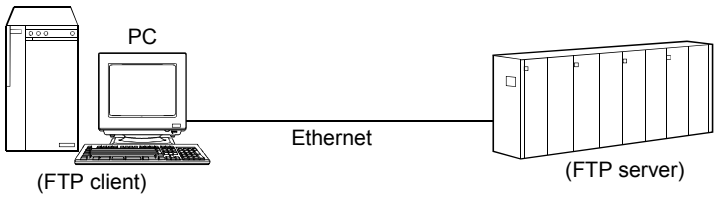
(3) Perform data communication between programmable controller CPUs (Details are explained in Chapter 4)

This function sends and receives data to/from another station's programmable controller CPU via the Ethernet using the data link instructions (SEND/RECV/READ/WRITE/REQ/ZNRD/ZNWR).
It also sends and receives data to/from another station's programmable controller CPU via the Ethernet and CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network systems.



(4) Perform file transfer (FTP) (Details are explained in Chapter 5)

The Ethernet module supports the server function of the TCP/IP standard protocol, FTP (File Transfer Protocol). By using the FTP commands, QCPU files can be read/written in file units.
Because of this, it is possible to manage QCPU files by computers, etc., and to transfer files and browse a file list as needed.



1.2 Additional Functions in Function Version B or Later

The following table lists the functions additionally provided for the Ethernet modules of function version B or later.

POINT

(1) The added/changed functions shown in this section includes the functions added in the first products or later of function version B and function version D. For the function version, serial No., and software version of the Ethernet module and related products (CPU module, and GX Developer) that can use the added/changed functions, refer to Section 2.7.

(2) Refer to Appendix 1.1 concerning a comparison of functions in the different Ethernet module function versions.

(1) Functions added for function version B

Function		Overview	Reference section
When using the e-mail function	Sending files in CSV format as attachment	Sends a file in CSV format as attachment to e-mail from the Ethernet module.	Chapter 2
	Sending main text	Sends main text of up to 960 words from the Ethernet module.	
	Support for encoding/ decoding	The following encoding/decoding is supported. • Encode the Subject using 7 bits encoding and send it from the Ethernet module. • Decode and receive an e-mail encoded with Quoted Printable by the Ethernet module.	
When using the file transfer (FTP server) function	Remote password check	Unlocks/locks the remote password of the QCPU. The unlock processing enables access to the QCPU using FTP commands.	Chapter 5
	Support for multiple CPU systems	The QCPU transfers files to the control CPU/non-control CPU of the Ethernet module when a multiple CPU system configuration is used.	

(2) Function added for function version D

Function		Overview	Reference section
When using the e-mail function	Sending character strings in the e-mail's main text by the programmable controller CPU monitoring function	The programmable controller CPU monitoring function allows transmission of character string information stored in word devices by the e-mail's main text.	Chapter 2
Specifying target station number in data link instructions		In the following data link instructions, the target station number 65 to 120 can be specified. (Specification of the station number 65 to 120 in the CC-Link IE controller network is available.) • SEND • READ/SREAD • WRITE/SWRITE • REQ	Chapter 4 Chapter 6
Specifying target station's CPU type in data link instructions		In the following data link instructions, the target station's CPU type can be specified ((S1)+3). (Specification of control/standby system or system A/B in the redundant system is available.) • READ/SREAD • WRITE/SWRITE • REQ	
Increased data length of data link instructions (480 to 960 words)		The data length can be specified up to 960 words in the following data link instructions: *1 • SEND • RECV/RECVS • READ/SREAD • WRITE/SWRITE	

*1 In a multiple network system, when transferring data exceeding 480 words to a station of another network No., specify the Q series models to all of the request source, relay station and request target.

2 USING THE E-MAIL FUNCTION

2.1 E-mail Function

The e-mail function sends and receives CPU information (programmable controller CPU status and device values) to/from PCs or programmable controller CPUs in remote locations via the Internet.
The following two methods are available to send/receive e-mail using this function.

(1) Sending/receiving e-mail by the programmable controller CPU
Executed by a sequence program using dedicated instructions.

(2) Sending e-mail using the Ethernet module's programmable controller CPU monitor function
Executed by the Ethernet module according to the Ethernet module parameter setting (notification setting) using GX Developer.

2.1.1 E-mail send and reception by the programmable controller CPU

(1) Sending/receiving e-mail by the programmable controller CPU
In sending/receiving e-mail by the programmable controller CPU, the CPU information of a station in which an Ethernet module is installed is sent to another Ethernet modules or an external device such as a PC as the main text or attached file of e-mail. E-mail sent from other Ethernet modules and PCs can also be received.

Sending e-mail by the programmable controller CPU (MSEND instruction)		External device			Remarks
		Ethernet module (MRECV instruction)	PC	Portable terminal (device that cannot handle attached files)	
Subject		○ (＊1)	○	○	—
Attached file	Binary format	○	○	×	Maximum 6k words
	Binary to ASCII conversion	×			
	Binary to CSV conversion				
Main text	Designating using ASCII data	×	○	○	Maximum 960 words.

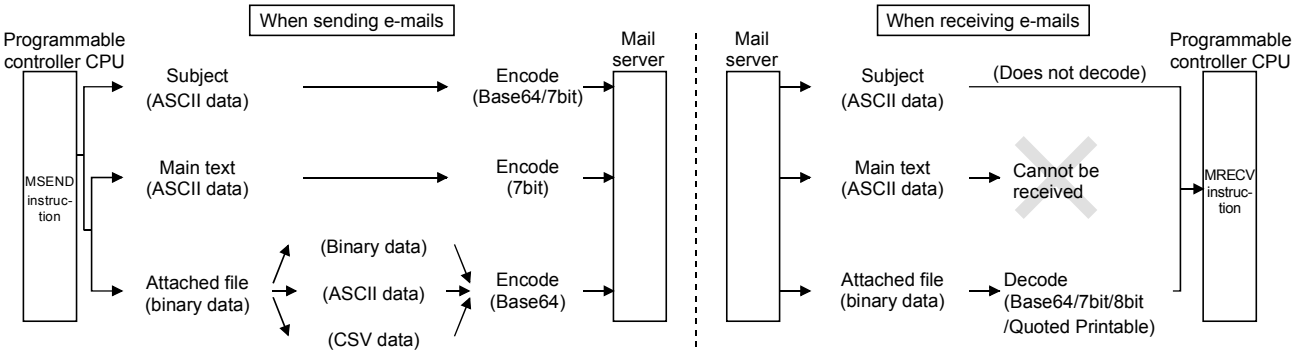
＊1 The Ethernet module receives the Subject without decoding.

(a) Sending e-mail by the programmable controller CPU (MSEND instruction)
Data transmission is performed via the main text or attached file of e-mail using the MSEND instruction.
1) For an attached file, device data and other information is sent by converting into binary/ASCII/CSV data format.
2) For the main text, ASCII code data (character string data) created by a sequence program is sent.

(b) Receiving e-mail by the programmable controller CPU (MRECV instruction)
Receives attached file data of e-mail using the MRECV instruction. The main text data of e-mail cannot be received.

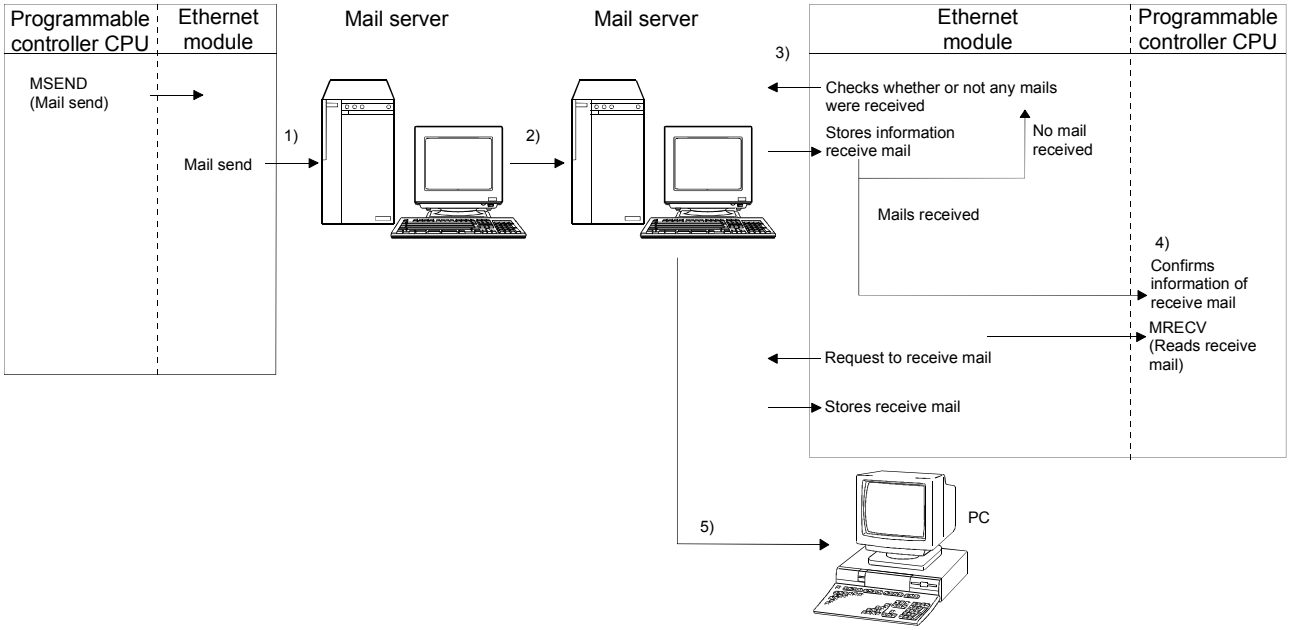
(2) Data conversion method used by the Ethernet module

The following shows the data conversion method used by the Ethernet module.



(3) Flow of the e-mail

The following diagram illustrates the flow of e-mail sent by the programmable controller CPU to its reception by the external device:



1) Send an e-mail to the send mail server of the local station's Ethernet module.
2) The send mail server of the local station's Ethernet module sends the e-mail to the receive mail server of the send destination device.

[When receiving by the Ethernet module]

3) The Ethernet module checks whether or not any mails have arrived at the inquiry interval set with GX Developer, and stores the results to the buffer memory.
4) By executing the MRECV instruction, the Ethernet module reads e-mails from the e-mail server to the mail buffer.
   The programmable controller CPU reads one e-mail and stores it in the mail buffer of the programmable controller CPU's device.
   * By user designation with the MRECV instruction, the Ethernet module reads the number of remaining receive mails on the mail server and stores this number in the buffer memory.

[When receiving by a PC]

5) Mails can be received using applications such as Internet Mail.

POINT

The e-mail send/reception function by the programmable controller CPU and the communication function using the random access buffer cannot be used together. Only one of them can be used at any given time.

2 - 2

2.1.2 Sending e-mail using the programmable controller CPU monitor function

(1) Monitor function of the programmable controller CPU

The monitor function of the programmable controller CPU is used to regularly monitor the status of the programmable controller CPU and device values, and send e-mail to the designated external device when they match with the notification conditions (programmable controller CPU status and device values) set by the user.

Sending e-mail using the programmable controller CPU monitor function (notification setting) (*1)		External device			Remarks
		Ethernet module (MRECV instruction)	PC	Portable terminal (device that cannot handle attached files)	
Subject		○ (*2)	○	○	—
Attached file	Binary format	○	○	×	Maximum 960 words
	Binary to ASCII conversion	×			
	Binary to CSV conversion				
Main text	Binary format	×	○	○	Maximum 960 words.
	Binary to ASCII conversion				

*1 For the notification of CPU status monitoring, only the Subject (that stores the programmable controller CPU status) will be sent.

*2 The Ethernet module receives the Subject without decoding.

(a) The programmable controller CPU in the Ethernet module loaded station is monitored for every CPU inquiry time interval set by the user. The following information can be registered as the notification conditions.
  1) Device monitoring of the programmable controller CPU
    • Monitoring the numeric values stored in the word device
    • Monitoring the bit device ON/OFF status
  2) Monitoring of the programmable controller CPU status
    • Monitoring the CPU module status (RUN/STOP/PAUSE)

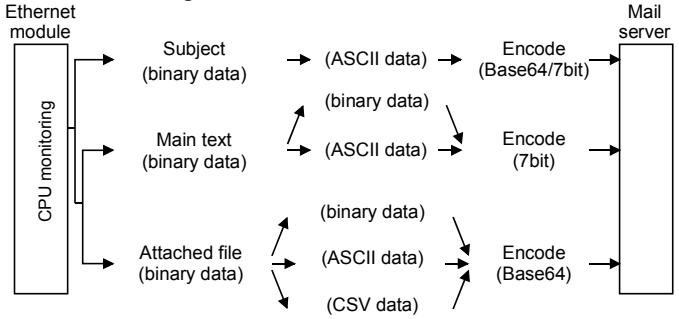
(b) The device monitoring result of the programmable controller CPU is sent by either the main text or attached file of e-mail.
  1) The attached file is sent by converting the device monitoring data into binary/ASCII/CSV data format.
  2) The main text is sent by converting the device monitoring data into Binary or ASCII format data.

(c) As for the status monitoring result of the programmable controller CPU, only the Subject (that stores the programmable controller CPU status) is sent.

(d) When more than one send mail address are specified in the notification setting, the smallest numbered address is set in the "To" field of the mail header.
The other addresses are set into the "Cc" field for transmission.

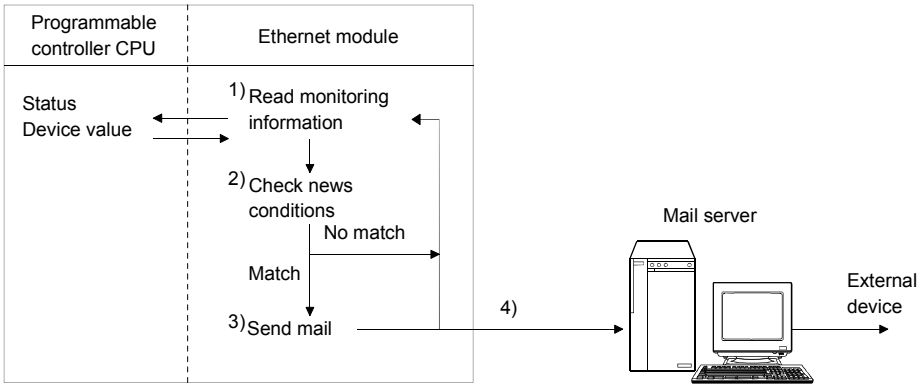
(2) Data conversion method used by the Ethernet module

The following shows the data conversion method used by the Ethernet module.



(3) Flow of the e-mail

The diagram shown below illustrates the flow of e-mails from the local station's Ethernet module to the external device after the monitor values match with the news conditions.

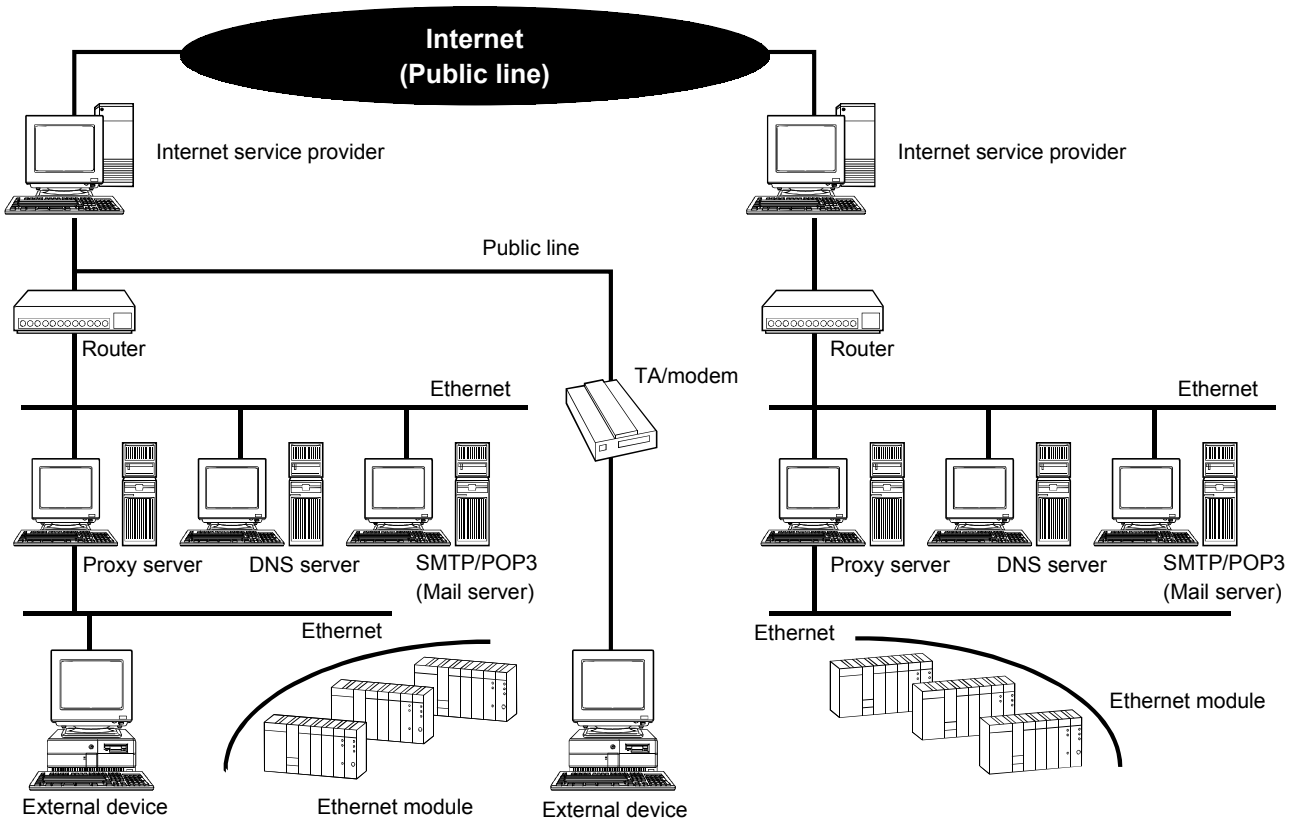


1) Reads the monitoring information (such as status and device values) of the programmable controller CPU.
2) Checks whether the monitoring information read and the news conditions set by the user match. (Checks match/mismatch of the news conditions.)
3) Sends an e-mail when the monitored values match with the news conditions.
   ＊ Multiple news conditions may be set so that an e-mail can be sent (notified) when any of the conditions matches. (See Section 2.9.1.)
   Set the CPU inquiry time interval used by the Ethernet module to monitor the programmable controller CPU, considering the interval of change time in the monitoring target.
   After a news condition match occurs, the Ethernet module must confirm the mismatches of other news conditions for the same monitoring target. The next e-mail can be sent only after the Ethernet module confirms the mismatches of these news conditions.
4) The Subject of e-mail, which is sent when the notification conditions match, is fixed data. The format of the Subject is as follows (see Section 2.9.2):
   • When monitoring the CPU status
     Subject = "No. of transmissions, CPU model name, Status, Detection time"
   • When monitoring the CPU device
     Subject = "No. of transmissions, Matched condition device, Monitoring value, ... "

POINT
The e-mail transmission function of the programmable controller CPU and the communication function using the random access buffer can be used together.

2.2 Configuration and Environment of the Applicable System

This section explains the environment and system configuration for using the e-mail function from the Ethernet module.



(1) E-mails can be sent and received in an environment where the Internet service is available as shown above.
(2) Set each Internet mail setting value for the Ethernet module and PC following the directions from the Internet service provider or system administrator.
(3) Each of the Ethernet module parameters for using the e-mail function is set with GX Developer.

2.3 Precautions for Using the E-mail Function

The following explains precautions when using the e-mail function of the Ethernet module.

(1) Precautions regarding the system

(a) Design the system so that the entire system operates normally at all times when sending/receiving e-mails to/from a running system and controlling the programmable controller.

(b) In order to avoid programmable controller system malfunctions caused by receptions of illegal e-mails from the outside sources, take precautions in preventing illegal e-mails from being received on the mail served on the Ethernet module side (using an anti-virus program, etc).

(2) Precautions regarding the external device

(a) E-mails can be sent to programmable controller CPU stations in which Q series Ethernet modules are installed.
Since the conventional A/QnA series Ethernet modules do not have the e-mail function, e-mails cannot be sent to those programmable controller CPU stations.

(b) To send files to the Ethernet module as attachments to e-mail, specify the encoding method (Base 64/7 bits/8 bits/Quoted Printable) of the attached files.

(3) Common precautions

(a) The Ethernet module stores the data of attached files received from the external device in the device specified by the MRECV instruction without converting it from ASCII to binary.

(b) The maximum sizes of data that can be sent/received by the Ethernet module are as follows:
- Data size of attached files: Up to 6k words
- Data size of main text: Up to 960 words

(c) Mails that are sent and received do not support encrypted data, compressed data, and data conversion.

(d) When the external device could not be found in an e-mail sending from the Ethernet module, the error code can be checked through the reception processing with the MRECV instruction.
* If an external device cannot be found when sending e-mail using the MSEND instruction, failure of e-mail transmission may not be recognized, depending on the operation of the mail server. Be sure to verify the receiver's e-mail address in advance.
* Error codes are stored within the control data of the MRECV instruction. (For details on error codes, refer to the User's Manual (Basic).)

(e) The e-mail function is supported for the SMTP and POP3 servers.

(f) When communication errors of e-mails cannot be checked by a dedicated instruction, check the error codes stored in the mail send/reception error log area of the buffer memory.

(g) If e-mails cannot be received, try one of the following.
1) Execute the MRECV instruction once.
2) Shorten the "Inquiry interval" time in the e-mail settings of GX Developer.
3) Check the number of incoming mails remaining on the mail server. (Can be checked with the buffer memory address 5870H area.)

(h) When the receive data of an e-mail sent using the MSEND instruction is abnormal (garbled characters, etc.), review the transmission data format (binary/ASCII/CSV) designated with the MSEND instruction.
* The Subject should be designated in ASCII code data. (It is not converted to ASCII format.)

(i) Confirm with a system administrator regarding the minimum time intervals for accessing the mail server when sending mails, reading receive mails, and inquiring whether or not there are receive mails.
Depending on the mail server's security setting, frequent access may be prohibited.

(j) The e-mail send/reception function using the programmable controller CPU and the communication function using the random access buffer cannot be used together. Only one of them can be used at a time.
* The e-mail send function using programmable controller CPU monitoring and the communication function using the random access buffer can be used together.

(k) A Subject that has been sent by the MSEND instruction from an Ethernet module of the following versions, cannot be received normally by the MRECV instruction.
- Ethernet modules with serial numbers where the first 5 digits are 03101 or less

Different methods are used for converting Subject data at send and reception. (See Section 2.1.1 (2).)
- When sending: Encodes the Subject and then send it.
- When receiving: Receives the Subject without decoding it.

2.4 E-mail Specifications

The following table lists the specifications of the e-mail function.

Item			Specification
Transmission specifications Transmission and reception data	Data size	Attached file	6 k words × 1
		Main text	960 words × 1
	Data transfer method		When sending: Sends either a file as attachment or main text (select one). When receiving: Received a file as attachment.
	Subject		Us-ASCII format or ISO-2022-JP (Base 64)
	Attached file format		MIME format
	MIME		Version 1.0
	Data of attached file format		Binary/ASCII/CSV can be selected. File name: XXXX.bin (binary), XXXX.asc (ASCII), XXXX.csv (CSV) (CSV: Comma Separated Value)
	Division of attached file		Cannot be divided (only one file can be sent/received) * If any divided files are received, only the first file will be received and the remaining files will be discarded.
	When sending (encode)		Subject: Base 64/7 bits Main text: 7 bits Attached file: Base 64
	When receiving (decode)		Subject: (Does not decode) Main text: (Cannot be received) Attached file: Base 64/7 bits/8 bits/Quoted Printable * If e-mail is sent from the external device to the programmable controller side, specify the encoding method (Base 64/7 bits/8 bits/Quoted Printable) of the attached file.
	Encryption		No
	Compression		No
	Communication with mail server		SMTP (sending server) Port number = 25 POP3 (receiving server) Port number = 110
	Operation check mailer		Microsoft® Corporation Internet Explorer 5.0 (Outlook Express 5.5/Outlook Express 5) Netscape® Communications Corporation Netscape® 4.05

REMARKS

Internet mail terminology list:

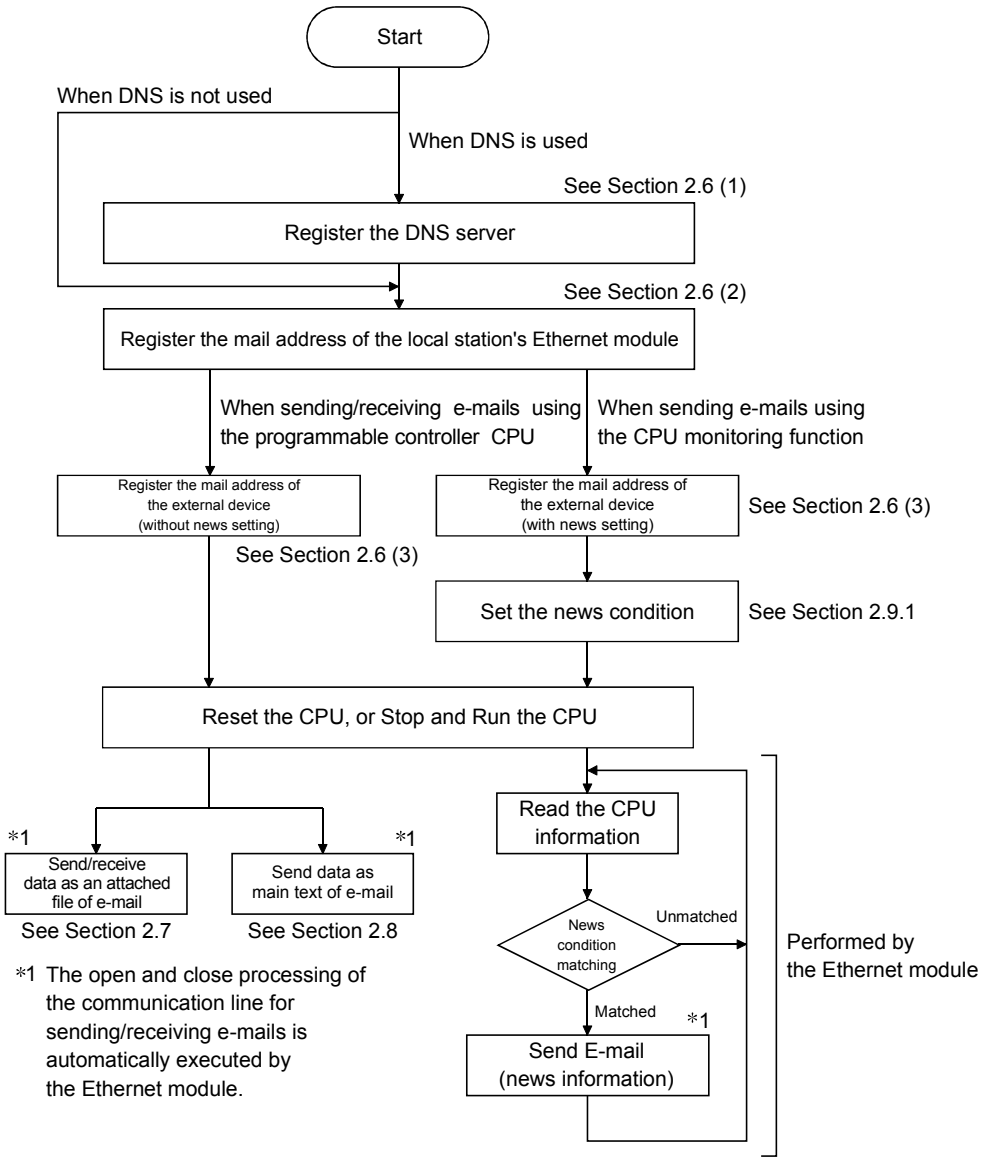
DNS server: Server that manages networks

SMTP server: Server that delivers (transfers) e-mail between mail servers

POP3 server: Server that transfers received e-mail addressed to subscribers to the corresponding subscribers

2.5 Processing Procedure of the E-mail Function

The following flowchart illustrates the procedure that is required before sending and receiving e-mails:



2.6 E-mail Setting from GX Developer

This section explains the settings required by GX Developer to send and receive e-mails.
For details on how to display each screen, refer to the GX Developer Operating Manual.

(1) DNS setting

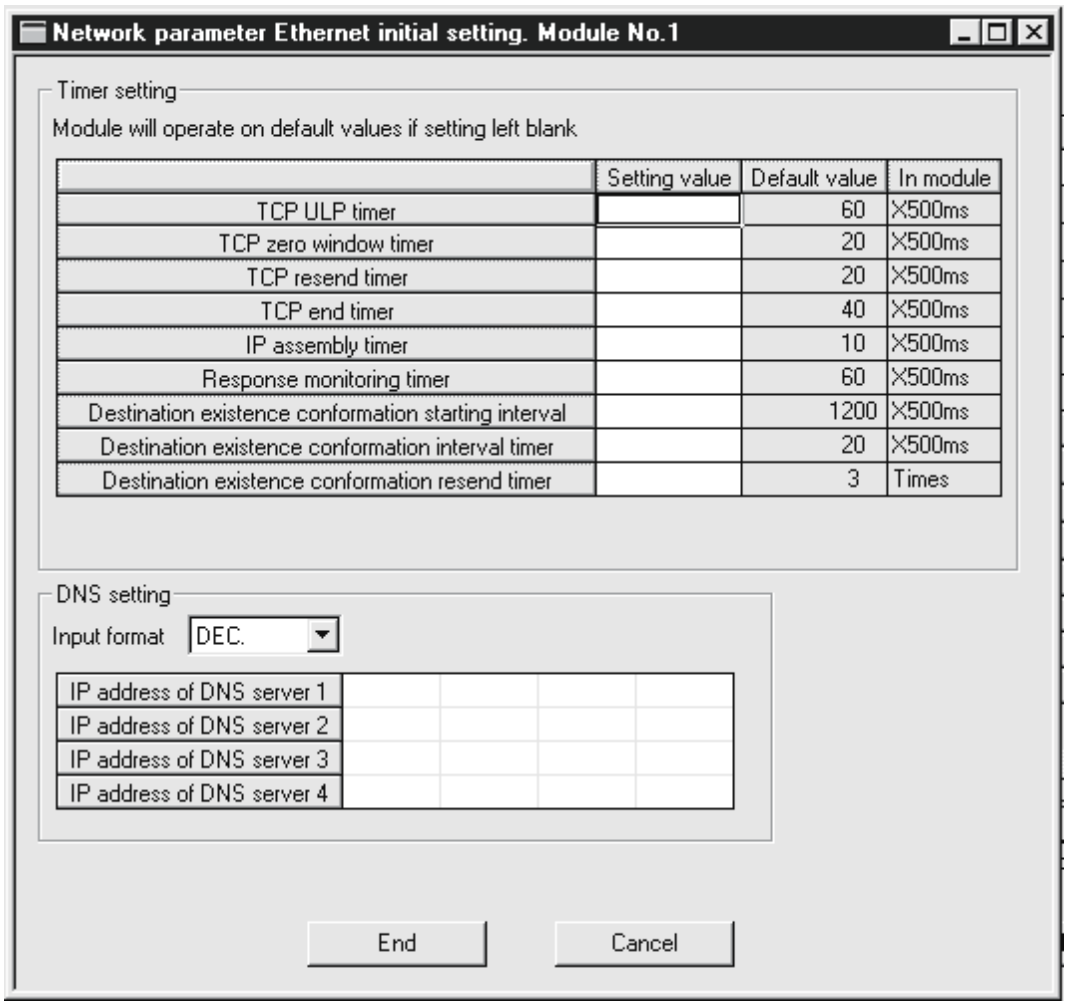
[Purpose of setting]

Specify the IP address of the DNS server when setting the mail server name using the domain name by the e-mail setting (see (2)).

[Start procedure]

[Network parameter setting the number of Ethernet/CC IE/MELSECNET cards] → Initial setting

[Setting screen]



Initial settings

Item name		Description of setting	Setting range/options
Timer setting (*1)	TCP ULP timer	Set the time of packet existence at TCP data send.	2 to 32767
	TCP zero window timer	Set the interval for checking the receive enabled status.	2 to 32767
	TCP resend timer	Set the time to resend at TCP data send.	2 to 32767
	TCP end timer	Set the confirmation wait time at TCP close processing.	2 to 32767
	IP assembly timer	Set the wait time for division data packets.	1 to 32767
	Response monitoring timer	Set the response wait time.	2 to 32767
	Destination existence confirmation starting interval	Set the time to start confirming existence of an external device after communication with it has terminated.	1 to 32767
	Destination existence confirmation interval timer	Set the time interval between reconfirming existence.	1 to 32767
	Destination existence confirmation resend timer	Set the number of times to reconfirm existence when a response to the existence confirmation is not received.	1 to 32767
DNS setting	Input format	Select the input format of the IP addresses of the DNS servers.	decimal/hexadecimal
	IP address of DNS server 1	Set IP address of DNS server 1.	—
	IP address of DNS server 2	Set IP address of DNS server 2.	—
	IP address of DNS server 3	Set IP address of DNS server 3.	—
	IP address of DNS server 4	Set IP address of DNS server 4.	—

*1 See Section 5.2 of the User's Manual (Basic)

(a) DNS setting

Designate the Internet service provider used by the local station's Ethernet module and the IP addresses of the domain name servers (DNS) designated by a system administrator.

1) Select the input format of the IP addresses (decimal/hexadecimal).
2) Designate the IP addresses of the DNS servers to DNS servers 1 to 4.

POINT

(1) The DNS servers manage networks.
DNS settings are required to search for the SMTP server and POP3 server from a domain name.

(2) Make the DNS setting when the mail server name shown in item (2) is specified with a domain name.
No setting is required when it is specified with an IP address.

(3) When obtaining the IP addresses from a domain name, the DNS servers are searched sequentially starting from the first DNS server.

(2) E-mail setting

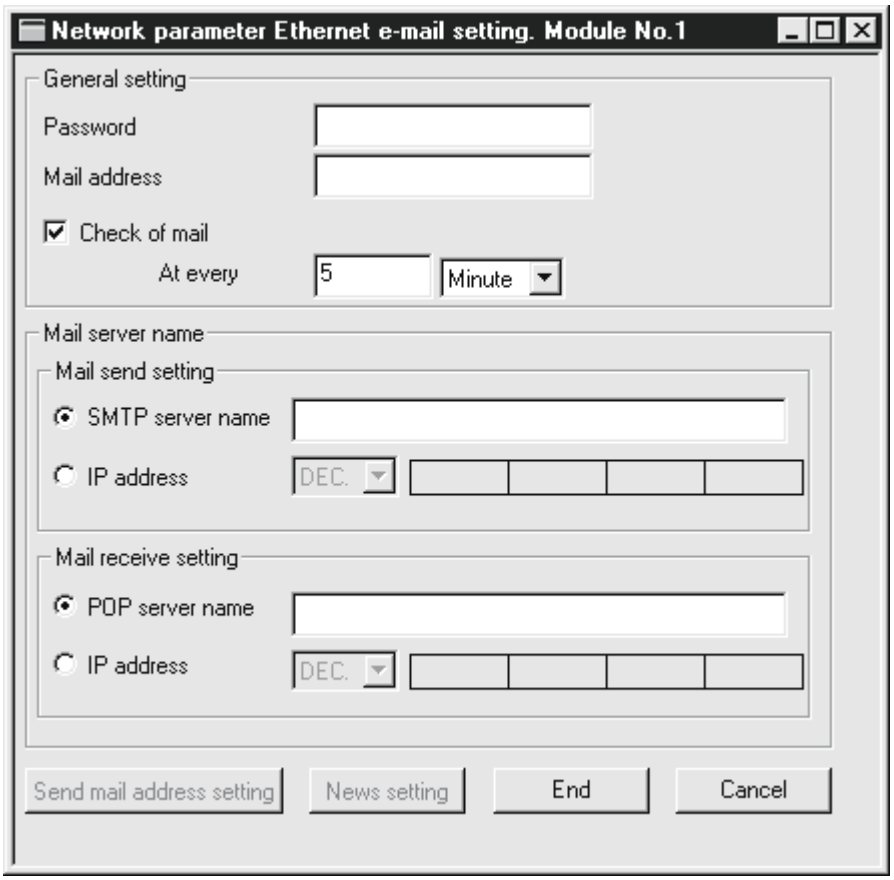
[Purpose of setting]

Perform the setting to use the e-mail function.

[Start procedure]

[Network parameter setting the number of Ethernet/CC IE/MELSECNET cards] →E-mail setting

[Setting screen]



[Setting item]

Item name			Description of setting item	Setting range/option
General setting	Password		Set the password to the mail server	—
	Mail address		Set the mail address for the Ethernet module	—
	Check of mail		Select whether or not to make inquiries to the incoming mail server regarding the receiving status	• Check mark (Inquire) • No check mark (Do not inquire)
	At every		Set the time interval and unit for making inquiries to the incoming mail server	• 30 s to 24 h • h/min/s
Mail server name	Mail send setting	SMTP server name	Set the send mail server name	—
		Input format	Select the input format of the send mail server's IP address	• Decimal • Hexadecimal
		IP address	Set the IP address of send mail server	00000001H to FFFFFFFEH
	Mail receive setting	POP server name	Set the receive mail server name	—
		Input format	Select the input format of the receive mail server's IP address	• Decimal • Hexadecimal
		IP address	Set the IP address of the receive mail server	00000001H to FFFFFFFEH

(a) General settings

Designate the mail setting values that have been registered with the Internet service provider of the local station's Ethernet module or the mail registration information designated by the system administrator.

1) Password:
Designate the mail password of the local station's Ethernet module.

2) Mail address:
Designate the mail address of the local station's Ethernet module.

3) Check receive mails:
Select whether or not to check if receive mails have arrived and set the checking time interval when incoming mails are checked.
When receive mail check is designated, set the time interval for inquiring the mail server whether or not there are mails addressed to the user.

The following table shows each setting range of the inquiry time intervals for checking receive mails. (30 s to 24 h)

Time units	Setting range (default: 5 min)
h	1 to 24
min	1 to 1440
s	30 to 3600

POINT

If the inquiry time interval from the programmable controller CPU or other module to the server is short because of the POP3 server specifications, access may be restricted (lock status) on the server side.
Check the POP3 server specifications, and set the inquiry time interval accordingly. (It is recommended to set the setting value of the inquiry time interval to the default (5 minutes) or more.)

(b) Mail server name

Set the Internet service provider and the domain name or IP addresses of the mail servers designated by the system administrator, used by the local station's Ethernet module.

1) Designate the domain name of the mail server.

2) Select the input format (decimal/hexadecimal) of the IP addresses.

3) Set the IP address of the outgoing mail server (SMTP).

4) Set the IP address of the incoming mail server (POP3).

POINT

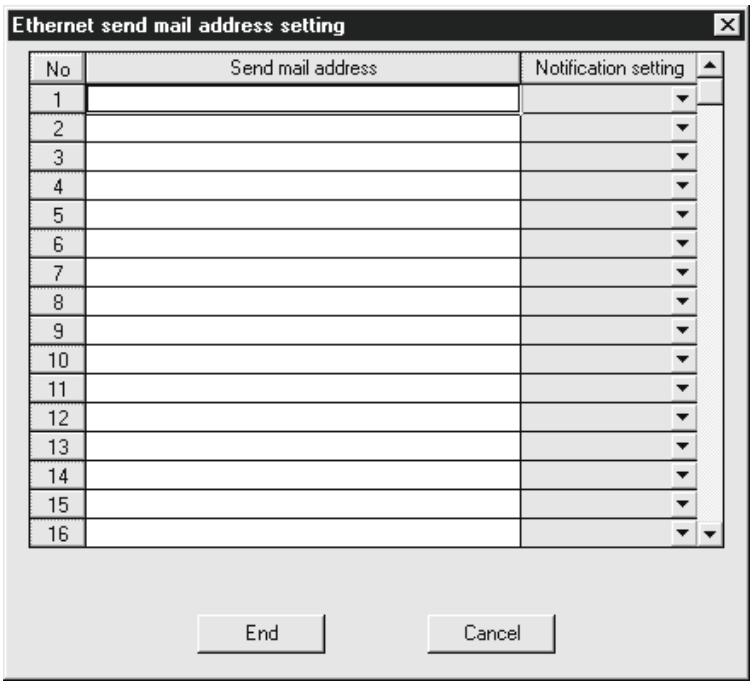
- The SMTP server delivers (transfers) e-mails between mail servers.
- The POP3 server transfers received e-mails addressed to users to the corresponding users.
- The mail server names must be designated to use the e-mail function. (See POINT of (1).)

(3) Send mail address setting

[Purpose of setting]
Register the e-mail address of the external devices where e-mail is to be sent.

[Start procedure]
[E-mail setting] → Send e-mail address setting

[Setting screen]



[Setting item]

Item name	Description of setting	Setting range/Selections
Send mail address	Set the mail address of the transmission destination	—
Notification setting	Select whether or not to set news	• Execute news • No execute

(a) Send mail address

1) Designate the mail addresses of a maximum of 16 external devices to which mails are sent from the local station's Ethernet module. (Only one e-mail address can be specified for each area.)
2) In the send e-mail address setting, sequentially set up e-mail addresses starting from No. 1.
To delete an e-mail address with a mid-setting number, specify dummy e-mail addresses before that address. (If it is preceded by any empty e-mail address areas, subsequent setting numbers and areas will move forward to fill in any empty numbers and areas after each setting, so the setting numbers will change.)
3) When sending (MSEND instruction) e-mail by the programmable controller CPU, specify these setting numbers (1 through 16) in the control data.

(b) Notification setting (News designation)
Designate whether or not to send the news information set with the CPU monitoring function.

Item	Explanation
Notification setting	Execute news
	No execute

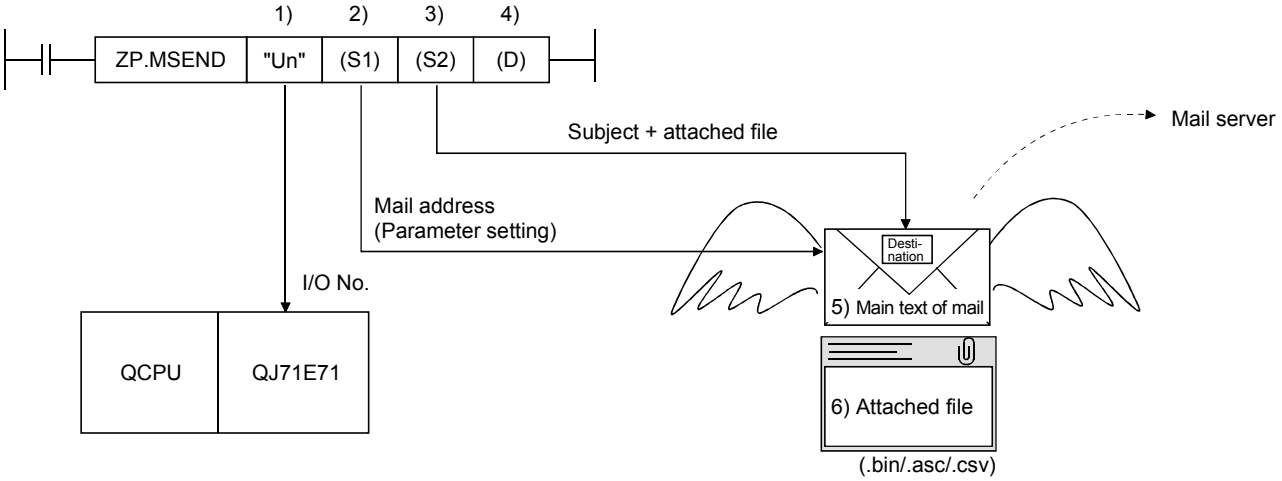
* For more details on the notification settings, see Section 2.9.

2.7 Sending/Receiving E-mail (Attached Files) by the Programmable Controller CPU

This section explains how to send and receive attached files of e-mail using the dedicated instructions (MSEND/MRECV) available for the Ethernet module.

2.7.1 When sending data as an attached file

The following explains the MSEND instruction and program for sending e-mail.
The following illustration shows how the MSEND instruction is used to store data in an attached file and send it to an external device.



1) I/O number of the Ethernet module

2) Control data (such as send mail address)
This indicates the mail address of the send destination device set on the send mail address settings screen.

3) Send mail (subject + attached file)
Subject consists of No. of transmissions and the character data designated by the sequence program. (It is not converted to ASCII format.)
＊ The Subject should be designated in the sequence program in ASCII characters.

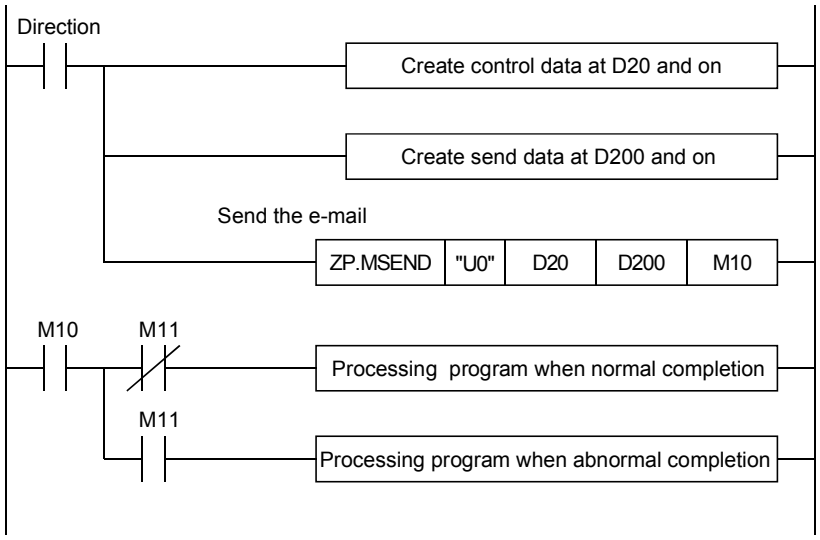
4) Complete bit

5) Main text of mail
There is no data for the main text of mail.
＊ The send data is included in the attached file.

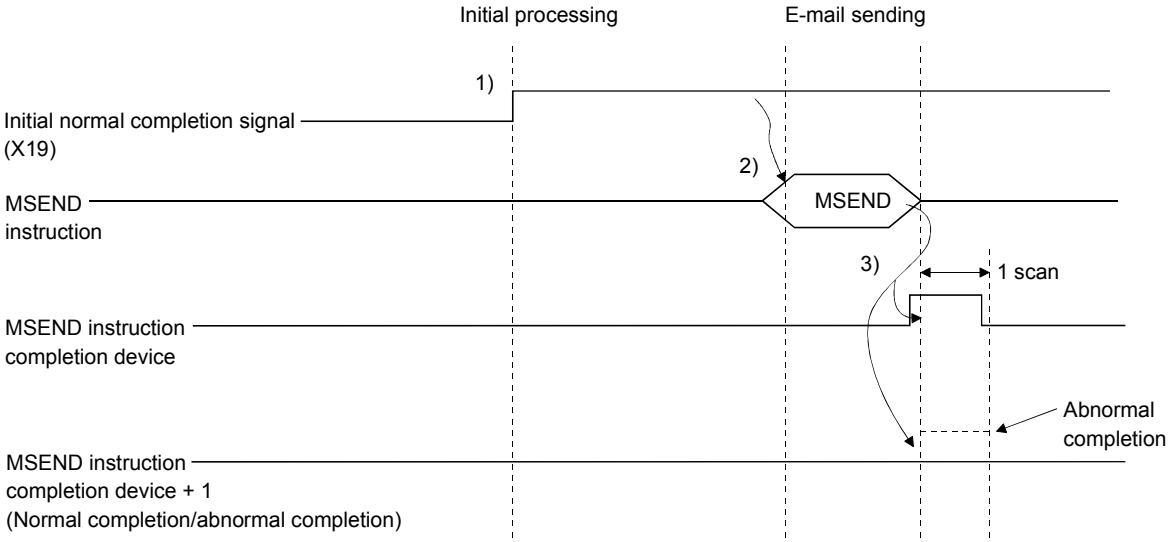
6) Attached file
This indicates the device data designated by the MSEND instruction.
The attached file is sent in either one of binary format, ASCII format or CSV format.
The transmission format for attached file is designated in the control data of the MSEND instruction.
(See (3) ＊1.)

(1) Send using the sequence program

The following explains how an e-mail is sent by the sequence program.
See Chapter 6 MSEND for detail.



(2) Execution timing of the instruction



1) Start the local station programmable controller.
The parameters for the e-mail function are stored in the Ethernet module.

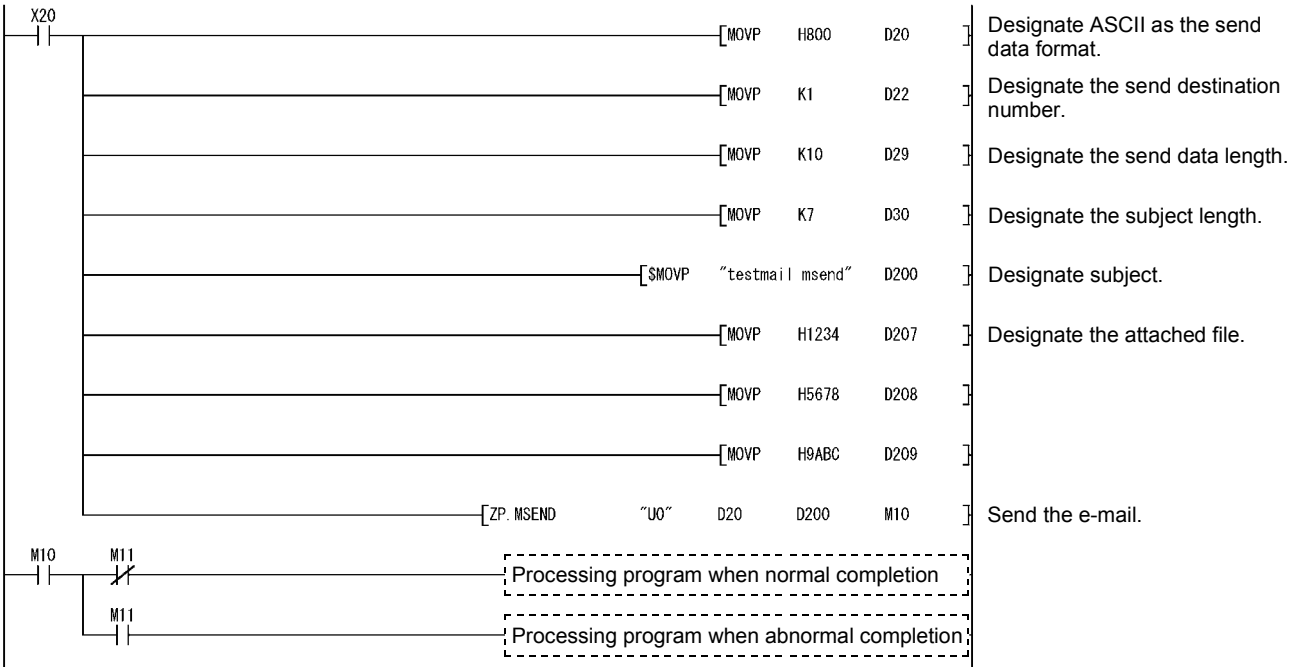
2) Execute the MSEND instruction.
The e-mail designated with the MSEND instruction is sent to the mail server.

3) When the e-mail sending to the send mail server is completed, the MSEND instruction completion device turns on.
When the completion device + 1 (abnormal completion signal) turns on, the error code is stored in the control data completion status ((S1)+1).
* For details on the causes of errors, see "Troubleshooting" in the Q Corresponding Ethernet Interface Module User's Manual (Basic).

(3) Sample program

The following shows a sample program for sending e-mails by the programmable controller CPU.
Perform e-mail send processing using the send command (X20).
The contents of the send data are shown in (4).

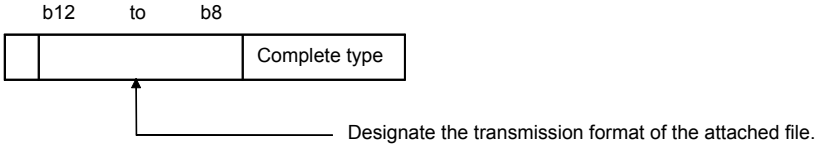
When I/O signals of the Ethernet module are X/Y00 to X/Y1F.



REMARKS

When an error occurs while sending e-mail from the sending mail server to an external device, an error code is stored in the receiving error log area.

∗1 The following shows the transmission format of the attached file designated in the control data of the MSEND instruction.
∗ For more details on the binary format/ASCII format/CSV format designation, see the MSEND Instruction in Chapter 6, "Dedicated Instructions."



Setting values for designating the attached file transmission format					Format set	Applicable station	Description of processing
b12	b11	b10	b9	b8			
0	0	0	0	0	Binary	Ethernet module	Sends the attached file in binary format. (∗∗∗.bin)
0	1	0	0	0	ASCII	PC/UNIX	Sends the attached file in ASCII format. The Ethernet module converts the attached file from binary to ASCII. (∗∗∗.asc)
0	1	0	0	1	CSV	PC/UNIX	Sends the attached file in CSV format. The Ethernet module converts the attached file from binary to CSV. (∗∗∗.csv)

(a) Designate binary format when communicating between Ethernet modules.
The attached file of the MSEND instruction will be sent as is.
The name of the attached file is mmddhhss.bin (system date.bin).
mm: Month dd: Date hh: Hour ss: minute

(b) Designate either binary format, ASCII format or CSV format when a PC/UNIX receives e-mail sent from an Ethernet module. The attached file of the MSEND instruction will be sent in the designated format.

1) When binary format is designated
The name of the attached file is mmddhhss.bin (system date.bin).
mm: month dd: day hh: hour ss: minute

2) When ASCII format is designated
The name of the attached file is mmddhhss.asc (system date.asc).
mm: month dd: day hh: hour ss: minute

3) When CSV format is designated
The name of the attached file is mmddhhss.csv (system date.csv).
mm: month dd: day hh: hour ss: minute

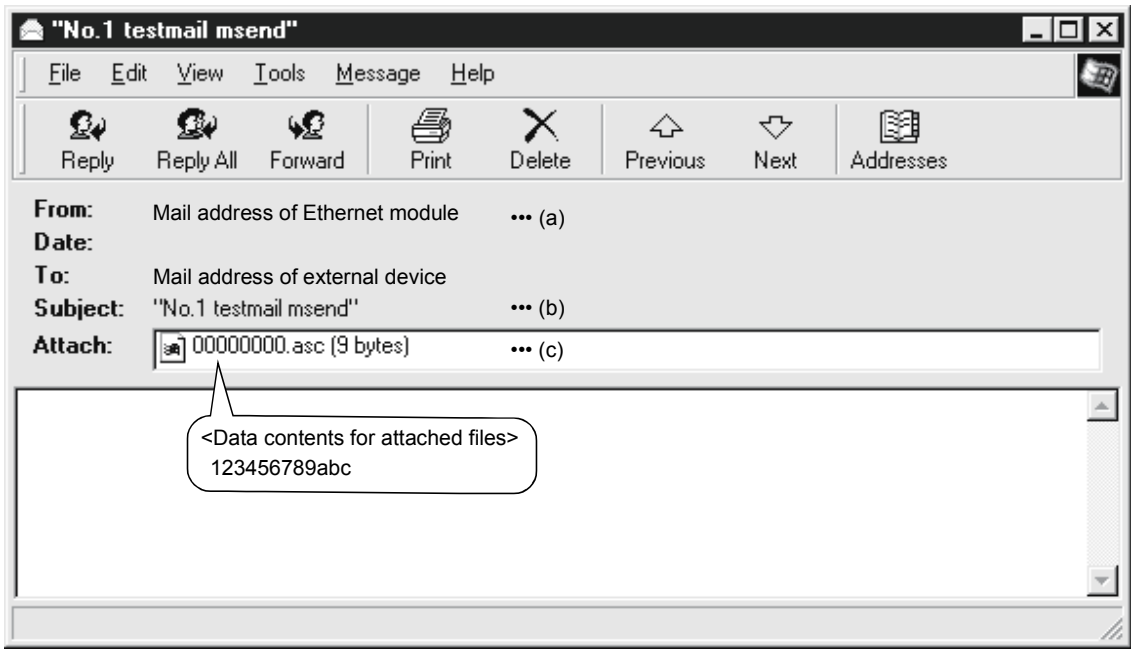
∗ For details on how to receive e-mails, see (4) on page 2-17.
∗ The system date for the file name is the data managed by the programmable controller of the station in which the Ethernet module is installed.

(4) Receiving by a personal computer

The following explains how a PC/UNIX receives e-mails sent from the Ethernet module.

After setting an environment for using the Internet with application software that processes e-mails, e-mails can be received on a receive message screen as shown below.

(Example) The following shows an example of the reception of e-mail sent using the MSEND instruction (see (3)). (The screen display shows is that of Microsoft® Corporation's Outlook Express 5.)



(a) From

Displays the mail address of the Ethernet module.

REMARKS

By entering the mail addresses of the send destination devices in the address book, the registered names (display names) can be displayed and it makes the management easier.

(b) Subject

This indicates the No. of transmissions (*1) and the Subject written by a sequence program.

*1 The number is automatically incremented every time an e-mail is sent from the Ethernet module, starting from 1.
(After the maximum number (4294967296) is reached, the number starts again from 0.)

(c) Attached file

This indicates the name of the attached file sent by the Ethernet module.

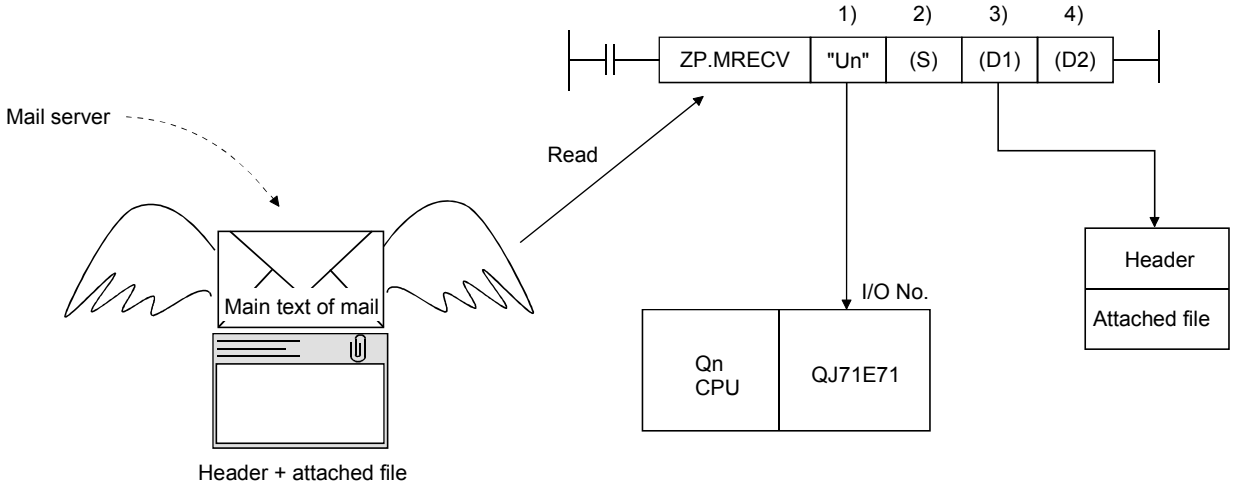
POINT

Data in the attached file in CSV format can be read in cell units in Excel, etc., for each 1 word of data.

2.7.2 When receiving data in the attached file

This section explains the MRECV instruction and a program to receive e-mails sent from external devices.

The MRECV instruction reads the attached file received.



1) I/O number of the Ethernet module
2) Control data (such as mail No. to be read)
3) Storage device of header + attached file
4) Complete bit

＊ Receive mail is temporarily stored in the buffer memory shown below.

Address (hexadecimal)	Item	Description	Remarks
2680H	Received e-mail size	Indicates the size of received e-mail (header + attached file) data.	—
2681H	Header size	Indicates the size of the header data.	
2682H	Mail information	(＊1)	
2683H	Head address of attached file	Indicates the head address where the attached file data information is stored.	(＊2)
2684H	Head address of header	Indicates the head address where the header information is stored.	
2685H	From head address	Indicates the head address of this data stored in the header information.	
2686H	Date head address	Indicates the head address of this data stored in the header information.	
2687H	Subject head address	Indicates the head address of this data stored in the header information.	
2688H	Attached file name head address	Indicates the head address of this data stored in the header information.	
2689H	Message ID head address	Indicates the head address of this data stored in the header information.	
268AH	System area	—	—
268BH to 3FFFH	Header information (maximum of 373 words)	Indicates the content of the header designation items above.	
	Attached file (maximum of 6144 words)	Indicates the contents of the attached file data.	
4000H	System area	—	

∗1 In the mail information storage area, the following information related to the receive mail is stored in the corresponding bits.

Mail information storage area address 2682H (9858)

b15	b14 to b5	b4	b3	b2	b1	b0
7)	6)	5)	4)	3)	2)	1)

1) Indicates whether the information (maximum of 128 words) in the From head address storage area is valid (1) or invalid (0).
2) Indicates whether the information (maximum of 4 words) in the Date head address storage area is valid (1) or invalid (0).
3) Indicates whether the information (maximum of 64 words) in the Subject head address storage area is valid (1) or invalid (0).
4) Indicates whether or not there is an attached file Yes (1) or No (0).
For "Yes", it indicates that the information (maximum of 12 words) stored at addresses starting from the Attached file name head address is valid.
5) Indicates whether or not there is information in the Message ID head address storage area Yes (1) or No (0).
6) Indicates the system information.
7) Indicates whether the receive mail that has not been read to the programmable controller CPU is stored in the Ethernet module Yes (1) or No (0).

∗2 The value stored in each head address shown in the table indicates the offset address (0H to nH) from the head address of the buffer memory in which the applicable address is stored (address: 268BH to 3FFFH).

POINT

(1) The Ethernet module checks whether or not there are any incoming mails addressed to the local station in the mail server at the time interval set in the inquiry interval in the "Network Parameter Ethernet e-mail setting" screen of GX Developer.
If there are incoming mails addressed to the local station, the reception information is stored in the following areas of the buffer memory.
- Bit 15 is turned on in the mail information storage area (see ∗1 above).
- The number of receive mails on the mail server is stored in the receive mail count storage area (address 5870H).
  ∗ When more than one receive mails are stored on the mail server, the receive mail information can be stored in the buffer memory in the same way as described above by designating "Inquire" in the MRECV instruction's control data item.
  Receive mails can successively be read based on this stored information.

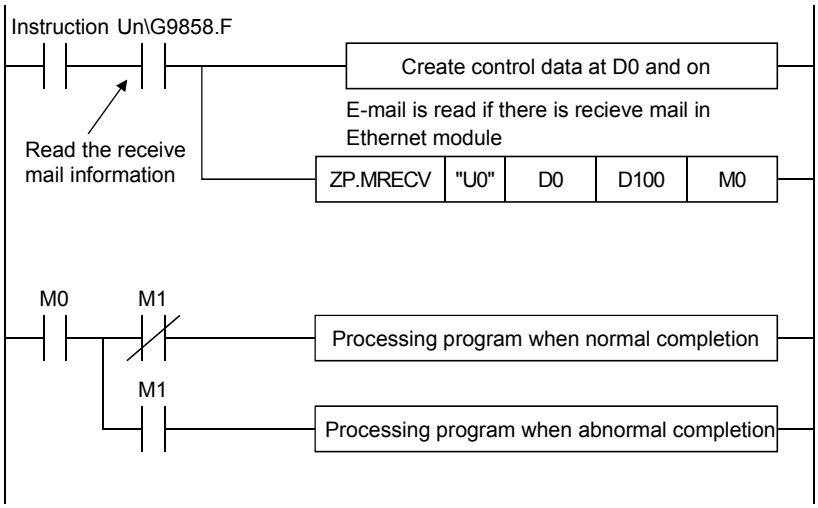
(2) Read receive mails stored on the mail server using the MRECV instruction. Receive mails will accumulate on the mail server if the MRECV instruction is not executed.

(3) After executing the MRECV instruction, e-mails that have been read are deleted from the mail server.
(Receive mails read will not remain on the mail server.)

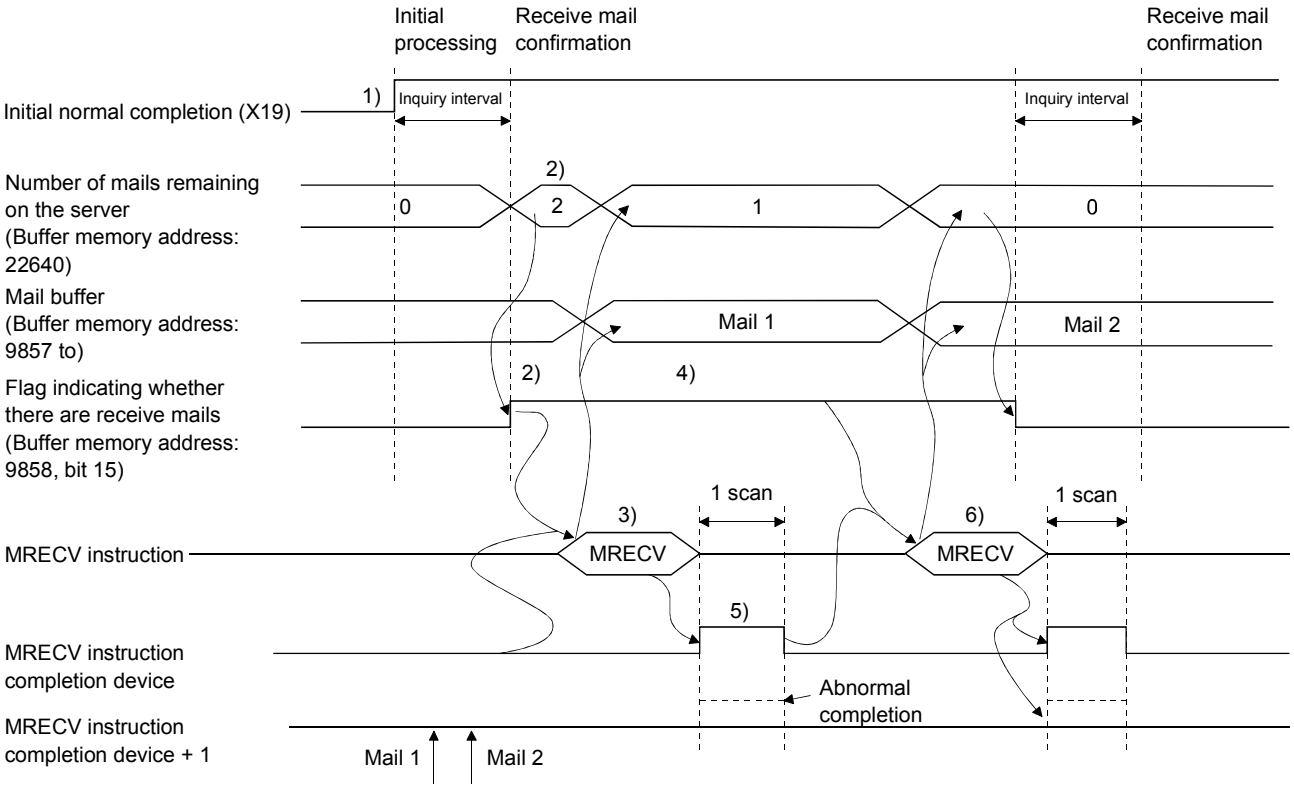
(4) If the Ethernet module has received e-mail longer than the reception data length specified with the MRECV instruction, it stores the data equivalent to the reception data length and ignores the remaining data.

(1) Reception using the sequence program

The following explains the designation method in a sequence program.
For details, see Chapter 6, "MRECV".



(2) Execution timing of the instruction



1) Start up the local station programmable controller.
   The parameters for the e-mail function are stored in the Ethernet module.
2) Check whether or not any received e-mails are stored on the mail server.
   If any receive mail has been stored, the receive mail information is stored in the buffer memory.
3) Execute the MRECV instruction.
   Read e-mails from the server.
   * E-mails that have been read will not remain on the mail server.
4) The flag indicating whether or not there is a receive mail stays on by designating "Inquire" with MRECV instruction's control data item.
5) When reading e-mails is completed, the MRECV instruction completion device turns on.
   When the completion device + 1 (abnormal completion signal) turns on, the error code is stored in the control data completion status ((S)+1).
   * For details on the causes of errors, see "Troubleshooting" in the Q Corresponding Ethernet Interface Module User's Manual (Basic).
6) Execute the MRECV instruction.
   Continue to read e-mails remaining on the mail server.

POINT

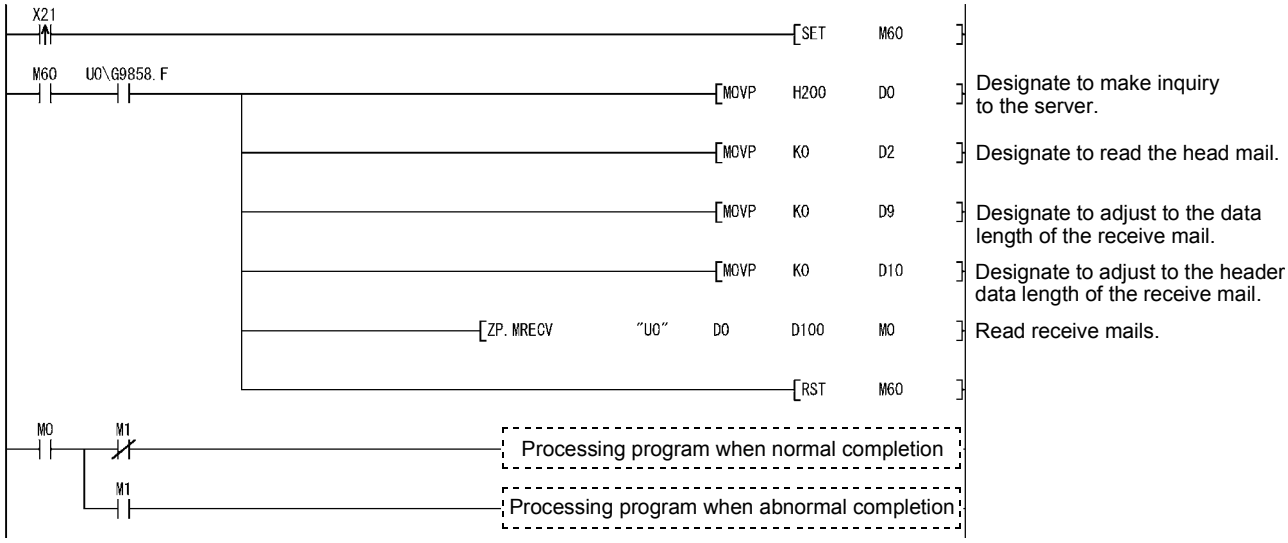
(1) Reading receive mails to the Ethernet module
The Ethernet module automatically checks the mail server to see whether or not there are any receive mails at the inquiry interval set with GX Developer. If there are any receive mails addressed to the local station, the reception information is stored in the buffer memory; the MRECV instruction should be executed based on this information.

(2) When there are two or more receive mails on the mail server
By designating "Inquire" in the MRECV instruction's control data, the Ethernet module also reads the information of the remaining receive mails on the mail server and stores it in the buffer memory when the MRECV instruction is executed.
Continue to execute the MRECV instruction based on this information.

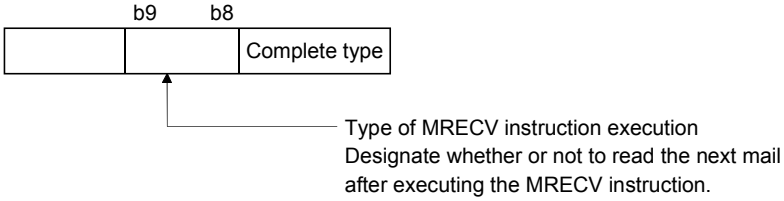
(3) Sample program

The following is a sample program for receiving e-mail by a programmable controller CPU.
It performs reception processing of e-mail using the receive command (X21).

When I/O signals of the Ethernet module are X/Y00 to X/Y1F.



* The following explains the types of execution that can be designated in the MRECV instruction's control data. For more details on how to designate the execution types, see Section 6.2 "MRECV Instruction".



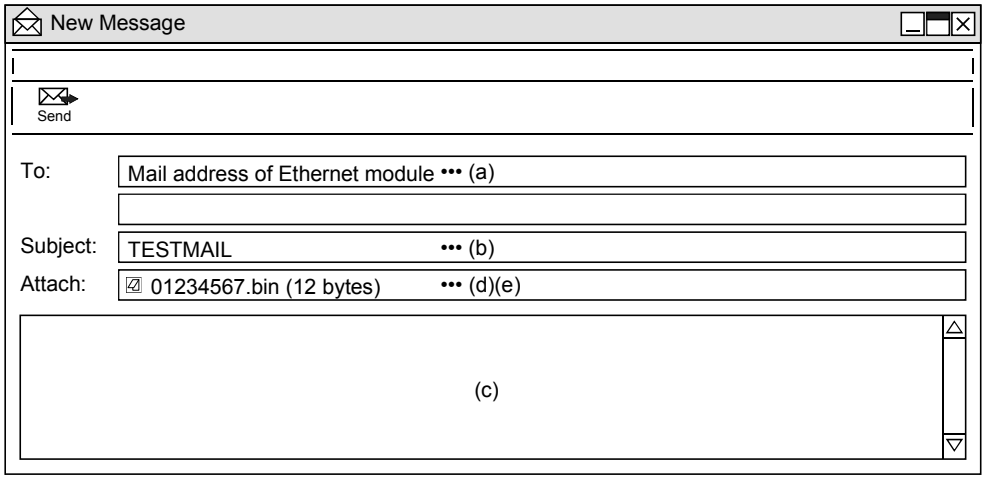
Setting value for designating the type of execution		Setting type	Description of processing	Merit	Demerit
b9	b8				
0	0	Do not inquire * Do not read	Execute only e-mail read processing. The inquiry (read) processing of the remaining receive mail information is executed after the time set with a parameter of GX Developer has elapsed.	Inquiries to the mail server can be less frequent.	The next receive mail cannot be read immediately. Mails tend to accumulate on the mail server.
1	0	Inquire * Read	Execute read processing of e-mails. After executing the MRECV instruction, the inquiry (read) processing of the remaining receive mail information is also executed.	Mails received by the mail server can be read in succession.	Inquiries to the mail server become more frequent. More processing in the module affects other internal processing.

(4) Sending from a personal computer

This section explains how to send e-mails from a PC/UNIX to the Ethernet module.
Once an environment that is capable of using the Internet through an application program that handles e-mail is set up, e-mail can be created and sent on the New Message screen.

POINT

As for an e-mail program that sends e-mail to the Ethernet module, use a program that can designate the encoding method (Base 64/7 bits/8 bits/Quoted Printable) of attached files.



(a) To
Designate the mail address of the Ethernet module.

(b) Subject
Designate the subject of the e-mail to be sent to the Ethernet module in ASCII format.

(c) Main text
Do not designate data (the Ethernet module ignores it.)

(d) Attach file
Data can be sent as an attached file.
Send the attached file data as binary data.
* The Ethernet module does not convert the received attached file data from ASCII to binary.

(e) Attached file name
Designate the name of the attached file using alphanumeric characters. (It is recommended to use the name within eight characters.) Designate either ".bin" or ".asc" for the attached file extension. The stored data will be received as binary data.

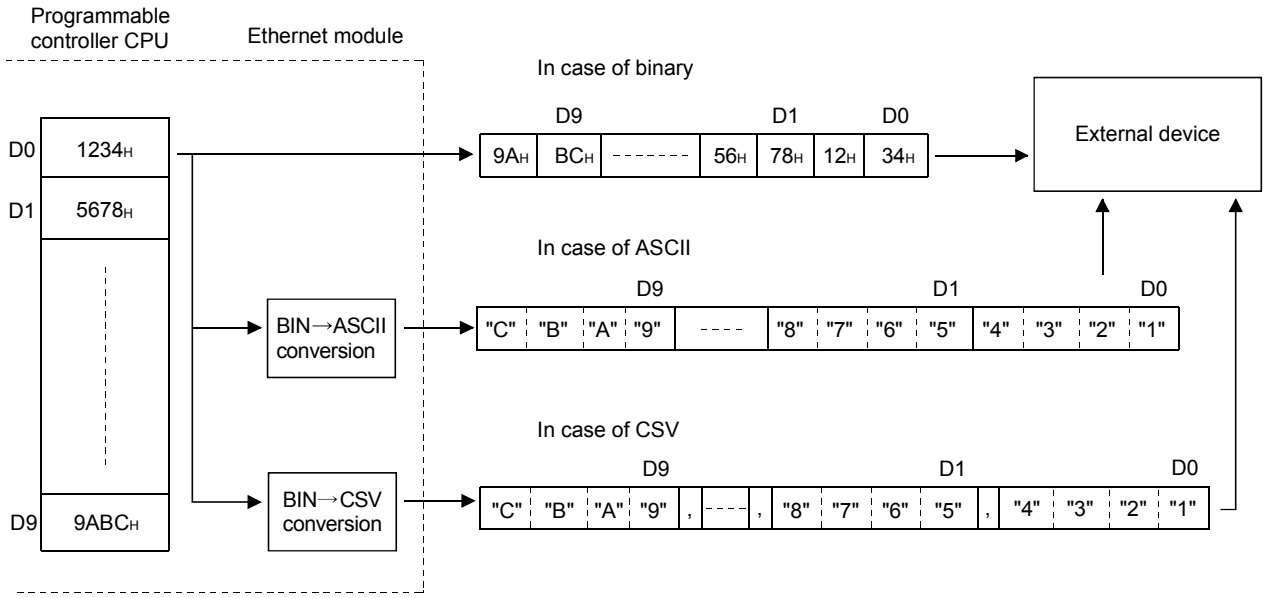
REMARKS

Designate a single attached file when sending e-mail to the Ethernet module.
If more than one files are attached, the destination Ethernet module will store only the first file and ignore the rest of the attached files.

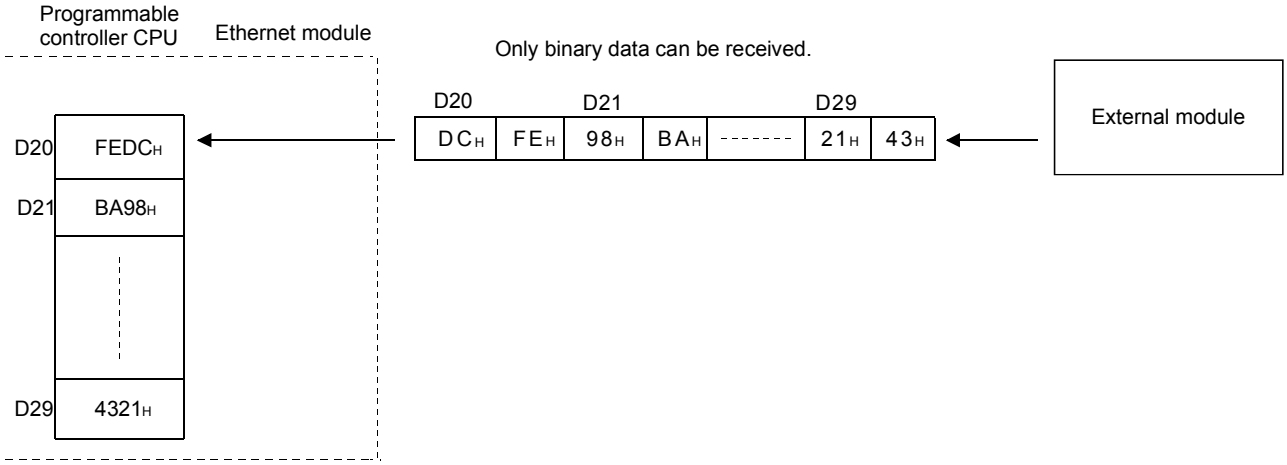
2.7.3 Contents of the attached files

The following explains the contents of the attached file data.
The data format of the attached file is ASCII code (ASCII format, CSV format) or binary code (binary format).
The following example shows the transmission contents for each data format (binary/ASCII/CSV) when the Ethernet module sends the data register value as an attached file.

(1) When sending from the Ethernet module



(2) When receiving by the Ethernet module



REMARKS

(1) For details on the order of data items when sending/receiving bit device data, see the figure shown in Section 2.9.2.

(2) Data configuration in CSV format

Data in CSV format can be used as control data for the cell units in Excel, etc. Data in CSV format handled by the Ethernet module is the data expressed as follows.

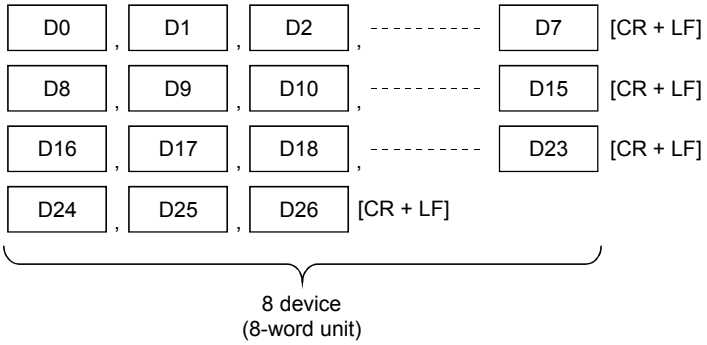
- 1 word (16 bits) binary data is converted to four digit ASCII code when expressed as a hexadecimal. (4 bytes of ASCII code)
- When handling multiple word data, insert comma data between each word (4 bytes of ASCII code).

Data designated by the MSEND instruction or data subject to the news function is sent in the following arrangement.

(a) Arrangement of data sent by the MSEND instruction

1) In addition to the data conversion and insertion described above, CR (code: $0D_H$) and LF (code: $0A_H$) are inserted for each 8 words of data.

2) The arrangement of data sent in CSV format is shown below.

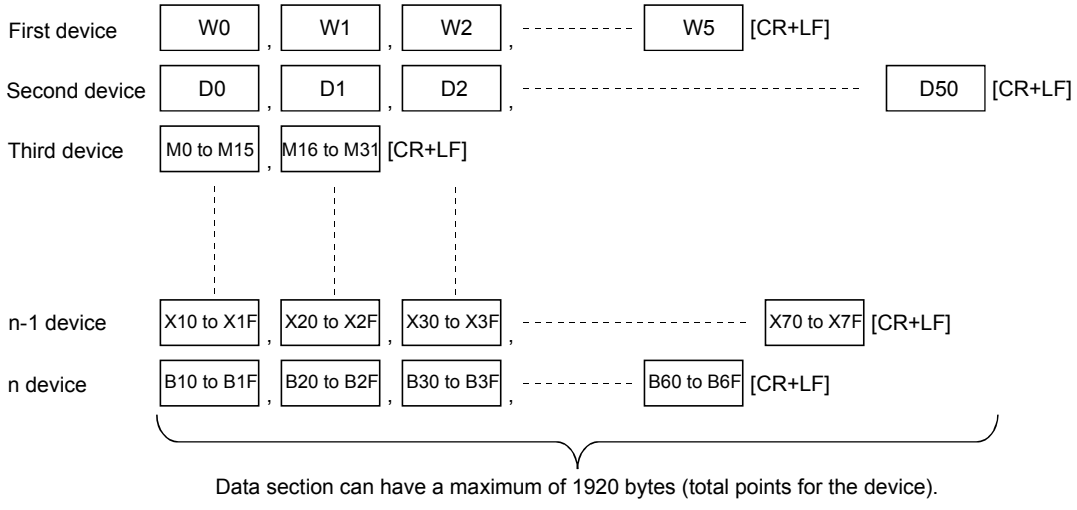


(b) Arrangement of data sent using the news function

1) In addition to the data conversion and insertion of comma data described above, CR (code: $0D_H$) and LF (code: $0A_H$) are inserted for each setting device range.

2) A maximum of 16 types of device ranges can be set for news data.
＊ See Section 2.9 for details.

3) The arrangement of data sent in CSV format is shown below.

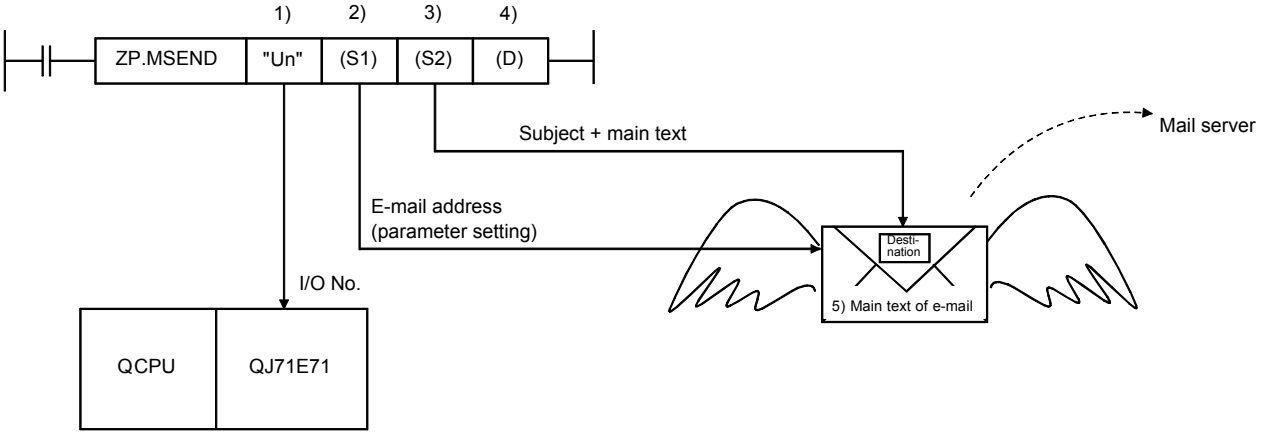


2.8 Sending E-mail (Main Text) by the Programmable Controller CPU

This section explains how to send the main text of e-mail using the dedicated MSEND instruction available for the Ethernet module.

2.8.1 When sending data as main text of e-mail

The following explains the MSEND instruction and program for sending e-mail.
The following illustration shows how the MSEND instruction is used to store data in the main text of e-mail and send it to an external device.



1) I/O number of the Ethernet module

2) Control data (such as sending e-mail address)
This indicates the e-mail address of the transmission destination device set on the Send E-mail Address Settings screen.

3) Sending e-mail (Subject + main text)
The Subject consists of No. of transmissions and the character data specified by a sequence program. (It is not converted to ASCII format.)
* Designate text data in ASCII characters in sequence programs.

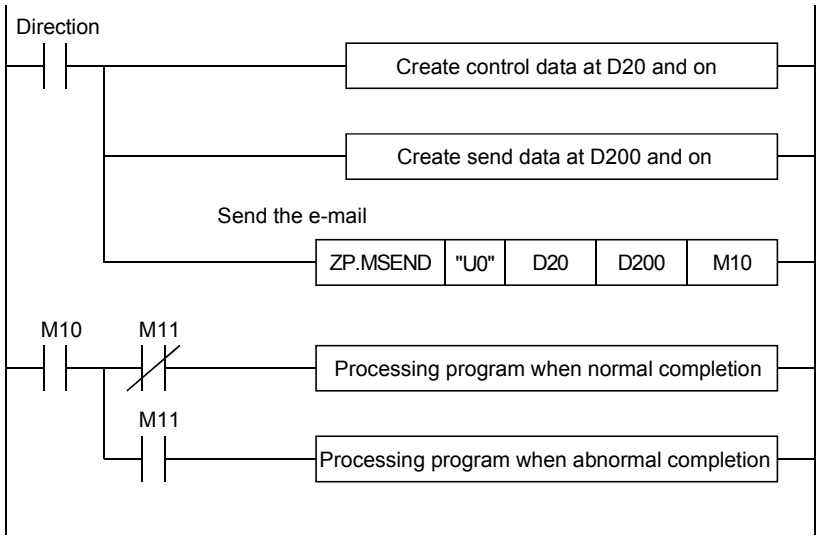
4) Completion bit

5) Main text of e-mail
This indicates the character string designated by the MSEND instruction.
It is not converted to ASCII format by the Ethernet module.
* Designate the main text in ASCII characters in sequence programs.
* The following binary code data is processed as control codes:
$0D0A_H$: Line feed code CR+LF
00_H: End of main text
* It is recommended to use 78 characters or less data when writing each line of the main text (sending data). (Be sure to add a line feed code CR+LF ($0D0A_H$) at the end of the main text lines.)

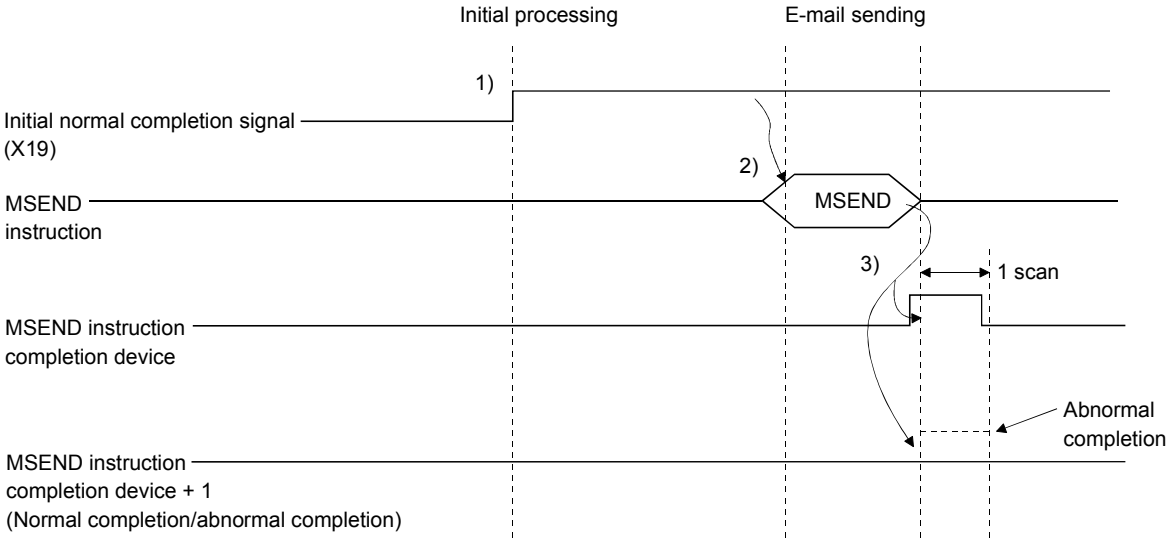
6) Attached file
No attached file can be sent when sending data as the main text of e-mail.

(1) Send using the sequence program

The following explains how an e-mail is sent by the sequence program.
See Chapter 6 MSEND for detail.



(2) Execution timing of the instruction



1) Start the local station programmable controller.
The parameters for the e-mail function are stored in the Ethernet module.

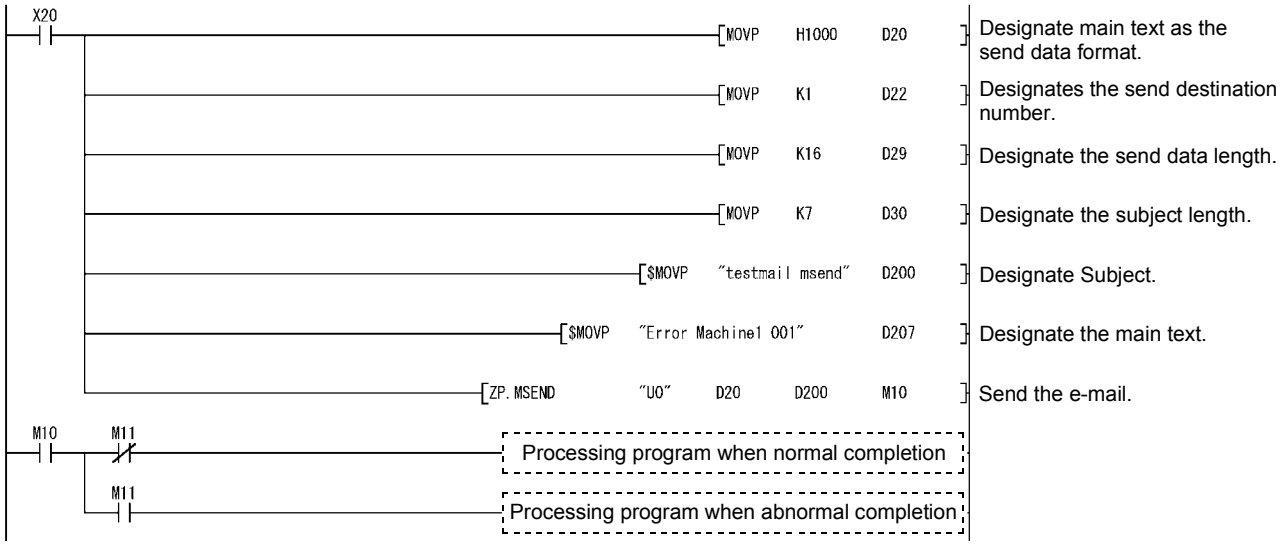
2) Execute the MSEND instruction.
The e-mail designated with the MSEND instruction is sent to the mail server.

3) When the e-mail sending to the send mail server is completed, the MSEND instruction completion device turns on.
When the completion device + 1 (abnormal completion signal) turns on, the error code is stored in the control data completion status ((S1)+1).
* For details on the causes of errors, see "Troubleshooting" in the Q Corresponding Ethernet Interface Module User's Manual (Basic).

(3) Sample program

The following shows a sample program for sending e-mail by the programmable controller CPU.
Perform e-mail transmission processing the send command (X20).
The contents of the send data are shown in (4).

When I/O signals of the Ethernet module are X/Y00 to X/Y1F

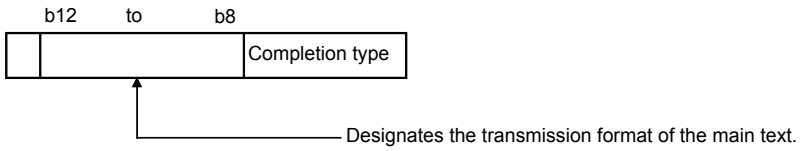


REMARKS

When an error occurs while sending e-mail from the sending mail server to an external device, an error code is stored in the receiving error log area.

∗1 The following shows the transmission format of the main text designated in the control data of the MSEND instruction.
If data is sent as the main text of e-mail, the Ethernet module does not convert the transmission format.

∗ Designate the main text data in ASCII characters in sequence programs.



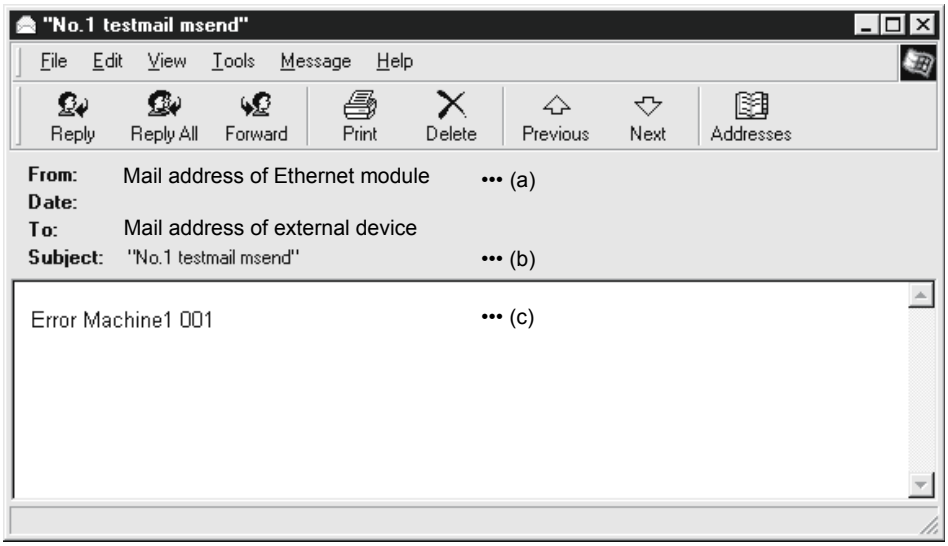
Setting values for designating the main text data transmission format					Format set	Applicable station	Description of processing
b12	b11	b10	b9	b8			
1	0	0	0	0	No conversion	PC/UNIX/ portable terminal	Send the main text data. The Ethernet module does not convert the transmission format. ∗ Designate the main text data in ASCII characters in sequence programs.

(4) Receiving by the a personal computer

The following explains how a PC/UNIX/portable terminal receives e-mail sent from the Ethernet module.

After setting an environment for using the Internet with application software that processes e-mails, e-mails can be received on a receive message screen as shown below.

(Example) The following shows an example of the reception of e-mail sent using the MSEND instruction (see (3)).
(The screen display shows is that of Microsoft® Corporation's Outlook Express 5.)



(a) From
Displays the e-mail address of the Ethernet module.

REMARKS

By entering the mail addresses of the send destination devices in the address book, the registered names (display names) can be displayed and it makes the management easier.

(b) Subject
This indicates the No. of transmissions (∗1) and the Subject written by a sequence program.
∗1 The number is automatically incremented every time an e-mail is sent from the Ethernet module, starting from 1.
(After the maximum number (4294967296) is reached, the number starts again from 0.)

(c) Main text of e-mail
This indicates the main text of e-mail sent by the Ethernet module.

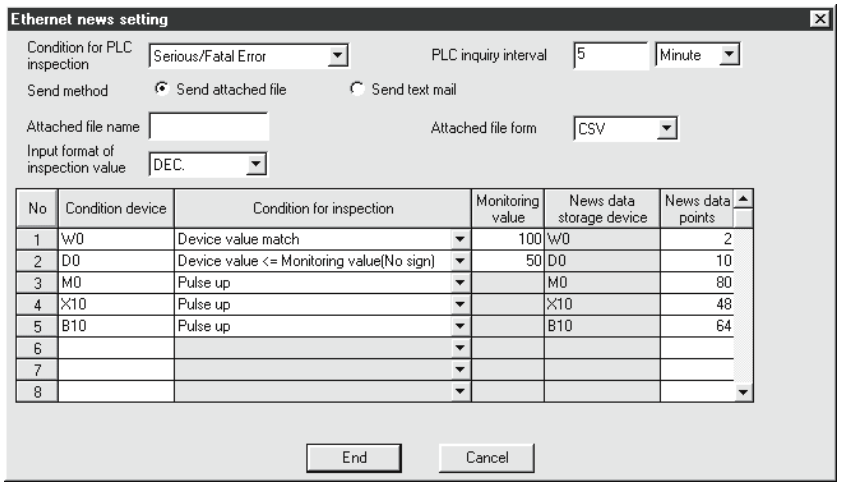
2.9 Sending E-mails Using the Programmable Controller CPU Monitoring Function

When the monitoring information read from the QCPU matches with the news conditions set by the user, the Ethernet module sends an e-mail to the external device.

2.9.1 News setting

[Purpose of setting]
The monitoring conditions (notification conditions) of the programmable controller CPU can be set on the News setting screen of GX Developer.
The monitoring function of the programmable controller CPU can be used according to this setting.
Both CPU status monitoring and device monitoring can be designated as notification conditions.
[Start procedure]
[E-mail setting] → News setting

[Setting screen]



News settings

Item name	Description of setting	Notification condition		Setting range/option
		CPU status monitoring (*1)	Device monitoring	
Condition for PLC inspection	Select the monitoring condition for the CPU	○	×	• No setting • Normal STOP • Module error/Module system error (Serious/Fatal Error) • Module warning STOP (Moderate error STOP) • Normal RUN • Module warning RUN (Moderate Error STOP) • PAUSE
Send method	Select the data send method.	×	○	• Send attached file • Send text mail
Attached file form	Set the data format for the attached file	×	○	• Binary format • ASCII format • CSV format
Attached file name	Set the attached file name	×	○	—
PLC inquiry interval	Set time interval between reading the CPU status and device values and the units (h/min/s)	○	○	• 30 s to 24 h
Input format of inspection value	Select the input format of the monitoring data	×	○	• Decimal/hexadecimal
Condition device	Set the condition device	×	○	—
Condition for inspection	Set the monitoring condition	×	○	—
Monitoring value	Set the monitoring value	×	○	—
Notification data storage device	Notification data storage device value	×	○	—
Notif. data points	Set the notification data points	×	○	—

○: Setting item ×: Setting not required

*1 When an e-mail is sent with the programmable controller status inspection, only subject (programmable controller CPU status is stored) is sent.

(1) Condition for PLC inspection

Condition for PLC inspection	Description
Normal STOP	Sends an e-mail when the programmable controller CPU is placed in the STOP status normally.
Module error Module system error	Sends an e-mail when an error that stops the CPU execution has occurred.
Module warning STOP	Sends an e-mail when the programmable controller CPU is stopped by an external operation, etc. while an error that allows to continue the CPU execution has occurred.
Normal RUN	Sends an e-mail when the programmable controller CPU is placed in the RUN status normally.
Module warning RUN	Sends an e-mail when an error that does not allow to continue the CPU execution has occurred while the programmable controller CPU is in the RUN status. (The programmable controller CPU is in operation.)
PAUSE	Sends an e-mail when the programmable controller CPU is placed in the PAUSE status.

(2) Send method

Select the send method of the device monitoring results.

Item	Explanation
Send attached file	Sends data as an attached file in the file format designated in (3).
Send text mail	Sends data as the main text of e-mail in ASCII code format. It is not necessary to designate items (3) and (4) when this setting is used.

(3) Attached file format

Item	Explanation
Binary format	Sends the attached file in binary format. The Ethernet module sends the attached file as they are with the code currently in use. (Binary to ASCII conversion is not performed.)
ASCII format	Sends the attached file in ASCII format. The Ethernet module converts the attached file from binary to ASCII.
CSV format	Sends the attached file in CSV format. The Ethernet module converts the attached file from binary to CSV.

(4) Attached file name

Designate the name of an attached file. If a file name is not designated, the Ethernet module automatically names it and sends the file named mmddhhss (month, date, hour, minute) (same as for e-mail sending).

(5) PLC inquiry interval

Designate the interval for the Ethernet module to read the CPU status and device values from the programmable controller CPU.
The user can designate any inquiry time interval (time) within the ranges shown below.

Time unit	Setting range (default: 5 min)
h	1 to 24
min	1 to 1440
s	30 to 3600

(6) Input format of inspection value

Select the input format (decimal/hexadecimal) of the monitoring value.

(7) Condition device

Designate the device to be monitored.

POINT

(1) A maximum of 16 devices can be monitored.

(2) It is possible to designate devices that can be accessed for communication using the MC protocol directly as condition devices (see the Reference Manual).
In this case, Timer, Retentive timer and Counter should be designated by T, ST, or C.
The following devices cannot be designated:
- Step relay (S)
- Direct input (DX)
- Direct output (DY)
- Index qualification
- Indirect designation

(3) After completion of the news setting, the system will rearrange the condition devices in the order; word devices first and then bit devices.
Display the news setting screen again to confirm the condition device settings.

(8) Condition for inspection

Designate the news conditions to monitor the devices of the programmable controller CPU.
The following table lists the comparison conditions for the designated device.

Condition of comparison		News condition
Bit device	No conditional settings	For each monitoring.
	Rise	When switching from off to on is detected.
	Drop	When switching from on to off is detected.
Word device	No conditional settings	For each monitoring.
	No conditional settings (Character String send)	For each monitoring.(Selectable when “Send text mail” and “Word device” are set for “Send method” and “Condition device” respectively.)
	Device value = monitoring value	When the monitoring device value and the value set by the user are the same.
	Device value ≠ monitoring value	When the monitoring device value and the value set by the user are different.
	Device value ≦ monitoring value (unsigned)	When the monitoring device value is equal to or less than the value set by the user.
	Device value < monitoring value (unsigned)	When the monitoring device value is less than the value set by the user.
	Device value ≧ monitoring value (unsigned)	When the monitoring device value is equal to or greater than the value set by the user.
	Device value > monitoring value (unsigned)	When the monitoring device value is greater than the value set by the user.
	Device value ≦ monitoring value (signed)	When the monitoring device value is equal to or less than the value set by the user.
	Device value < monitoring value (signed)	When the monitoring device value is less than the value set by the user.
	Device value ≧ monitoring value (signed)	When the monitoring device value is equal to or greater than the value set by the user.
	Device value > monitoring value (signed)	When the monitoring device value is greater than the value set by the user.

(9) Monitoring value

Designate the comparison value of the condition of comparison given in (8) above.

(10) Notification data storage device (News data storage device)

The condition device that stores the news data is set when the news condition is satisfied.

When the CPU monitoring condition shown in (1) is "No setting", GX Developer automatically sets the condition device, so the user does not need to set it.

(11) Notif. data points (News points)

Designate how many devices should be read (number of points read) from the devices designated in (10) above.

(a) The number of device points that can be sent at a time is calculated as follows.

Word device points $\times$ 2 + bit device points $\div$ 8 (round up) $\leqq$ 1920

1) Designate the settings so that the total number of points satisfies the equation above when multiple news conditions are satisfied when monitoring multiple condition devices.

2) When multiple bit devices are to be designated, be aware of following:

• One device occupies 16 device points.

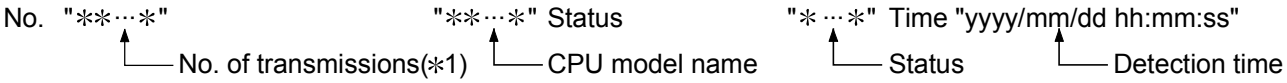
2.9.2 Receiving a news e-mail

The designated external device side can open the news e-mail from the Ethernet module in the same way as opening a mail received from the programmable controller CPU.

(1) When monitoring the CPU status

(a) When the result of the CPU status monitoring matches the monitoring condition, the Subject will be sent. The attached file or main text will not be sent.

(b) The following shows the contents for the Subject sent.



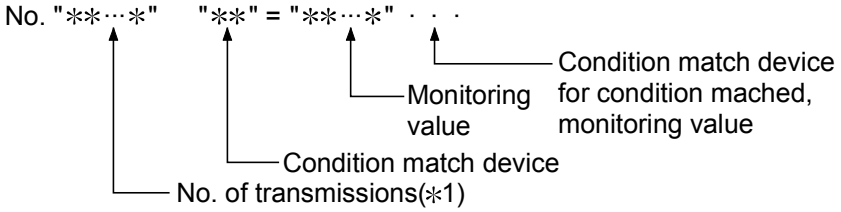
(Send contents of the parts for the status)

CPU module status		Send contents
During RUN	At normal	"Status : RUN"
	At module warning occurrence	"Status : RUN (Warning)" or "Status : RUN (Slight Abnormal)"
During STOP	At normal	"Status : STOP"
	At module warning occurrence	"Status : STOP (Warning)" or "Status : STOP (Slight Abnormal)"
	During the module error or module system error	"Status : STOP (Serious/Fatal Error)" or "Status : STOP (Abnormal)"
During PAUSE	—	"Status : PAUSE"

(2) When monitoring a device

(a) Once any of the results of the device monitoring matches the monitoring condition among the devices having the conditions designated on the "Ethernet news setting" screen, the Subject and attached file, or the Subject and main text will be sent.

(b) The following shows the contents for the Subject sent.



(C) All device values for the number of registered points designated on the "Ethernet news setting" screen are recorded in the attached file or main text. The size of the data recorded in the attached file or main text is calculated as follows:

Information of bit devices:

$$\frac{\text{Reqistered points (number of bits)} \div 16}{\text{(Round up to a whole number)}} \times 2 \text{ bytes}$$

Information of word devices:

$$\text{Registered points (number of devices)} \times 2 \text{ bytes}$$

*1 The number is automatically incremented every time an e-mail is sent from the Ethernet module, starting from 1.
(After the maximum number (4294967296) is reached, the number starts again from 0.)

(d) The contents of the data recorded are as follows.

1) When sending data as an attached file

- If the data format is binary, values are recorded from the lower byte (L) side.
- If the data format is ASCII, target values are converted to 4-digit hexadecimal ASCII codes and recorded from the higher byte (H) side of the values.
- If the data format is CSV, target values are converted to 4-digit hexadecimal ASCII codes and recorded from the higher byte (H) side of the values.
  If multiple word data is to be processed, insert a comma between each word (4-byte ASCII code) data.
  Insert CR (Code: 0D$_H$) and LF (Code: 0A$_H$) every each setting device range.

(Example) In case of M15 to M0 = 0001 $_H$, M31 to M16 = 0002$_H$, ..., W0 = 001A $_H$, W1 = 002B $_H$, ...

For M15 to M0

M15	to	M12	to	M8	to	M4	to	M0
0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 1

For binary

W0(L)W0(H)W1(L)W1(H)	D0(L)D0(H)D1(L)D1(H) - - - - - - - - - - - - - -	D8(L)D8(H) D9(L)D9(H)
1A 00 2B 00	11 00 12 00	- - - - - - - - - - - - - - 19 00 1A 00

M0 M8 M16 M24 - - - - - - - - - -	M72	X10 X18 X20 - - - - X38	B10 B18 - - - B40 B48
01 00 02 00 03 00 04 00 05 00		60 00 61 00 62 00	30 00 - - - 33 00

For ASCII

W0 W1	D0 D1 D2 D3 D4 D5 D6 D7 D8 D9
001A 002B	0011 0012 0013 0014 0015 0016 0017 0018 0019 001A

M0 M16 M32 M48 M64	X10 X20 X30	B10 B20 B30 B40
0001 0002 0003 0004 0005	0060 0061 0062	0030 0031 0032 0033

For CSV

W0 W1 001A,002B [CR+LF]
D0 D1 D2 D3 D4 D5 D6 D7 D8 D9 0011,0012,0013,0014,0015,0016,0017,0018,0019,001A [CR+LF]
M0 M16 M32 M48 M64 0001,0002,0003,0004,0005 [CR+LF]
X10 X20 X30 0060,0061,0062 [CR+LF]
B10 B20 B30 B40 0030,0031,0032,0033 [CR+LF]

* The spaces and lines between device numbers and device values are inserted for the purpose of explanation. They are not recorded in the attached file.

2) When sending data as main text

<When data format is CSV>

- Target data values are converted to 4-digit hexadecimal ASCII codes and recorded from the higher byte (H) side of the values.
- The device name and display device No. are recorded for each setting device.
- If multiple word data is to be processed, insert a comma between each word (4-byte ASCII code) data.
  Insert a CR (code: 0D$_H$) and a LF (code: 0A$_H$) for each setting device range or 8-word data.

(Example) In case of M15 to M0 = 0001$_H$, M31 to M16 = 0002$_H$, ..., W0 = 001A$_H$, W1 = 002B$_H$, ...

For M15 to M0

M15	to	M12	to	M8	to	M4	to	M0
0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 1

For the main text of e-mail

```
W0-W1 [CR+LF]
001A,002B [CR+LF]
----------
D0-D9 [CR+LF]
0011,0012,0013, 0014, 0015 ,0016,0017 , 0018 [CR+LF]
0019, 001A [CR+LF]
----------
M0-M79 [CR+LF]
0001,0002, 0003, 0004, 0005 [CR+LF]
----------
X10-X3F [CR+LF]
0060,0061, 0062 [CR+LF]
----------
B10-B4F [CR+LF]
0030,0031,0032, 0033 [CR+LF]
```

* The dotted boarder lines between device values in the above figure are inserted for the purpose of explanation. They are not recorded in the main text.

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<When data format is character strings (binary)>

- The device name and display device No. are recorded for each setting device.
- When “Condition for inspection” is set to “No conditional settings (character string send)”, “Notification data storage device” records the data of specified notification points starting from the low byte (L) of the specified value. (If NULL (00_H) exists in the range, contiguous data immediately before it are recorded.)
- Insert CR (Code: $0D_H$) and LF (Code: $0A_H$) for each setting device range.

(Example) Setting “No conditional settings (character strings send)” to “Condition for inspection”, “D0” to “Notification data storage device”, and “20 points” to “Notif. data points”:
This means that “Normal system start completion” is stored in D0 to D19 by the $MOV instruction.

For the main text of e-mail (character string (binary) format)

D0-D19 [CR+LF]
Normal system start completion [CR+LF]

* ASCII or SHIFT-JIS format values must be set in the Notification data storage device.

POINT

(1) When e-mail is sent after the result of the device monitoring and the monitoring condition match, the Subject and attached file, or the Subject and main text will be sent.
As a device monitoring result, the data that was read from the programmable controller CPU by the Ethernet module in order to determine whether or not the conditions match will be sent.
For details on the correspondence between the word device values and the data format of the attached file, see the figure in Section 2.7.3.
The main text will be sent after converting the data read into ASCII code data.
If the condition for inspection is set to “No conditional settings (character strings send)” for e-mail text transmission, however, binary code data are sent without being converted.

(2) When e-mail is sent after the result of the CPU status monitoring and the monitoring condition match, only the Subject will be sent. The attached file and main text will not be sent.

3 WHEN COMMUNICATING WITH CC-LINK IE CONTROLLER NETWORK, MELSECNET/H, MELSECNET/10 RELAY

The Ethernet network system can be in the same class as the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network system. External device or Ethernet module installed QCPU station can give access to the other stations via Ethernet networks and CC-Link IE controller network, MELSECNET/H, MELSECNET/10 within the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 specification range.
In this chapter, the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication functions are described, to perform data communication with another station's programmable controller CPU via Ethernet module or CC-Link IE controller network, MELSECNET/H, MELSECNET/10 from the QCPU at external device or Ethernet module installed QCPU station.

3.1 CC-Link IE controller network, MELSECNET/H, MELSECNET/10 Relay Communication

The CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication is a function to perform the following data communication to another station's programmable controller via Ethernet or CC-Link IE controller network, MELSECNET/H, MELSECNET/10 from the external device or Ethernet module installed QCPU station.
By setting the parameter described in Section 3.3, the other station access becomes possible with the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function.

<table>
<tr><th rowspan="2">Function that can be used for communication</th><th colspan="2">Communication range</th><th rowspan="2">Communication request source</th><th rowspan="2">Function reference section</th></tr>
<tr><th>When using this function</th><th>When not using this function</th></tr>
<tr><td>Communication using the MC protocol</td><td rowspan="3">Possible to read/write data from/to another station's programmable controller, which is the access request destination, from an access source device via multiple CC-Link IE controller network, MELSECNET/H, MELSECNET/10 and Ethernet network systems.</td><td rowspan="3">Only possible to read/write data from/to the programmable controllers of other stations in the same Ethernet or CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network system as that of the station in which the Ethernet module is installed.
(Example) Only access 1) shown in the diagram in Section 3.2.1 is possible.</td><td>External device</td><td>Reference Manual</td></tr>
<tr><td>Communication using the data link instructions</td><td>Network module installed QCPU station</td><td>Chapter 4</td></tr>
<tr><td>Communication with other stations using GX Developer</td><td>GX Developer</td><td>GX Developer Manual</td></tr>
</table>

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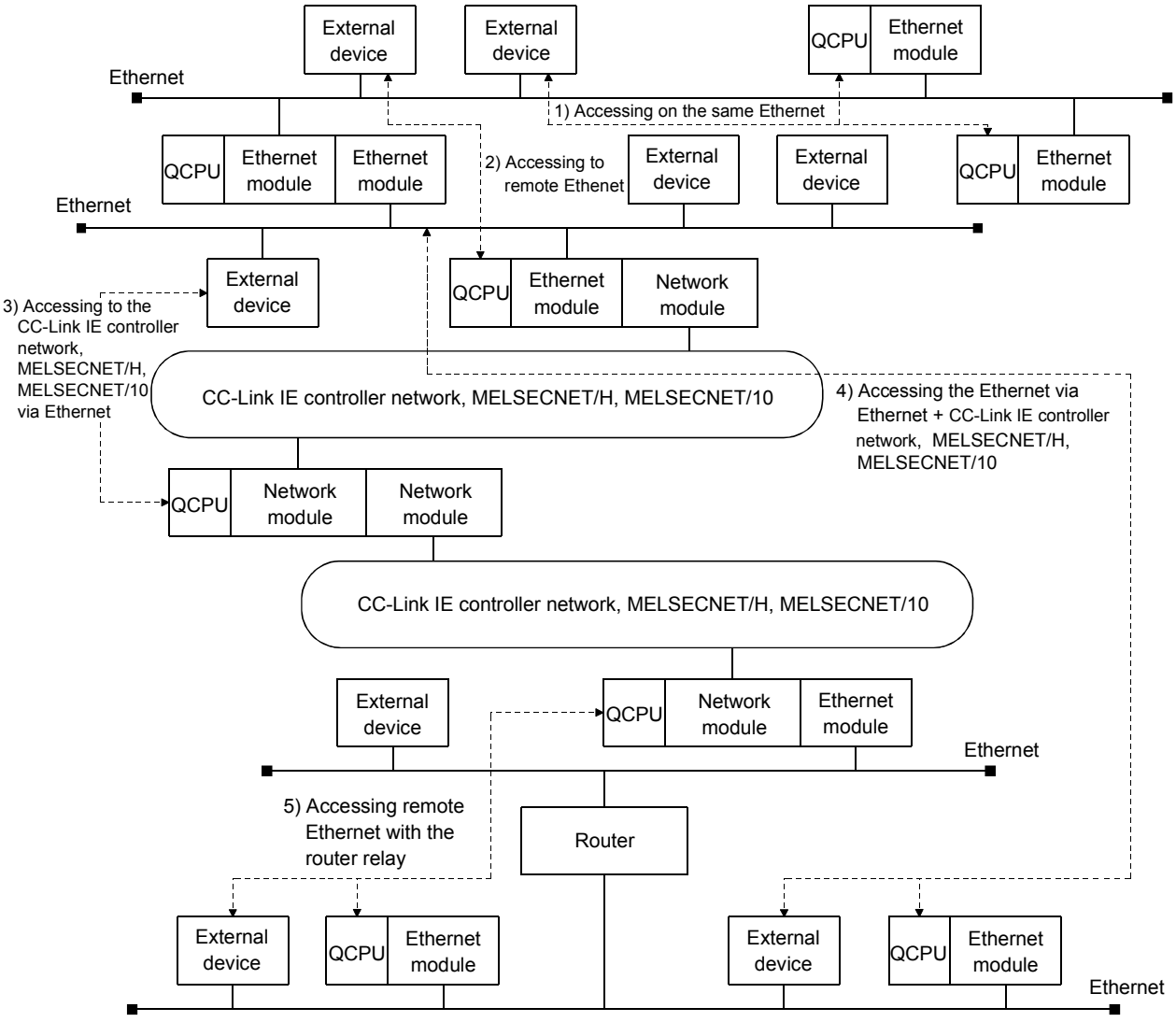
3.2 Range of Accessible Other Station's Programmable Controllers and Accessible Stations

The accessible range and the stations when performing the other station access via Ethernet module using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function is described.

3.2.1 Accessible range and stations



(1) Accessible range

1) Routing via the Ethernet and CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network systems is allowed within the range of the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 specifications.
   * Accessing other station is possible between devices indicated by 1) to 5) in the figure above.
2) The only networks that can be routed are the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 and Ethernet.

(2) Accessible stations (communication request destination stations) and relay stations (communication relay stations)

This relay communication function allows communication with programmable controllers of other stations if the communication destination programmable controllers (communication request destination stations) and all the relay stations to the communication destination stations (communication relay stations) are configured with the modules listed below.

(a) Accessible modules (communication request destination stations: other stations)

1) Programmable controller CPU

		Model name
QCPU (Q mode)	Basic model QCPU	Q00JCPU, Q00CPU, Q01CPU
	High performance model QCPU	Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU
	Process CPU	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU
	Redundant CPU	Q12PRHCPU, Q25PRHCPU
	Universal model QCPU	Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q13UDHCPU, Q26UDHCPU Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q13UDEHCPU, Q26UDEHCPU
Safety CPU (*1)		QS001CPU
QnACPU		Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q3ACPU, Q4ACPU
	Redundant CPU	Q4ARCPU
ACPU QCPU (A mode)		A1NCPU, A2NCPU, A2NCPU-S1, A3NCPU, A2ACPU, A2ACPU-S1, A3ACPU, A2UCPU, A2UCPU-S1, A3UCPU, A4UCPU, A1SCPU, A1SJCPU(-S3), A1SHCPU, A1SJHCPU, A2SCPU, A2SHCPU, A2ASCPU, A2ASCPU-S1, A0J2HCPU, Q02CPU-A, Q02HCPU-A, Q06HCPU-A

*1 The safety CPU can be used only as a request target station, and cannot be used as a relay station.

2) Remote I/O station modules

	Model name
MELSECNET/H Remote I/O station	QJ72LP25-25, QJ72LP25GE, QJ72BR15
MELSECNET/10 Remote I/O station (*2)	AJ72QLP25, AJ72QBR15, A1SJ72QLP25, A1SJ72QBR15 AJ72LP25(G), AJ72BR15,

*2 It is possible to read from and write to the buffer memory of special function modules that are installed in MELSECNET/10 remote I/O stations.

(b) Modules that can act as relays between networks (communication relay stations)

	Model name
CC-Link IE controller network	QJ71GP21-SX, QJ71GP21S-SX
MELSECNET/H	QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21GE, QJ71BR11 (MELSECNET/H mode)
MELSECNET/10	QJ71LP21, QJ71LP21-25, QJ71LP21S-25, QJ71LP21GE, QJ71BR11 (MELSECNET/10 mode)
	AJ71QLP21(S/G), AJ71QBR11, A1SJ71QLP21, A1SJ71QBR11
	AJ71LP21(G), AJ71LR21, AJ71BR11, A1SJ71LP21, A1SJ71BR11
Ethernet (*3)	QJ71E71-100, QJ71E71-B5, QJ71E71-B2, QJ71E71
	AJ71QE71N3-T, AJ71QE71N-B5, AJ71QE71N-B2, AJ71QE71N-T, AJ71QE71N-B5T, A1SJ71QE71N3-T, A1SJ71QE71N-B5, A1SJ71QE71N-B2, A1SJ71QE71N-T, A1SJ71QE71N-B5T, AJ71QE71, AJ71QE71-B5, A1SJ71QE71-B2, A1SJ71QE71-B5

*3 QnA series Ethernet interface modules can act as relays between networks if the function version is B or later.
Verify the function version with the production date shown in the "Date column of the rated plate", which is attached to the side of the module.
(Manufactured date: Year (last two digits), Month (two digits), function version (one digit))

3.3 Settings for Accessing Other Stations

This section explains the parameters and setting items that need to be set with GX Developer to access other stations via the Ethernet using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function.

(1) Network parameter, setting the number of Ethernet/CC IE/MELSECNET cards

1) Network No., group number, station number (station No.), etc. for using the Ethernet module are set on this screen.
2) Make sure to set the values by seeing Section 4.6 of the User's Manual (Basic).

(2) Setting the Ethernet Station No. <-> IP Information (setting the MELSECNET/Ethernet routing information)

1) The Ethernet's routing method, correspondences of the Ethernet module's IP address and Network No./station number, etc. for using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function are set on this screen.
2) Set these values by seeing Section 3.3.1.

(3) Setting the Ethernet/CC IE/MELSECNET routing information (setting of routing parameters)

1) On this screen, the routing parameters between Ethernet modules for accessing other stations on other CC-Link IE controller network, MELSECNET/H, MELSECNET/10 networks are set, in the same way as for the routing parameter settings of the CC-Link IE controller network, MELSECNET/H, MELSECNET/10.
   ＊ The Network No. and station number of the first communication relay station as seen from the local station are set.
2) These settings are required for a station in which two or more Ethernet modules or CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network modules are installed.
3) Set these values by seeing Section 3.3.3.

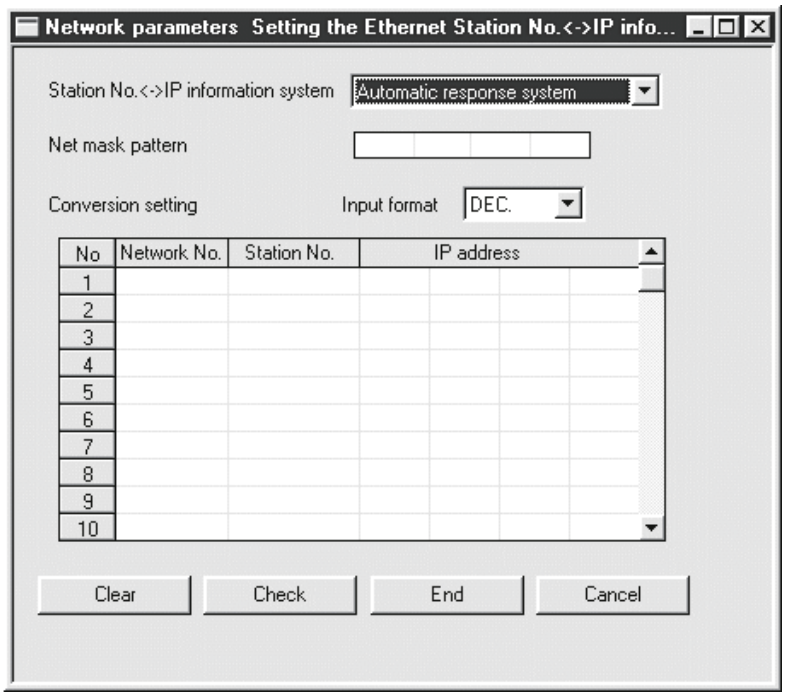
3.3.1 Setting the Station No. <-> IP information

The Station No. <-> IP information is used to obtain the IP address of the transmission destination station in order to send an access message to other station designated with the Network No. and station number, from one Ethernet module to the next Ethernet module.

This section explains the Station No. <-> IP information settings that are required to access other stations via the Ethernet module using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function.

Select [GX Developer] - [Network parameter] to start the [Network parameters Setting the Ethernet Station No. <-> IP information] screen.

For details on how to display this screen, see the GX Developer Operating Manual.



Setting the Station No. <-> IP information

Item name	Description of setting	Setting range/option
Station No. <-> IP information system	Select the Station No. <-> IP information system (conversion method).	• Automatic response system • IP address computation system • Table exchange system • Use-together system
Net mask pattern	• This setting is required when"IP address computation system" or "Use-together system" is selected as the conversion method. • Set the mask value used in the logical product with the local station's IP address.	C0000000H to FFFFFFFFH
Input format	Select the input format of "Net mask pattern" and "IP address" .	• Decimal • Hexadecimal
Network No.	• This setting is required when "Table computation system" or " Use-together system" is selected as the conversion method. • Set the Network No.s of the communication request destination/source stations.	1 to 239 (designate in decimal)
Station No.	• This setting is required when " Table computation system" or " Use-together system" is selected as the conversion method. • Set the station number of the communication request destination/source stations.	1 to 64 (designate in decimal)
IP address	• This setting is required when " Table computation system" or " Use-together system" is selected as the conversion method. • Set the IP address of the communication request destination/source stations.	Other than 00000000H and FFFFFFFFH

(1) Station No. <-> IP information system (conversion method) (address: 4H ... b7, b6)

(a) There are four kinds of Station No. <-> IP information methods as shown below.

(b) Select one of them according to Section 3.3.2 and make sure to set the values on this screen using the method selected. (The default conversion method is the Automatic response method.)

Parameter settings requirement

Conversion method	Net mask pattern	Conversion setting
Automatic response system	×	×
IP address computation system	○	×
Table exchange system	×	○
Use-together system	○	○

○: Setting required ×: Setting not required

(2) Net mask pattern (address: 3A9H)

(a) Designate the mask value based on the guidelines given below. This pattern is used in a logical sum with the local station's IP address when calculating the IP address of the opposite device using the IP address computation system.

(b) When setting the sub-net mask, designate the target settings of the IP address class, network address, and sub-net address so that all bits are "1" in the mask pattern.

* The mask pattern is designated with a decimal/hexadecimal value obtained by dividing the 32-bit mask value into 8-bit segments.

(c) When the sub-net mask is not designated, the mask pattern designation is not necessary.

* When the mask pattern is not designated, the following mask value is used as the mask pattern according to the local station IP Address class.

Class	Mask value used
Class A	FF. 00. 00. 00H
Class B	FF. FF. 00. 00H
Class C	FF. FF. FF. 00H

(3) Conversion setup (conversion information) (address: 229H to 3A8H)

(a) The conversion setting is required to obtain the IP address from the Network No. and station number using the table exchange system.

(b) If the local station is an Ethernet module and the next station to which the communication request /response message is passed to access other station is also an Ethernet module, designate the Network No., station number, and IP address of the next station's Ethernet module.

* Designate the values set on "Network parameters, Setting the number of Ethernet/CC IE/MELSECNET cards" screen.

(c) Designate the Network No. in the range of 1 to 239 (1H to EFH) and the station number in the range of 1 to 64 (1H to 40H).

POINT

(1) Communication between the Ethernet module and QCPU is performed according to the Network No., and communication between two Ethernet modules are performed according to the IP address and UDP port number. Thus, the Ethernet module must convert the data shown below:
Network No. and station number of CC-Link IE controller network, MELSECNET/H, MELSECNET/10 ↔ IP address and UDP port number of Ethernet.

(2) The Station No. <-> IP information are required when accessing other stations via other Ethernet network systems and must be registered in all the QCPU stations in which the Ethernet modules are installed.

(3) The Station No. <-> IP information should be set on the "Setting the Station No. <-> IP information" screen and written in the programmable controller CPUs of the applicable stations where Ethernet modules are installed.

3 - 7

3.3.2 Convert format between the Network No./station number and IP address/port number

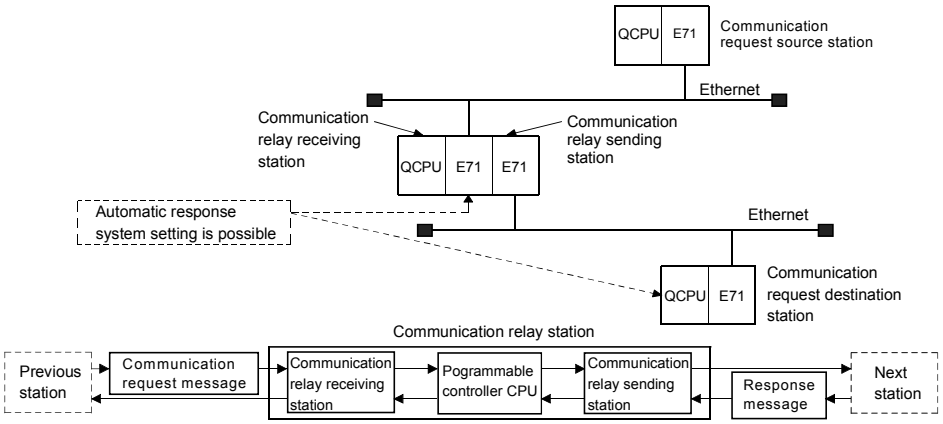
The process overview of the conversion method set by the Station No. <-> IP information screen for performing the other station access via Ethernet module using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function is explained.
Select one of the conversion methods to set.

(1) Automatic response system (Convert format of Ethernet module default value)

(a) Overview of automatic response system

1) The automatic response system differs from the other convert format in that designations can only be made when the Ethernet module installed station is the communication request destination station or communication relay receiving station.

2) The partner station IP Address or port number setting are not necessary with this conversion method, making the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication performed easily.



(b) Convert format of Automatic response system

1) When the Ethernet module receives other station access communication request message (command frame) from the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function, the send source Network No., IP address, and UDP port number in the request message, are stored internally.
The response message (response) for the communication request message is returned to the destination IP address and UDP port number calculated from the stored Network No. and station number. Therefore, by receiving the other station access communication request message first, the communication partner stations can be maintained.

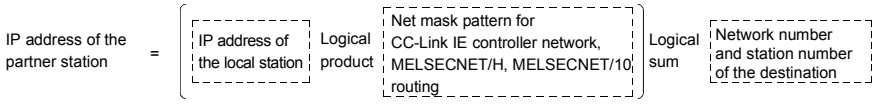
2) The maximum number of station information that can be set is 64.
When more than 64 other station access communication request message is received, the Ethernet module starts deleting from the oldest data to store the station information in the newly received message communication request message.
However, it is ignored if the station information is the same as the station information already stored.
＊ Information from the same station is not stored twice.

(2) IP address computation system

(a) Overview of the IP address computation system

During calculation, the IP address of the partner station is obtained from the calculation equation below according to the Network No. and station number, and the UDP port number predefined for the Ethernet module system is used as the UDP port number of the destination.

＊ For more information about the net mask pattern for CC-Link IE controller network, MELSECNET/H, MELSECNET/10, see Section 3.3.2.



(b) Conversion processing of the IP address computation system

1) When a communication request message (command frame) to access other station is received, the IP address is calculated from the Network No. and station number of the destination in the communication request message, and the communication request message is sent to the next station.

＊1 The Network No. and station number of the destination in the communication request message are stored in the Ethernet module.

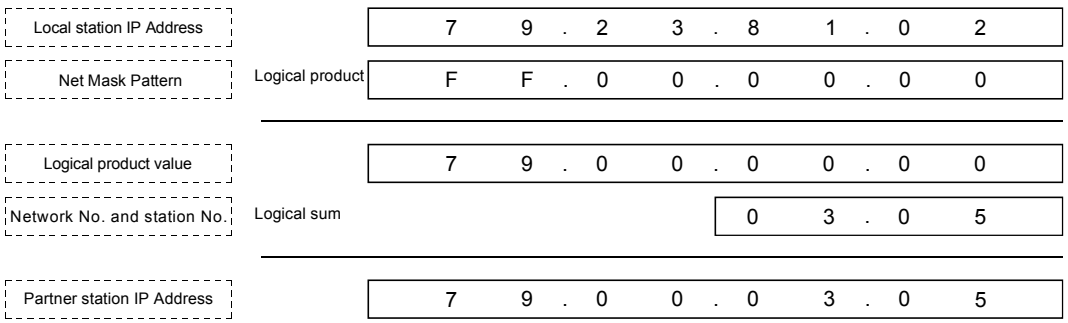
2) The response message (response) for the communication request message is returned based on the return IP address and the stored data above.

(c) IP address computation example

The logical sum is calculated differently depending on the class of the local station IP address. An IP address is calculated as follows.

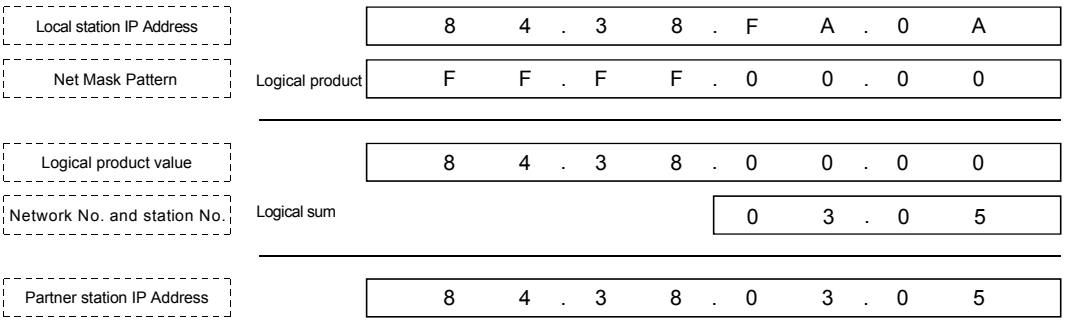
(For class A)

- When the local station IP Address is 79238102H
- When the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 Routing Net Mask Pattern is FF000000H
- When the destination Network No. is 03H, and the station number is 05H



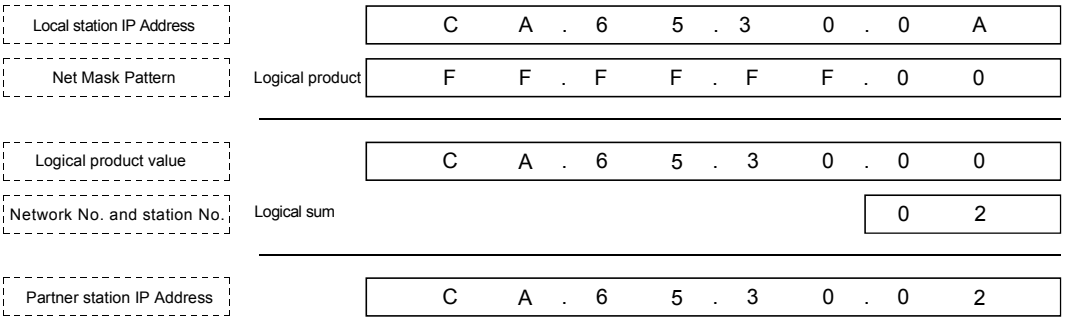
(For class B)

- When the local station IP Address is 8438FA0AH
- When the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 Routing Net Mask Pattern is FFFF0000H
- When the destination Network No. is 03H and station number is 05H



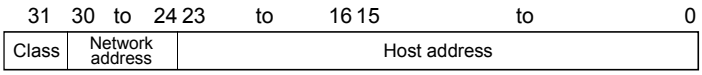
(For class C)

- When the local station IP Address is CA65300AH
- When the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 Routing Net Mask Pattern is FFFFFF00H
- When the destination Network No. is 02H (The Network number is not used.)

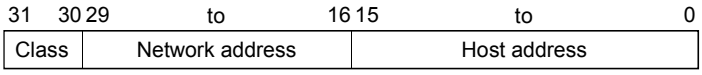


REMARKS

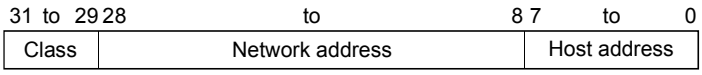
- IP address configuration of class A



- IP address configuration of class B



- IP address configuration of class C



(3) Table exchange system

(a) Overview of the table exchange system

1) This method uses the Network No., station number, and IP address set in the conversion table of the Station No. <-> IP information, and uses the UDP port number predefined for the Ethernet module system as the UDP port number of the destination.

2) If duplicate network and station numbers are set in the conversion table, the data set with the younger registration number is used.
   * If all the required values are not set, communication may not be performed successfully.

(b) Conversion processing of the table exchange system

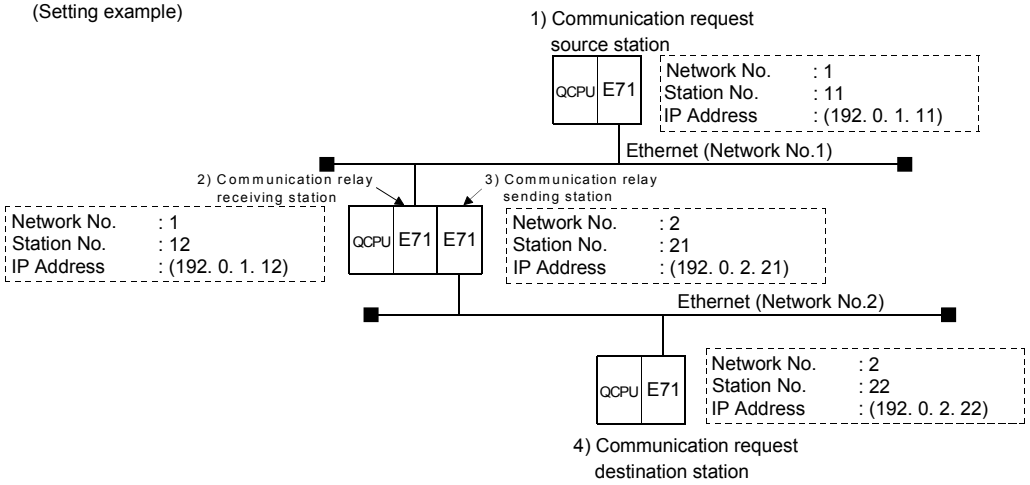
1) When a communication request message (command frame) to access other station is received, the same Network No. and station number are searched in the conversion table of the Station No. <-> IP information, and the communication request message is sent to the partner station with the corresponding IP address.

2) The response message (response) for the communication request message is returned based on the return IP address and the data in the conversion table above.

(c) Designation example

Shown on the next page.

(Setting example)



		E71 module setting details when accessing from QCPU 1) to QCPU 2)			
		1) Communication request source station a)	2)	3)	4)
Setting value (Decimal)	Network No. Station No.	1, 12	Setting not necessary	Setting not necessary	Setting not necessary
	IP Address	192. 0. 1. 12			

		E71 module setting details when accessing from QCPU 1) to QCPU 4)			
		1) Communication request source station a)	2) Communication relay receiving station b)	3) Communication relay sending station a)	4) Communication request destination station b)
Setting value (Decimal)	Network No. Station No.	1, 12	1, 11	2, 22	2, 21
	IP Address	192. 0. 1. 12	192. 0. 1. 11	192. 0. 2. 22	192. 0. 2. 21

		E71 module setting details when accessing from QCPU 2) to QCPU 1)			
		1)	2) Communication request destination station a)	3)	4)
Setting value (Decimal)	Network No. Station No.	Setting not necessary	1, 11	Setting not necessary	Setting not necessary
	IP Address		192. 0. 1. 11		

		E71 module setting details when accessing from QCPU 3) to QCPU 4)			
		1)	2)	3) Communication request source station a)	4)
Setting value (Decimal)	Network No. Station No.	Setting not necessary	Setting not necessary	2, 22	Setting not necessary
	IP Address			192. 0. 2. 22	

		E71 module setting details when accessing from QCPU 4) to QCPU 1)			
		1) Communication request source station b)	2) Communication relay sending station b)	3) Communication relay receiving station b)	4) Communication request destination station a)
Setting value (Decimal)	Network No. Station No.	1, 12	1, 11	2, 22	2, 21
	IP Address	192. 0. 1. 12	192. 0. 1. 11	192. 0. 2. 22	192. 0. 2. 21

		E71 module setting details when accessing from QCPU 4) to QCPU 3)			
		1)	2)	3)	4) Communication request destination station a)
Setting value (Decimal)	Network No. Station No.	Setting not necessary	Setting not necessary	Setting not necessary	2, 21
	IP Address				192. 0. 2. 21

* The a) and b) in the E71 station setting details column indicate whether the value is for the communication request message transmission or response message transmission.

a) : For communication request message transmission b) : For response message transmission

(4) Use-together system

(a) Overview of the Use-together system

1) This method uses both the IP address computation system and the table exchange system.

2) This method can be designated when accessing other station with the same Network No., accessing other station in other CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network system or accessing an Ethernet with different Network No., and relaying from the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 to the Ethernet network system.

3) The set target Ethernet module can be installed either at a communication request source station, communication relay station, or communication request destination station.

(b) Conversion processing of the Use-together system

1) When a communication request message (command frame) to access other station is received, the communication request message is sent to the next station obtained by the table exchange system at first.

2) If the IP address of the Ethernet module cannot be obtained by the table exchange system, the IP address is obtained by the IP address computation system in order to send the communication request message.

3) The response message (response) to the communication request message is returned based on the return IP address and the data in the conversion table or the stored data.

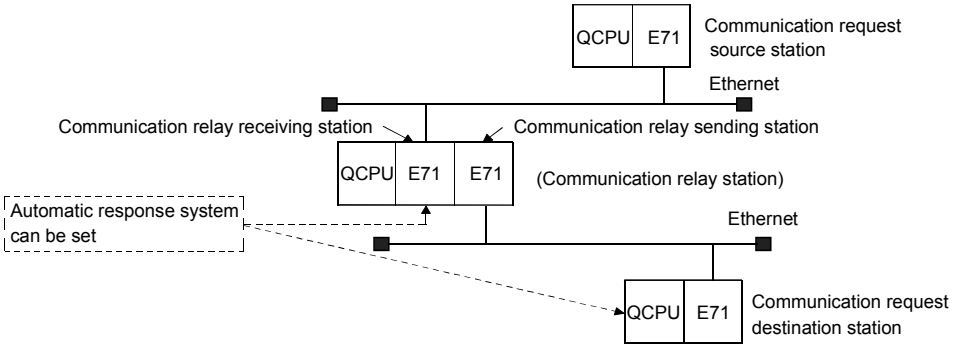
REMARKS

The relationship between the Convert Format and definition of the Ethernet module installed station is as follows.

Conversion method	Ethernet module installed station definition			
	Communication request source station	Communication relay station		Communication request destination station
		Relay receiving station	Relay sending station	
Automatic response system	× (*1)	○	× (*1)	○
IP Address computation system	○	○	○	○
Table exchange system	○	○	○	○
Use-together system	○	○	○	○

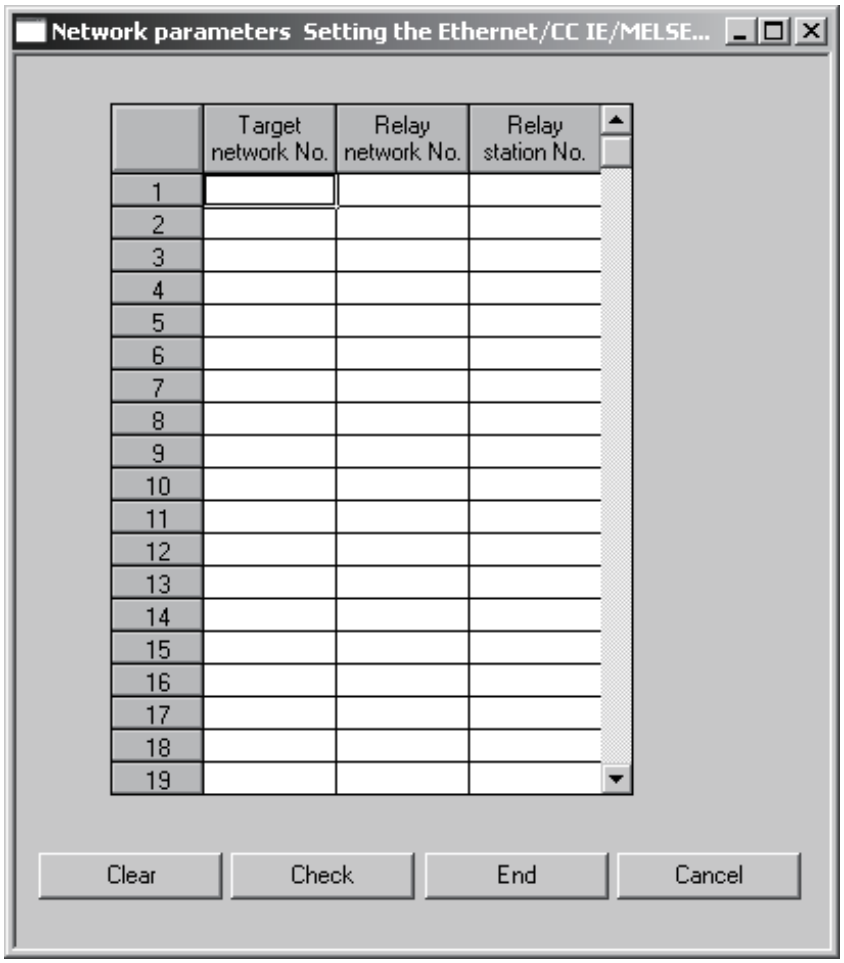
○ : Can be designation × : Cannot be designated

*1 For the external device that completed the communication, the station can be a communication request source station or a relay sending station.



3.3.3 Routing parameter settings

The routing parameters contain information of the Ethernet modules passed through when accessing other stations.
This section explains the routing parameters that must be set in order to access other stations via the Ethernet module using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function.
Select [GX Developer] - [Network parameters] to start the [Setting the Ethernet/CC IE/MELSECNET routing information].
For details on how to display the screen, see the GX Developer Operating Manual.



Routing information setting

Item name	Description of setting	Setting range/option
Target Network No.	Set the Network No. of the Ethernet or CC-Link IE controller network, MELSECNET/H, MELSECNET/10 to which the communication request destination station or the communication request source station is connected when sending a communication request message or a response message, respectively.	1 to 239
Relay network No.	Set the Network No. of the Ethernet or CC-Link IE controller network, MELSECNET/H, MELSECNET/10 to which the next communication relay receive station or the next communication relay send station is connected when sending a communication request message or a response message, respectively.	1 to 239
Relay station No.	Set the station number of the target Ethernet module/network module that is used as relay to the network set by the Relay station No..	Universal model QCPU: 1 to 120 Other than Universal model QCPU: 1 to 64

(1) Target Network No.

Designate the Network No. of the Ethernet or CC-Link IE controller network, MELSECNET/H, MELSECNET/10 to which the communication request destination station or the communication request source station is connected when sending a communication request message or a response message, respectively.

(2) Relay Network No.

Designate the Network No. of the Ethernet or CC-Link IE controller network, MELSECNET/H, MELSECNET/10 to which the next communication relay reception station or the next communication relay transmission station is connected when sending a communication request message or a response message, respectively.

(3) Relay station No.

Designate the station number of the target Ethernet module/network module that is used as a relay to the network set by the Relay station No..

POINT

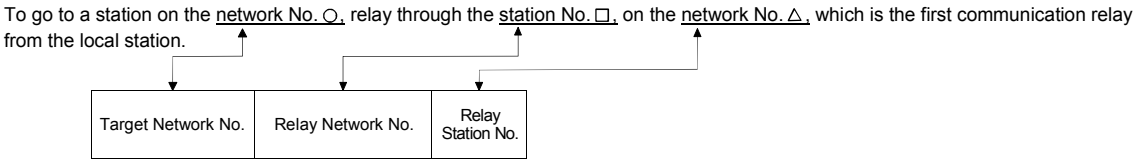
The following stations require the routing parameters to be set and registered:

1) The programmable controller CPU of the communication request source station
2) The programmable controller CPU of the stations (relay reception station and relay transmission station) that relay communication request messages.
3) The programmable controller CPU of the stations (relay reception station and relay transmission station) that relay response messages.

REMARKS

(1) The routing parameters setting is not necessary for the other station access on the same Ethernet network as the external device/local station QCPU.

(2) The routing parameters are designated in the following manner:

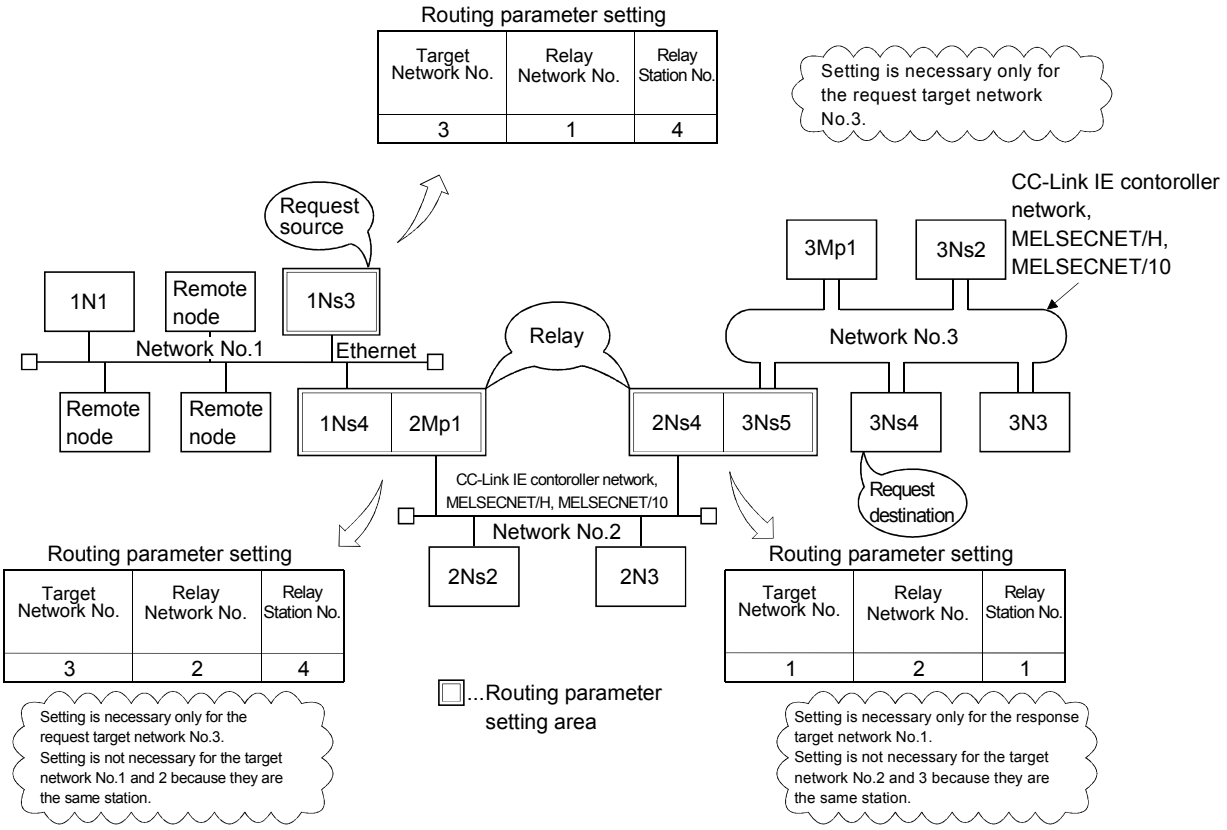


(3) As an example, to perform other station access from station 1Ns3 to 3Ns4 in the diagram in the next page, the following values are set to the stations which require the routing parameter setting.

- Communication request source station : Station 1Ns3
- Communication relay station : Station 1Ns4/2Mp1, and Station 2Ns4/3Ns5

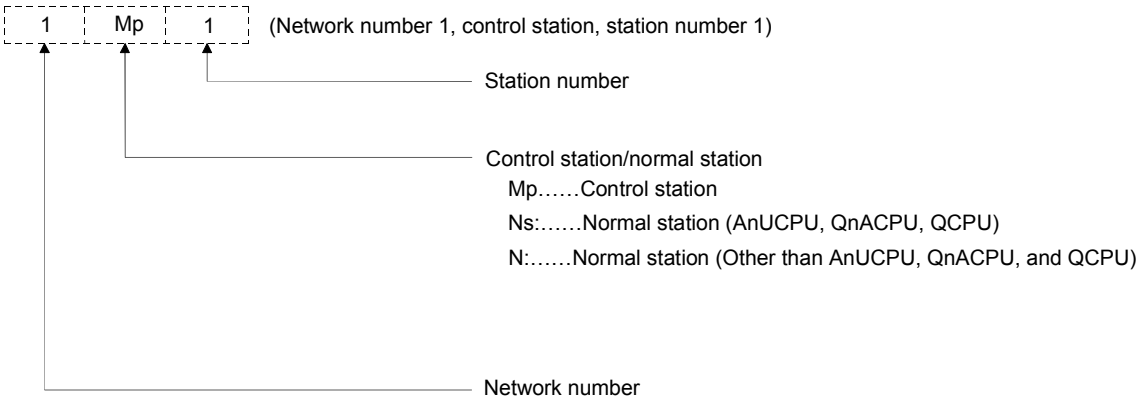
＊ The code used for each station in the diagram indicates the Network No. of the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet, station type, and station number.

＊ A maximum of 64 "Target Network No." can be set in the QCPU.
64 types of Network No. can be accessed to other station via local station or can be the request source.
However, the same transfer destination Network No. cannot be set two or more times. (multiple times)



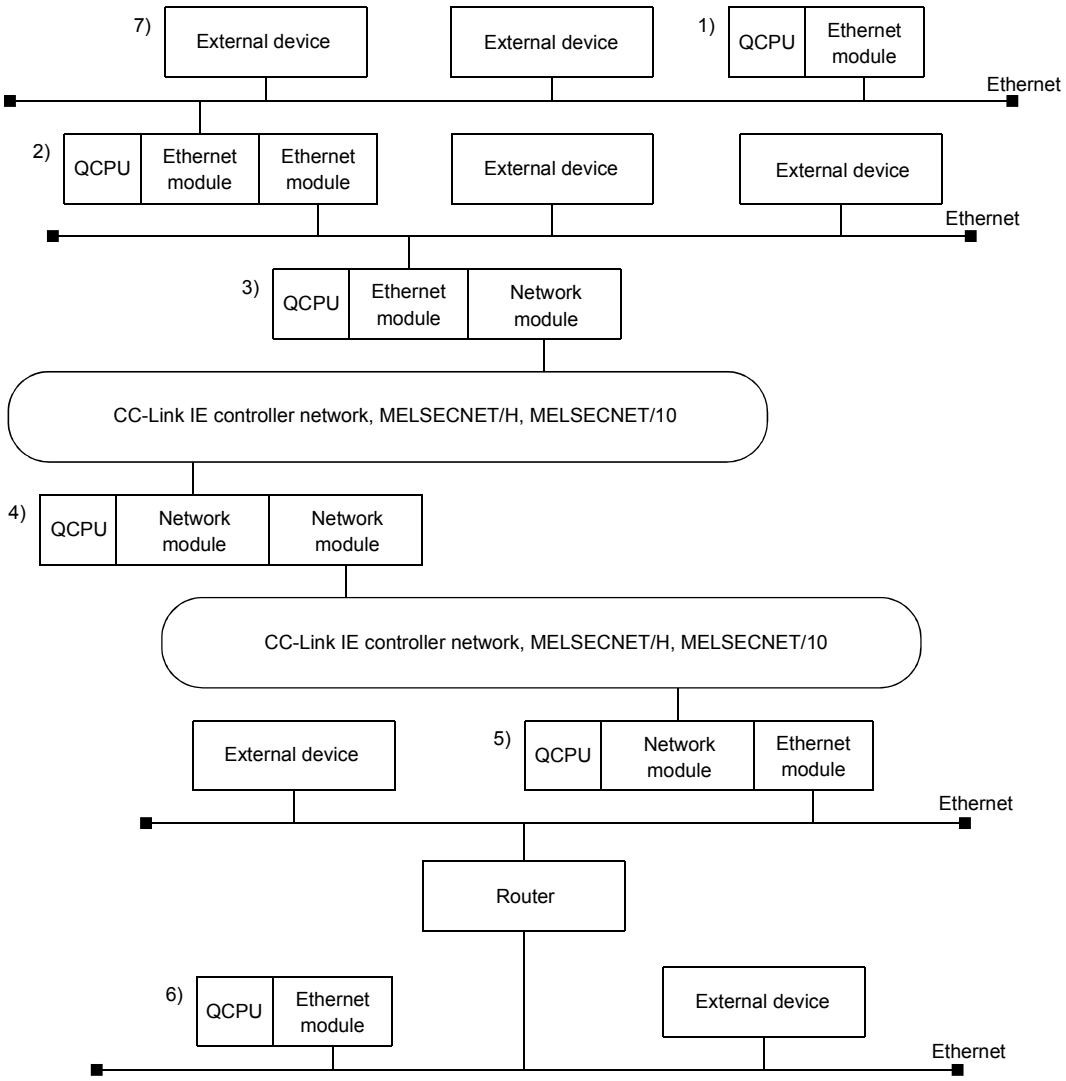
(The meanings of the symbols used for the stations shown in the diagram)

- Network system (CC-Link IE controller network, MELSECNET/H, MELSECNET/10)



(4) Using the example of a system shown below, the accessible stations and the stations that require parameter settings when an opposite device or QCPU access other stations are explained.

* Stations that require the setting of the "setting the Ethernet router relay parameter" as mentioned in Section 5.3 of the User's Manual (Basic) are also shown.



Accessible/not accessible combination		Access destination					
		1)	2)	3)	4)	5)	6)
Access source	1)		○	○	○	○	○
	2)	○		○	○	○	○
	3)	○	○		○	○	○
	4)	○	○	○		○	○
	5)	○	○	○	○		○
	6)	○	○	○	○	○	
	7)	○	○	○	○	○	○

○ : Accessible × : Not accessible

△ : Accessible (The number of access points, etc., is restricted.)

(1) When performing a remote access from 1) to 2)

Setting item	Station that does (●)/does not (×) require setting						
	1)	2)	3)	4)	5)	6)	7)
Setting the number of Ethernet/CC IE/MELSECNET cards	●	●	×	×	×	×	×
Setting the Ethernet/CC IE/ MELSECNET routing information	×	×	×	×	×	×	×
Setting the Ethernet Station No. <-> IP information	●	●	×	×	×	×	×
Setting the Ethernet router relay parameter	×	×	×	×	×	×	×

(2) When performing a remote access from 1) to 3)

Setting item	Station that does (●)/does not (×) require setting						
	1)	2)	3)	4)	5)	6)	7)
Setting the number of Ethernet/CC IE/MELSECNET cards	●	●	●	×	×	×	×
Setting the Ethernet/CC IE/ MELSECNET routing information	●	●	×	×	×	×	×
Setting the Ethernet Station No. <-> IP information	●	●	●	×	×	×	×
Setting the Ethernet router relay parameter	×	×	×	×	×	×	×

(3) When performing a remote access from 1) to 5)

Setting item	Station that does (●)/does not (×) require setting						
	1)	2)	3)	4)	5)	6)	7)
Setting the number of Ethernet/CC IE/MELSECNET cards	●	●	●	●	●	×	×
Setting the Ethernet/CC IE/ MELSECNET routing information	●	●	●	●	×	×	×
Setting the Ethernet Station No. <-> IP information	●	●	●	×	×	×	×
Setting the Ethernet router relay parameter	×	×	×	×	×	×	×

(4) When performing a remote access from 1) to 6)

Setting item	Station that does (●)/does not (×) require setting						
	1)	2)	3)	4)	5)	6)	7)
Setting the number of Ethernet/CC IE/MELSECNET cards	●	●	●	●	●	●	×
Setting the Ethernet/CC IE/ MELSECNET routing information	●	●	●	●	●	×	×
Setting the Ethernet Station No. <-> IP information	●	●	●	×	●	●	×
Setting the Ethernet router relay parameter	×	×	×	×	●	× (∗1)	×

∗1 Setting is required when accessing to the programmable controller of 1) to 5) from the device of 6).

(5) When performing a remote access from 7) to 1)

Setting item	Station that does (●)/does not (×) require setting						
	1)	2)	3)	4)	5)	6)	7)
Setting the number of Ethernet/CC IE/MELSECNET cards	●	×	×	×	×	×	×
Setting the Ethernet/CC IE/ MELSECNET routing information	×	×	×	×	×	×	×
Setting the Ethernet Station No. <-> IP information	●	×	×	×	×	×	×
Setting the Ethernet router relay parameter	×	×	×	×	×	×	×

(6) When performing a remote access from 7) to 3)

Setting item	Station that does (●)/does not (×) require setting						
	1)	2)	3)	4)	5)	6)	7)
Setting the number of Ethernet/CC IE/MELSECNET cards	×	●	●	×	×	×	×
Setting the Ethernet/CC IE/ MELSECNET routing information	×	●	×	×	×	×	×
Setting the Ethernet Station No. <-> IP information	×	●	●	×	×	×	×
Setting the Ethernet router relay parameter	×	×	×	×	×	×	×

(7) When performing a remote access from 7) to 4)

Setting item	Station that does (●)/does not (×) require setting						
	1)	2)	3)	4)	5)	6)	7)
Setting the number of Ethernet/CC IE/MELSECNET cards	×	●	●	●	●	×	×
Setting the Ethernet/CC IE/ MELSECNET routing information	×	●	●	×	×	×	×
Setting the Ethernet Station No. <-> IP information	×	●	●	×	×	×	×
Setting the Ethernet router relay parameter	×	×	×	×	×	×	×

(8) When performing a remote access from 7) to 6)

Setting item	Station that does (●)/does not (×) require setting						
	1)	2)	3)	4)	5)	6)	7)
Setting the number of Ethernet/CC IE/MELSECNET cards	×	●	●	●	●	●	×
Setting the Ethernet/CC IE/ MELSECNET routing information	×	●	●	●	●	×	×
Setting the Ethernet Station No. <-> IP information	×	●	●	×	●	●	×
Setting the Ethernet router relay parameter	×	×	×	×	●	×	×

3.4 Procedure for Accessing Other Stations

This section explains the procedure for accessing other stations via the Ethernet using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function as well as the required processing.

(1) Setting the parameters

The parameters shown in Section 3.3 must be set using GX Developer.

(2) Accessing other stations

Access to other stations is performed from an external device/local station QCPU using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function.

REMARKS

- Access to other stations with the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function is performed using the UDP/IP protocol and data is always communicated in binary code.
- In the data communication, the port number (for the UDP/IP port) for the Ethernet module system is used.
- It is possible to continue accessing other stations while the initial normal completion signal (X19) is on.
  When the initial normal completion signal (X19) is turned off, the Ethernet module forcefully closes the connection although other station is being accessed.

(3) End processing of the Ethernet module

When ending access to other station with the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function that has been made using a connection opened by user, execute the close processing of the connection by seeing Section 5.6 of the User's Manual (Basic).
When the following two functions are used to access other station, the close processing is not required.

- Communication using the data link instructions
- Communication with other stations using GX Developer

3.5 Precautions for Accessing Other Stations

The following describes precautions when accessing other stations via the Ethernet module using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function.

(1) The user should make an arrangement so that duplicate Network No.s for the Ethernet network system that have already been assigned to the Ethernet modules are not used.
In addition, make sure that the same station numbers for the Ethernet network system as those already assigned to the existing network system mentioned above and other Ethernet are not used.

(2) Access to other stations using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function is performed using the UDP/IP protocol and data is always communicated in binary code.

POINT

See the manual for the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 system for the interlock signals and the send/receive processing and processing time of the link data when performing data communication with QCPUs of other stations via the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network system.

4 WHEN THE QCPU ACCESSES THE PROGRAMMABLE CONTROLLER OF ANOTHER STATION USING THE DATA LINK INSTRUCTION

By using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function, the Ethernet network system is regarded as the same class as the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network system, therefore, the QCPU can perform data communication with the programmable controller CPUs of other stations as follows using the data link instructions.

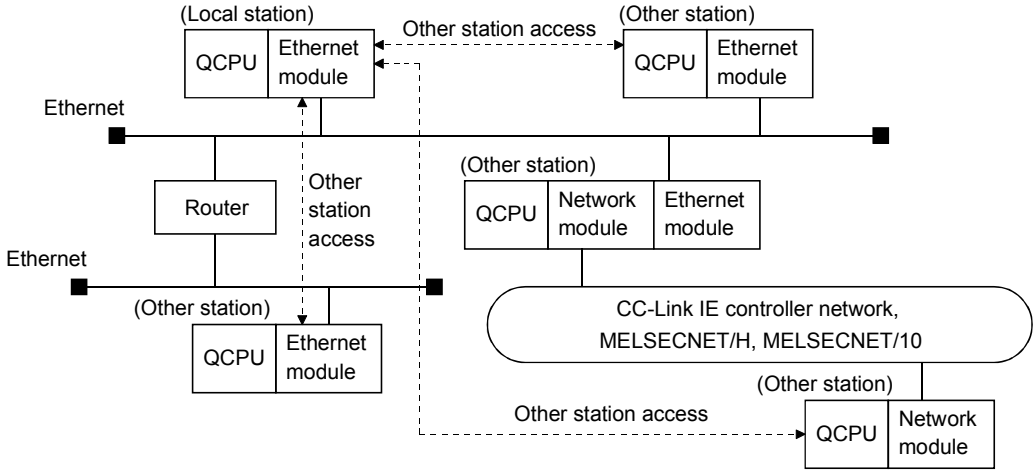
- Programmable controller CPUs of other stations on the same Ethernet network system
- Programmable controller CPUs on other Ethernet networks accessed via routers (using the router relay function)
- Programmable controller CPUs on other Ethernet or CC-Link IE controller network, MELSECNET/H, MELSECNET/10 networks accessed via the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 (using the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 relay communication function)

In this chapter, the usage of the data link instructions, etc. are explained when the local station QCPU performs data communication with the programmable controller CPU of another station with the Ethernet module via Ethernet or CC-Link IE controller network, MELSECNET/H, MELSECNET/10.

POINT
When accessing other stations using data link instructions via Ethernet module, set the parameters shown in Chapter 3.

4.1 Other Station Access with the Data Link Instruction

The data link instruction is an instruction to perform data send/receive, read/write of the word device memory, and other station access such as remote RUN/STOP to the other station QCPU connected to the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet. If the initial processing of the local station, relay station, and access station's Ethernet module is finished correctly, it will be possible to access other stations by the data link instruction.



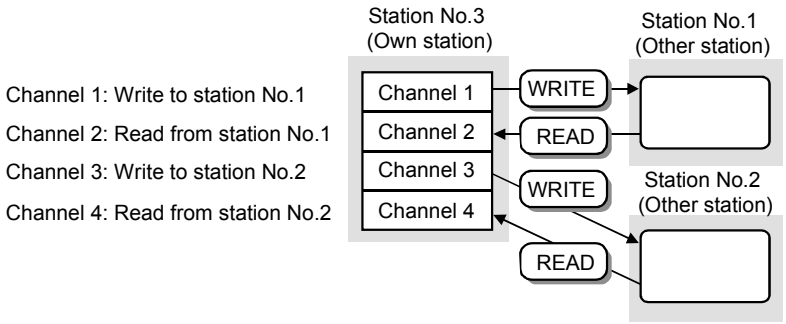
4 - 1

4.2 Precautions for Accessing Other Stations

The following describes precautions when accessing other stations via the Ethernet module using the data link instructions.

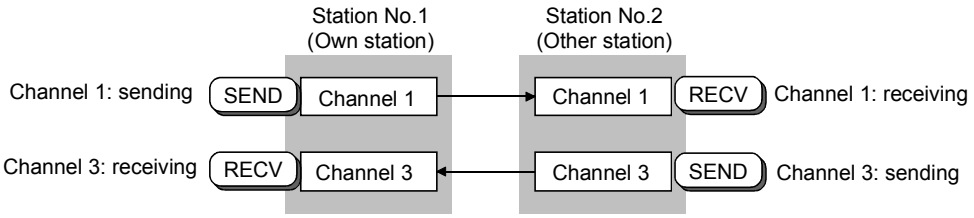
(1) Executing multiple instructions at one time (common to the data link instructions)

(a) When simultaneously accessing multiple other stations from the own station, change the channel setting of the own station for each request target.



(b) When accessing other stations using the same channel number, access the next station after the last access to other station is completed.
The completion status can be checked by the completion device of the data link instruction.

(c) When making access mutually between the own station and another station, change the channel of the own station for each dedicated link instruction.



* A maximum of eight instructions can be executed at one time as long as the channel numbers (1 to 8) designated in the control data of each instruction do not overlap.

(d) Channels used for RECV instructions cannot be used for any other instructions. Channels used for other instructions must be changed.

(2) Setting the arrival monitoring time of the control data storage device

For the arrival monitoring time designation area of the control data storage device, set the monitoring time that is equal to or greater than the TCP resend timer value set with the initial processing parameters.
When the monitoring time is equal to or less than the TCP resend timer value, the TCP resend timer value is set as the arrival monitoring time. (*1)
(When the setting value is less than or equal to the TCP resend timer value, the arrival monitoring timer equals the TCP resend timer value.)

*1 Although the units of setting values for the TCP resend timer (setting value units: 0.5 s) and the arrival monitoring timer (setting value units: s) are different, the TCP resend timer value is used as is.

(3) Checking the execution result of each data link instruction

The execution result (completion status) of each data link instruction is stored in the areas shown as binary values.
After the execution of an instruction is completed, read the execution result from the storage area and verify either normal or abnormal completion.

Stored value at normal completion : 0
Stored value at abnormal completion: Other than 0 (error code)

When an error code that indicates abnormal completion is stored, take an action by seeing the "Troubleshooting" section in the User's Manual (Basic).

<table>
<tr><th>Instruction</th><th colspan="2">Storage area of execution result</th></tr>
<tr><td>SEND</td><td colspan="2" rowspan="5">The completion status storage device of the control data storage device of the instruction used.</td></tr>
<tr><td>RECV, RECVS</td></tr>
<tr><td>READ, SREAD</td></tr>
<tr><td>WRITE, SWRITE</td></tr>
<tr><td>REQ</td></tr>
<tr><td>ZNRD</td><td rowspan="2">Data link instruction execution result storage area in buffer memory</td><td>Address CF$_H$ (207)</td></tr>
<tr><td>ZNWR</td><td>Address D1$_H$ (209)</td></tr>
</table>

(4) Clock data when each of the data link instructions ends abnormally

In the clock data stored as control data at the time that each of the data link instructions ends abnormally (set only when it is something wrong), the year data (upper 2 digits) is stored only when the QCPU is the error detection station. If the error detection station is other than the QCPU, 00$_H$ is stored.

(5) Channels used by the ZNRD and ZNWR instructions

The ZNRD and ZNWR instructions for Ethernet modules are executed using the following channels of the target Ethernet module.

- ZNRD: Channel 1
- ZNWR: Channel 2

Do not use the channels used by the ZNRD and ZNWR instructions listed above for other data link instructions in an Ethernet module mounted station that executes the ZNRD and ZNWR instructions. Also, do not execute data link instructions from other stations on the channels listed above in an Ethernet module mounted station that executes the ZNRD and ZNWR instructions.

POINT

(1) See Chapter 3 for details of the following when performing other station access using the data link instructions.
- The accessible range and accessible stations of the other stations
- Setting to perform other station access
- Other station access procedure

(2) The communication using the data link instructions on the Ethernet is performed with UDP/IP.
When executing each data link instruction except for ZNRD and ZNWR, it is recommended to designate a value greater than "1" to the number of retries setting area of the control data storage device.

(3) See the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 Reference Manual regarding the link data send/receive processing and processing time in data communication with the programmable controller CPU of another station via CC-Link IE controller network, MELSECNET/H, MELSECNET/10.

(4) For details about data designation methods in the data link instruction, see Chapter 6.

4.3 Using the Data Link Instructions

This section explains how to use the data link instructions when accessing other stations via the Ethernet module.

(1) SEND instruction

1) When performing simultaneous other station accesses from multiple communication request source stations to the same communication request destination station, change the channel number of the communication request destination station for each communication request source station.
   If the channel number is being used at the communication request source station (being accessed from other station using the same channel number) when other station is accessed, the data link instruction ends in error. So, re-execute the instruction.
   * If the channel number used is different at the communication request destination station side, simultaneous other station access can be performed from a maximum of eight communication request source stations to the same station.
2) When performing other station access from the same communication request source station to the same communication request destination station, change the channel number at the communication request destination station side.
   When designating the same channel number on the communication request destination station side, perform the second other station access after the first other station access is complete. If the second SEND instruction is executed before the first SEND instruction is completed, the SEND instruction ends in error.

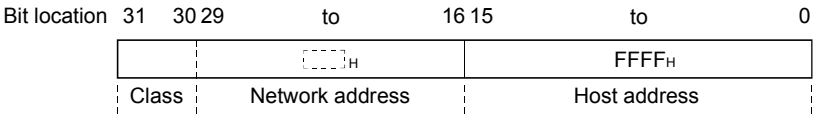
(2) Instruction other than the SEND instruction

1) When simultaneous other station access is performed to the same communication request destination station from multiple communication request source station, and a busy error (being accessed from other station) occurs, re-execute the instruction.
2) When accessing other station from the same communication request source station to the same communication request destination station, execute the second data link command after other station access by the first data link instruction is complete.

(3) Broadcast (Simultaneous broadcast)

When FF_H is designated as the target station number in the control data when executing SEND/WRITE (SWRITE)/REQ on the Ethernet, the command is sent to all external devices on the network.

(Example) IP address when the command is sent (for class B)



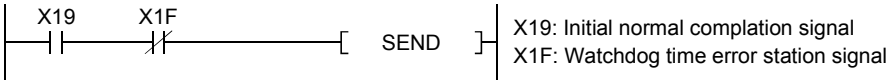
For the external devices on the Ethernet, perform read-dump processing locally for the received commands not related to the local station.

* The COM.ERR.LED indicator of an Ethernet module may turn on and an error code may be stored in the following buffer memory area when a response to a simultaneous broadcast from the Ethernet module is returned from an external device.
  Error code/end code area (address: from E5H (229))
* These processing are performed automatically with the Ethernet module.

(4) Interlock when executing the data link instruction

(a) Via Ethernet

Execute the data link command when the local station (communication request source station) Ethernet module is at the following I/O signal state.



(b) Via CC-Link IE controller network, MELSECNET/H, MELSECNET/10

Check the status of the local station (communication request source station), communication relay station, and access destination (communication request destination station) using the following devices. Execute the data link instruction if the status is normal.

- Link special relay: SB20, SB47, SB70, etc.
- Link special register: SW70 to 73, SW74 to 77, etc.

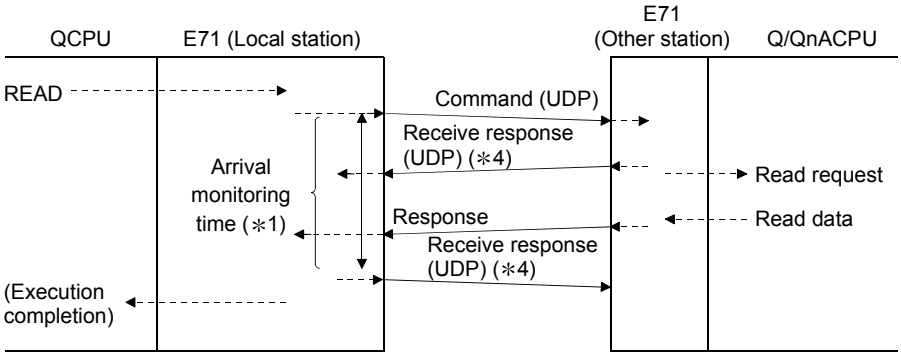
* See the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 Reference Manual for the interlock signals, link data send/receive processing, and processing time when performing data communication with the programmable controller CPU of another station via CC-Link IE controller network, MELSECNET/H, MELSECNET/10.

(5) Number of resend designation of data link instruction

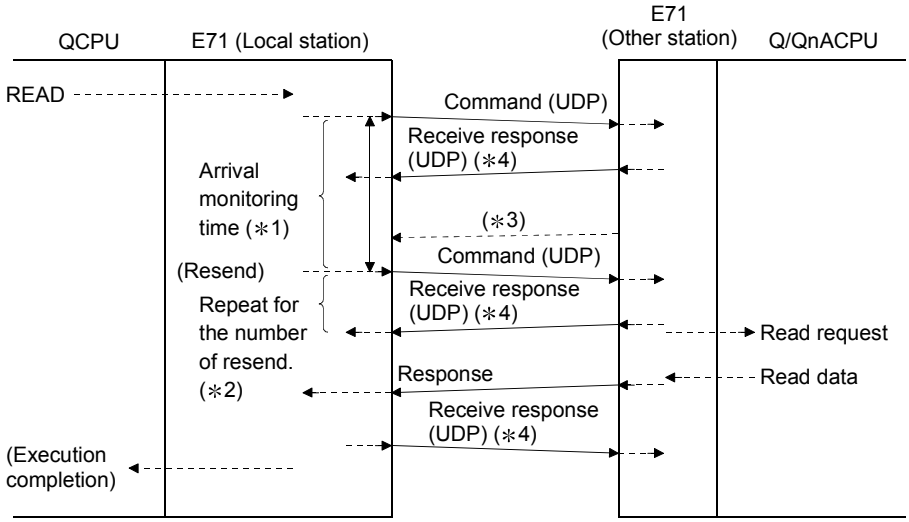
When executing each data link instruction except for ZNRD and ZNWR, it is recommended to designate a value greater than "1" for the number of resend designation area of the control data storage device.
The resend timing when the READ command is executed after designating the number of resend is described below.

(Example) READ instruction execution timing

1) Communication timing when the READ instruction completed successfully (when resend is not performed)



2) Communication timing when the READ instruction completed successfully (when resend is performed)



∗1 The user designates the arrival monitoring time with the READ instruction control data ((S1)+8).

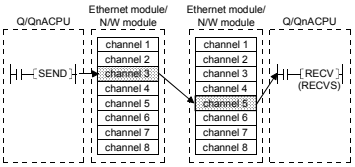
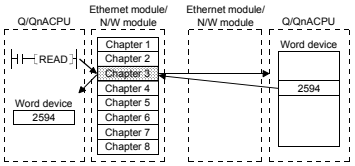
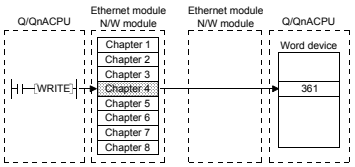
∗2 The user designates the number of resend with the READ instruction control data ((S1)+7).

∗3 Indicates the response not returned within the arrival monitoring time.
The Ethernet module performs a resend of the command for the number of resend when this response is not received.

∗4 The "receive response (UDP)" in the diagram is for the interlock between the Ethernet module, and this is the response to the partner station Ethernet module from the Ethernet module OS.

4.4 Data Link Instructions

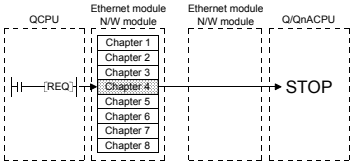
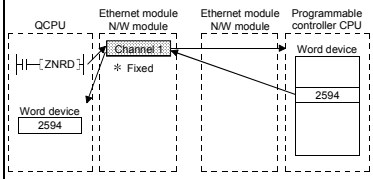
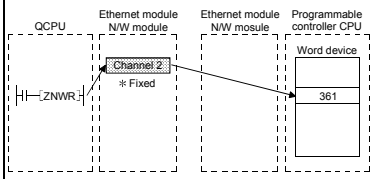
This section explains the overview of the data send/receive in each data link instruction when accessing via Ethernet Module.

Instruction	Details	Instruction execution station (Local station)	Target station		
		Station type	Station type	Programmable controller CPU type	
				QCPU QnACPU	Other than described left ∗1
SEND RECV RECVS	Data is sent (SEND) and received (RECV) between the Q/QnACPU stations. ∗2  See Section 4.5.1, 4.5.2	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	○	×
READ SREAD	Reads data from other station's word device. (With SREAD, completion device on target station can be turned on.)  See Section 4.6	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	○	×
WRITE SWRITE	Writes data to other station's word device. (With SWRITE, completion device on target station can be turned on.) ∗3  See Section 4.6	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	○	×

∗1 Access to programmable controller CPUs other than the QCPU and QnACPU is allowed only to stations connected to the MELSECNET/10.

∗2 Cannot be used if the source or target station is a safety CPU.

∗3 Writing to a safety CPU is not allowed from other stations.

Instruction	Details	Instruction execution station (Local station)	Target station		
		Station type	Station type	Programmable controller CPU type	
				QCPU QnACPU	Other than described left ∗1
REQ	Performs remote RUN/STOP to other station. ∗2 Performs "clock data read and write" for other stations. ∗3  See Section 4.8	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station. CC-Link IE controller network Control station Normal station	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	○	×
ZNRD	Reads data from other station's word device. ∗3  See Section 4.7	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	○	○
ZNWR	Writes data to other station's word device. ∗2  See Section 4.7	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	Ethernet Ethernet module MELSECNET/H, MELSECNET/10 Control station Normal station Remote master station Multiple remote master station Parallel remote master station Multiple remote submaster station Parallel remote submaster station CC-Link IE controller network Control station Normal station	○	○

∗ "Channels 1 to 8" for the Ethernet module and network module are the OS area for each module in the diagram to store the send/receive data of each data link instruction.

∗1 Access to programmable controller CPUs other than the QCPU and QnACPU is allowed only to stations connected to the MELSECNET/10.

∗2 Cannot be used if the source or target station is a safety CPU.

∗3 Writing to a safety CPU is not allowed from other stations.

POINT

(1) The CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network No., group No., and station No., for the Ethernet module in the data link instruction setting data, designate the network No., group No., and station No., assigned to the Ethernet module by the "Setting the number of Ethernet/CC IE/MELSECNET cards" indicated in User's Manual (Basic).
 * This is so that the Ethernet network system will be considered to be the same class as the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 network system, to perform other station accessing processing for the QCPU.

(2) For details of the data designation method for the data link instruction, see chapter 6.

(3) A maximum of eight instructions can be performed simultaneously, as long as the channel number (1 to 8) designated in each instruction control data do not overlap with each other.

There are no operation differences in the instruction format JP. [ ] and GP. [ ], and J. [ ] and G. [ ].

DANGER

[Precautions for data link instruction]

(1) In a system where AnUCPU coexist, never execute the following instruction from the Q/QnACPU to other station's AnUCPU. The AnUCPU that has been executed such instruction results in "MAIN CPU DOWN" or "WDT ERROR," and may stop the operation.
 1) SEND 2) READ 3) SREAD 4) WRITE 5) SWRITE 6) REQ

(2) When accessing for all Q/QnACPU stations on the MELSECNET/10 including programmable controller CPU other than Q/QnACPU, perform the access using the group No. designation.

4.5 Data Sending/Receiving

This section explains the arbitrary data sending/receiving function, instruction format and programs using the data send/receive instructions (SEND, RECV and RECVS instructions).

(1) The SEND, RECV, and RECVS instructions are used for sending and receiving arbitrary data to/from the programmable controller CPU with which communicate is being performed.

(2) Data sending is performed using the SEND instruction and data receiving is performed using the RECV or RECVS instruction.
The RECV instruction and the RECVS instruction are used differently as follows.

(a) The RECV instruction is used in the receiving processing in the main program.
The main program reads from the RECV instruction executing request area in the buffer memory and executes the RECV instruction using a switch from off to on of a bit corresponding to the data receiving channel number as a trigger.

(b) The RECVS instruction is used in the receiving processing in an interrupt program.
An interrupt program is started when data is received from the programmable controller CPU with which communication is being performed to enable receive data reading to the programmable controller CPU.
In order to start the interrupt program, set the parameters on the following screens of GX Developer.

1) "Network Parameters Ethernet Interrupt Settings" screen
Set the control number (SI) on the Ethernet module side when an interrupt request is made to the programmable controller CPU from the Ethernet module.

2) "Intelligent function module interrupt pointer setting" screen
Associate the control number (SI) set in the "Ethernet Interrupt Settings" above with the interrupt pointer (Ixx) used in the sequence program.

＊ The settings on the two screens above are the same as when received data is read by an interrupt program in the fixed buffer communication.
For details on the settings and setting method on these screens, see Section 7.3.2 of the User's Manual (Basic).

POINT

(1) In order to start an interrupt program, the following settings with GX Developer and interrupt enable by the sequence program must be required.
- "Network parameters Ethernet interrupt settings" and "Intelligent function module interrupt pointer settings" with GX Developer.
- Create interrupt enable/disable programs in the main program in order to start an interrupt program.
Use the EI, DI and IMASK instructions for this.

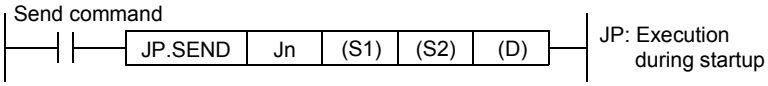
(2) In cases where receive data is read on the same channel, the main program for reading receive data and the interrupt program for reading receive data can not be used together. Please use either program to read receive data.
＊ In order to read receive data with the interrupt program, when the setting corresponds to GX Developer, the main program can not be used to read receive data.

4.5.1 Data sending/receiving for receive with the main program (SEND/RECV)

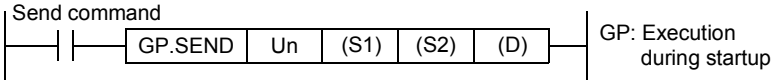
This section explains the format and program examples of the SEND and RECV instructions that are used to send/receive data between the programmable controller CPUs.
For more details, see Sections 6.5 and 6.9.

(1) Instruction format

(a) SEND instruction
[Network number designation]



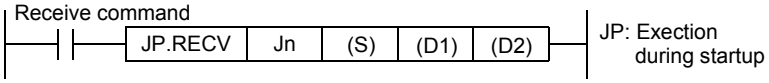
[Network module/Ethernet module start I/O signal designation]



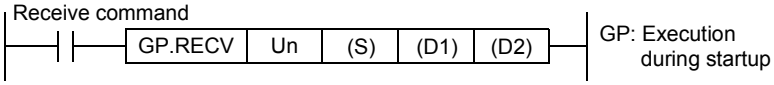
	Setting details	Setting range
Jn	Local station network number	1 to 239 : Network number 254 : Network designated in the valid module for other station access
Un	Start I/O signal of the local station network module/ Ethernet module Designate by higher two digits when the I/O signal is expressed by three digits	0 to FE_H
(S1)	Control data storage head device Designate the head device of the local station that stores the control data.	Word device ＊2
(S2)	Send data storage head device Designate the head device of the local station that stores the send data.	Word device ＊2
(D)	Send completion device Designate the device to turn on one scan when the send is complete. (D) ····· OFF: Incomplete ON: Complete (D) + 1 ····· OFF: Normal ON: Error	Bit device ＊1 Word device bit designation ＊3

＊1: Bit device ····· X, Y, M, L, F, V, B
＊2: Word device ····· T, C, D, W, ST, R, ZR
＊3: Word device bit designation ····· Word device . Bit number

(b) RECV instruction (for receive by the main program)
[Network number designation]



[Network module/Ethernet module start I/O signal designation]

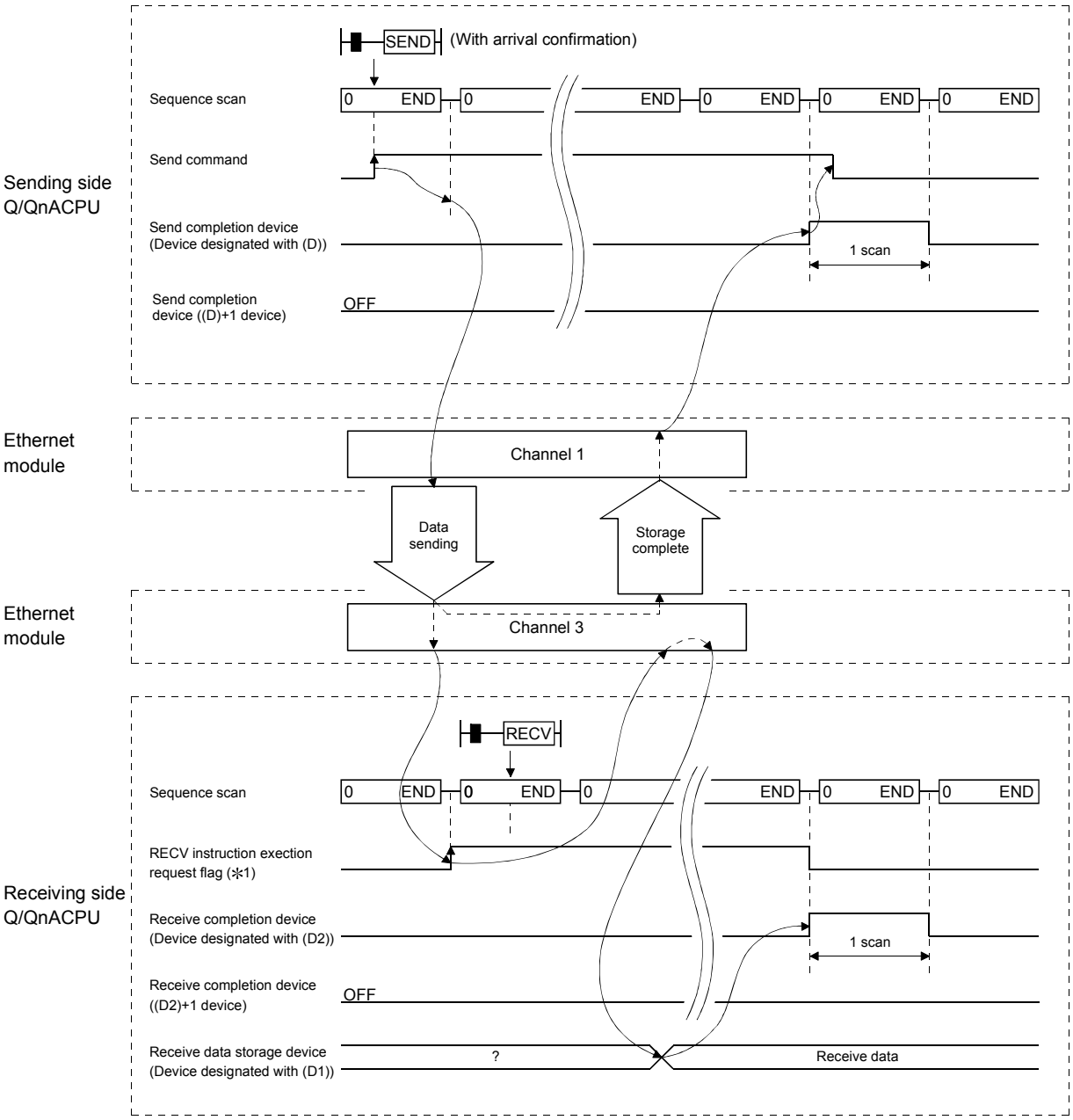


	Setting details	Setting range
Jn	Local station network number	1 to 239 : Network number 254 : Network designated in the valid module for other station access
Un	Start I/O signal of the local station network module/ Ethernet module Designate by higher two digits when the I/O signal is expressed by three digits	0 to FE_H
(S)	Control data storage head device Designate the head device of the local station that stores the control data.	Word device ＊2
(D1)	Receive data storage head device Designate the head device of the local station that stores the receive data.	Word device ＊2
(D2)	Receive completion device Designate the device to turn on one scan when the receive is complete. (D2) ····· OFF: Incomplete ON: Complete (D2) + 1 ····· OFF: Normal ON: Error	Bit device ＊1 Word device bit designation ＊3

＊1: Bit device ····· X, Y, M, L, F, V, B
＊2: Word device ····· T, C, D, W, ST, R, ZR
＊3: Word device bit designation ····· Word device . Bit number

(2) Instruction execution timing (for receive processing by the main program)

(a) When normal completion



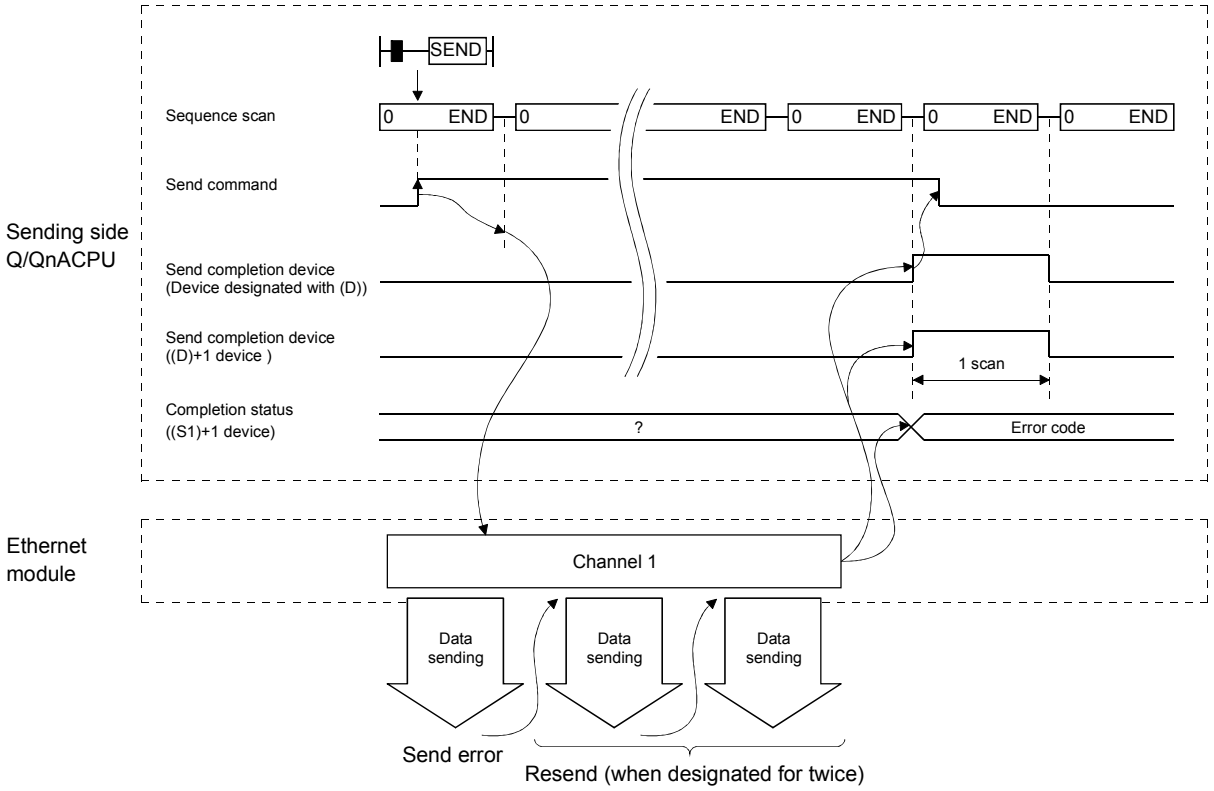
*1 The RECV instruction execution request flag for Channel 3 used at the receiving side Q/QnACPU is as shown below.

* For Ethernet module : Bit 2 of the RECV instruction execution request area (address: 205) in the buffer memory

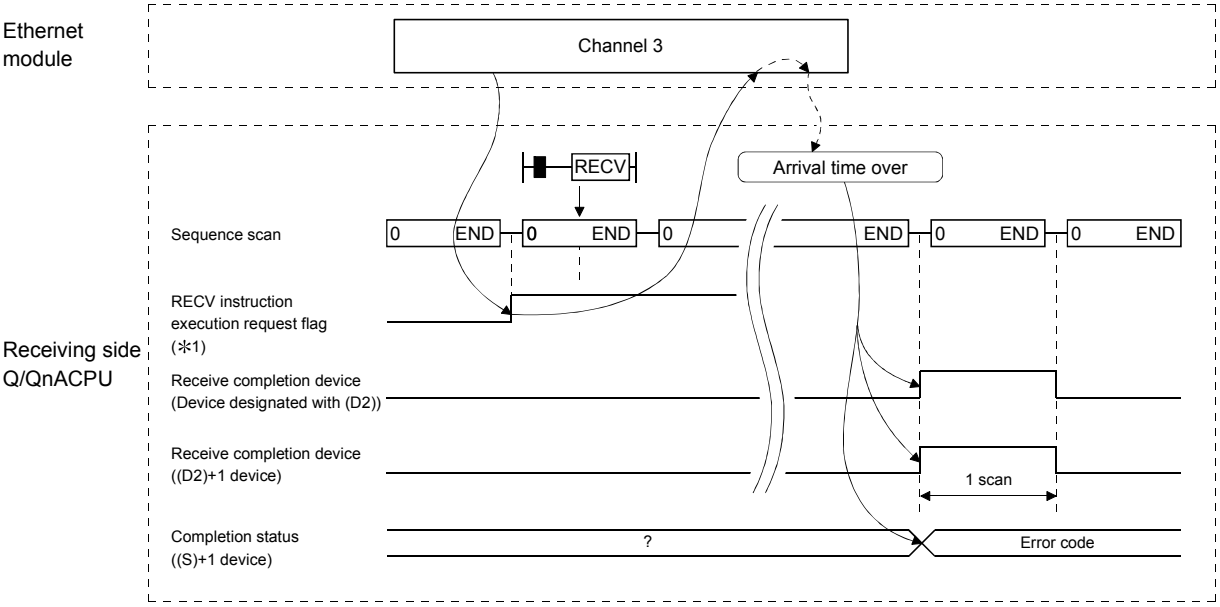
For the N/W module : SBA2 of the link special relay

(b) When abnormal completion

1) SEND instruction



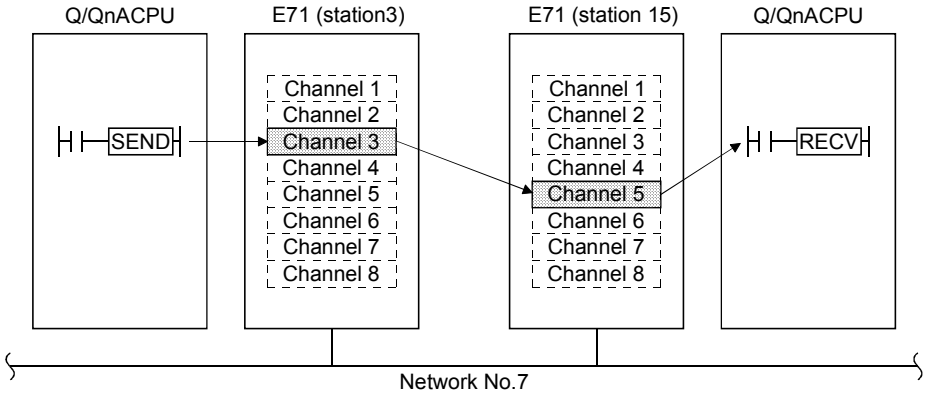
2) RECV instruction



*1 The RECV instruction execution request flag for Channel 3 used at the receiving side Q/QnACPU is as shown below.
For Ethernet module : Bit 2 of the RECV instruction execution request area (address: 205) in the buffer memory
For the N/W module : SBA2 of the link special relay

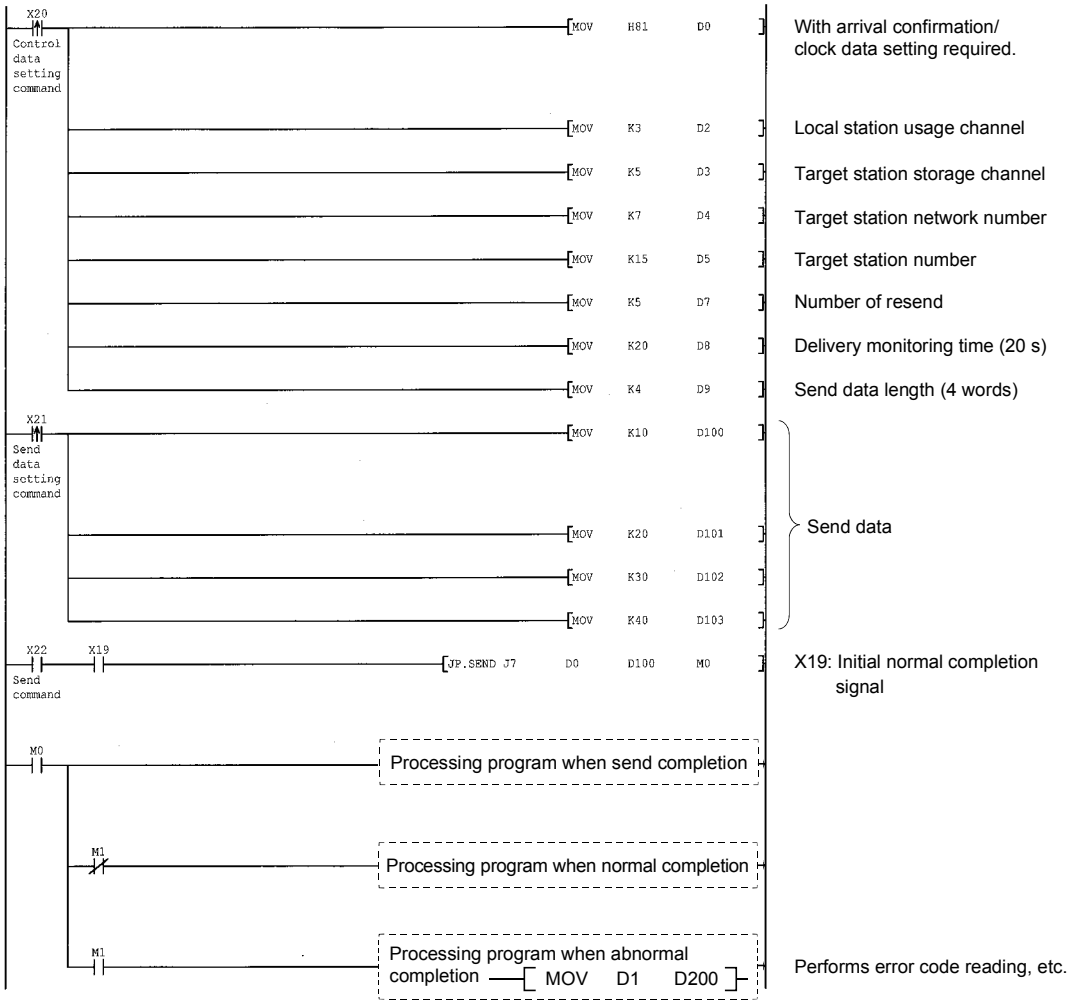
(3) Program example

Station 3 uses channel 3 with an SEND instruction, and sends data to station 15 using channel 5. When data is received at station 15, data is read from channel 5.

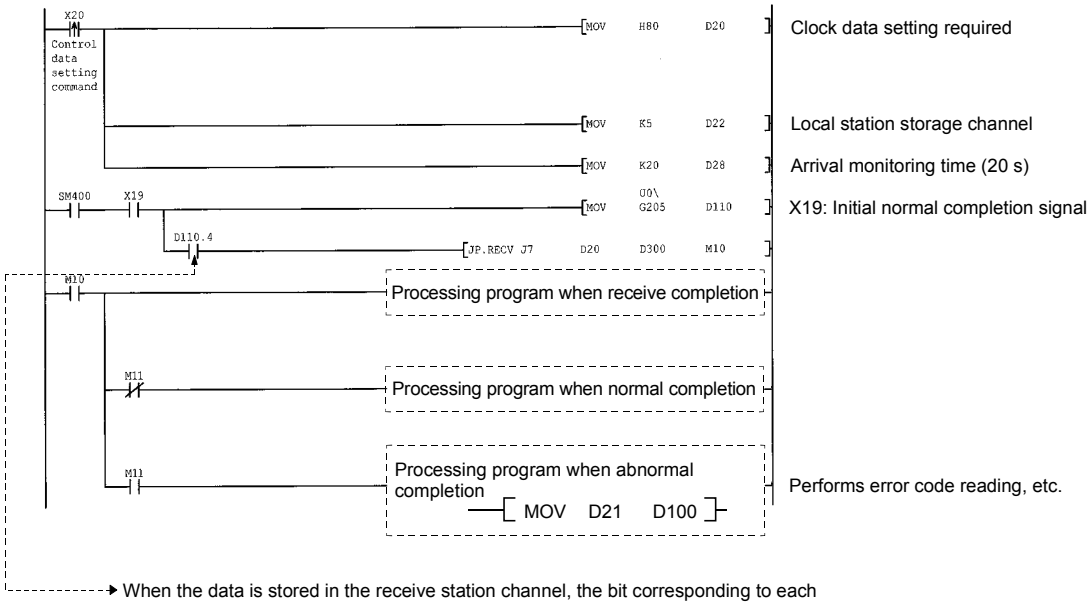


(a) Station 3 program (SEND instruction)

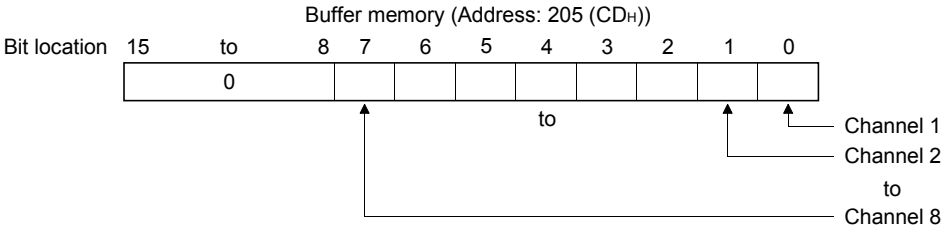
When I/O signals of Ethernet module are X/Y00 to X/Y1F



(b) Station 15 program (RECV instruction)
When I/O signals of the Ethernet module are X/Y00 to X/Y1F



When the data is stored in the receive station channel, the bit corresponding to each channel of buffer memory RECV instruction execution request area turns on.
Data can be read automatically bu using this signal for the receive command.
The signal turns off shen the RECV instruction is completed.



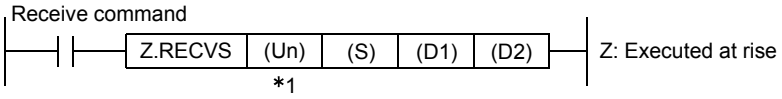
4.5.2 Data sending/receiving for receive with an interrupt program (SEND/RECVS)

This section explains the format and program examples of the RECVS instruction for receive when sending/receiving data between the programmable controller CPUs.
For details on the instruction format and program examples of the SEND instruction, see Section 4.5.1.
For more details, see Sections 6.5 and 6.9.

(1) Instruction format

(a) SEND instruction
Same as the instruction format described in Section 4.5.1.

(b) RECVS instruction
[Ethernet module start I/O signal designation]



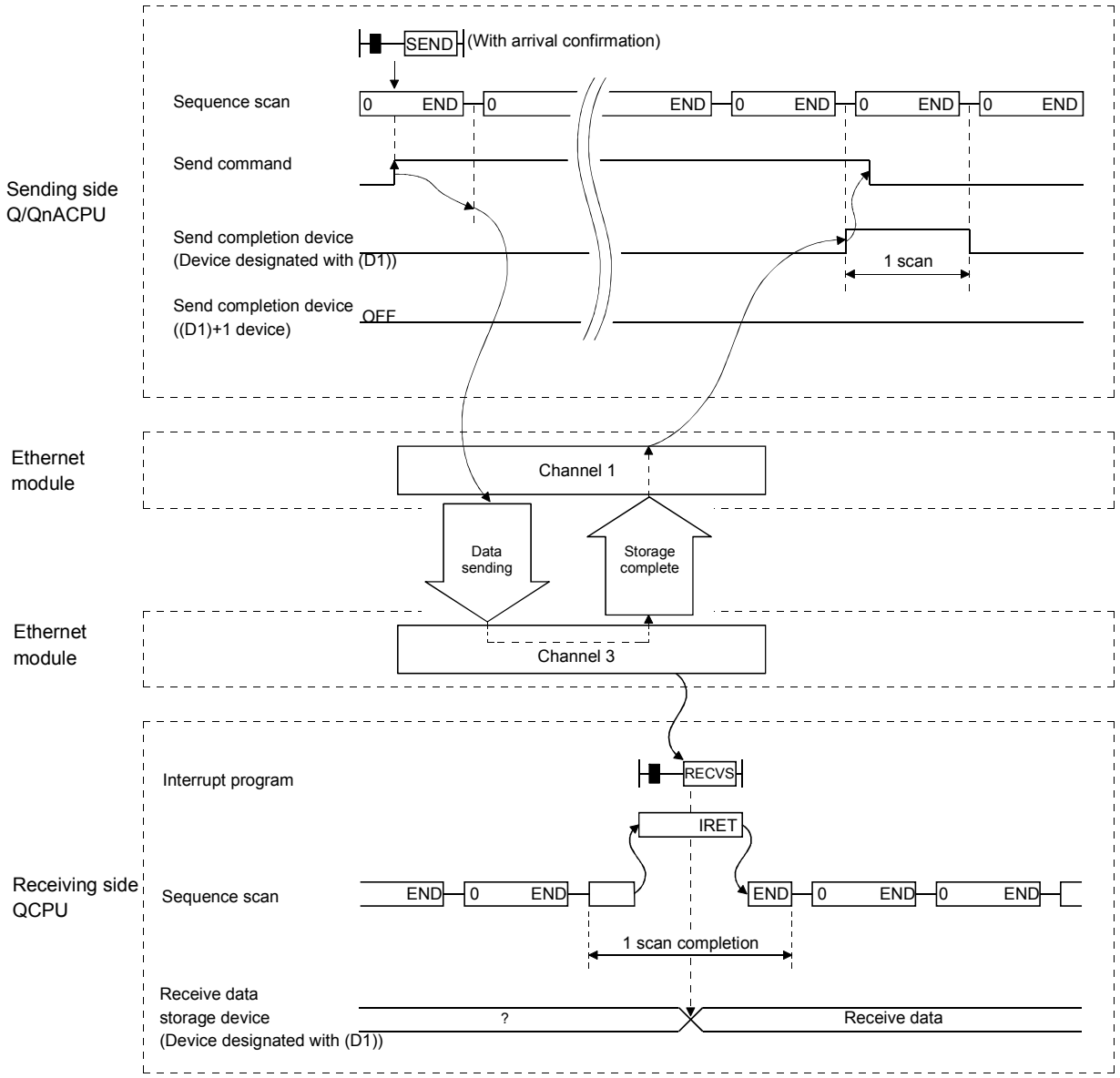
*1 If the originating station is a Basic model QCPU (function version B or later) or Universal model QCPU, " " (double quotation) of the first argument can be omitted.

	Description of setting	Setting range
Un	Start I/O signal of the local station Ethernet module Designate by higher two digits when the I/O signal is expressed by three digits.	0 to FE_H
(S)	Control data storage head device Designate the head device of the local station that stores the control data.	Word device *2
(D1)	Send data storage head device Designate the head device of the local station that stores the receive data.	Word device *2
(D2)	Designate dummy data	Bit device *1 Word device bit designation *3

*1: Bit device ····· X, Y, M, L, F, V, B
*2: Word device ····· T, C, D, W, ST, R, ZR
*3: Word device bit designation ····· Word device, Bit number

(2) Execution timing of the instruction (When executing reception processing by an interrupt program)

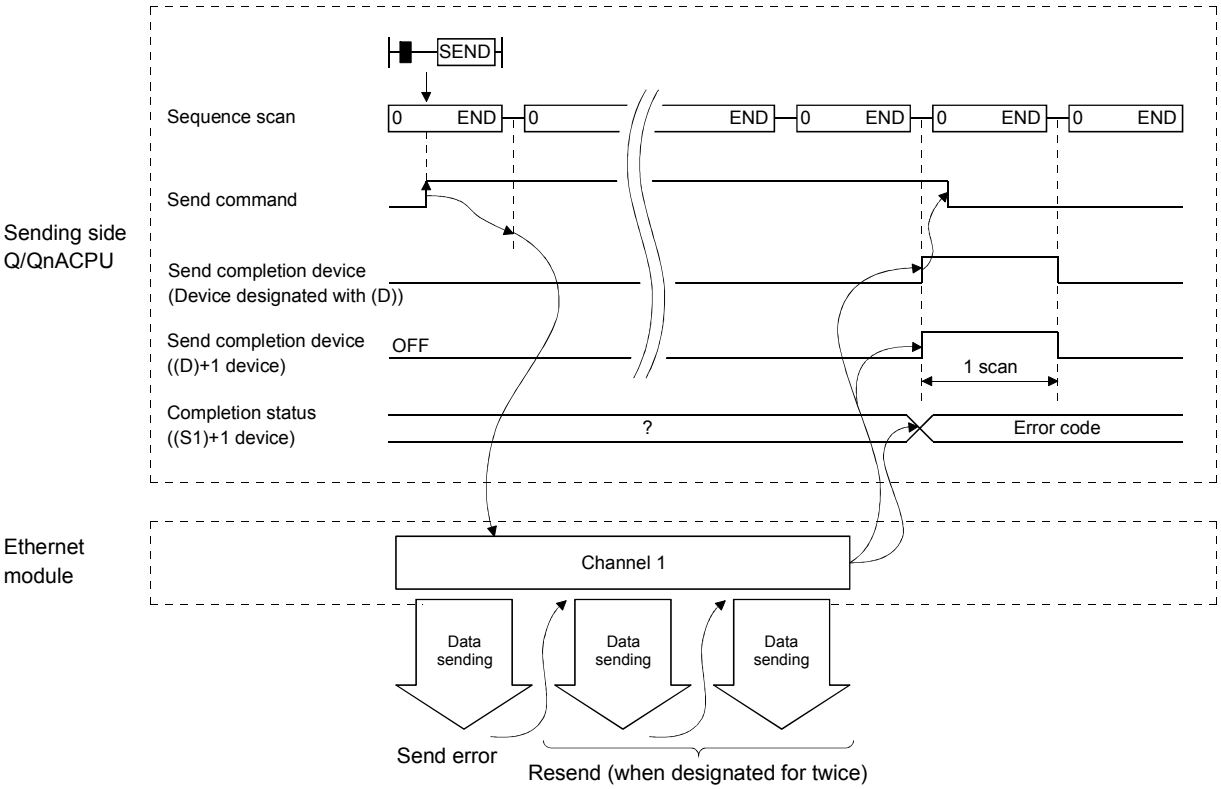
(a) When normal completion



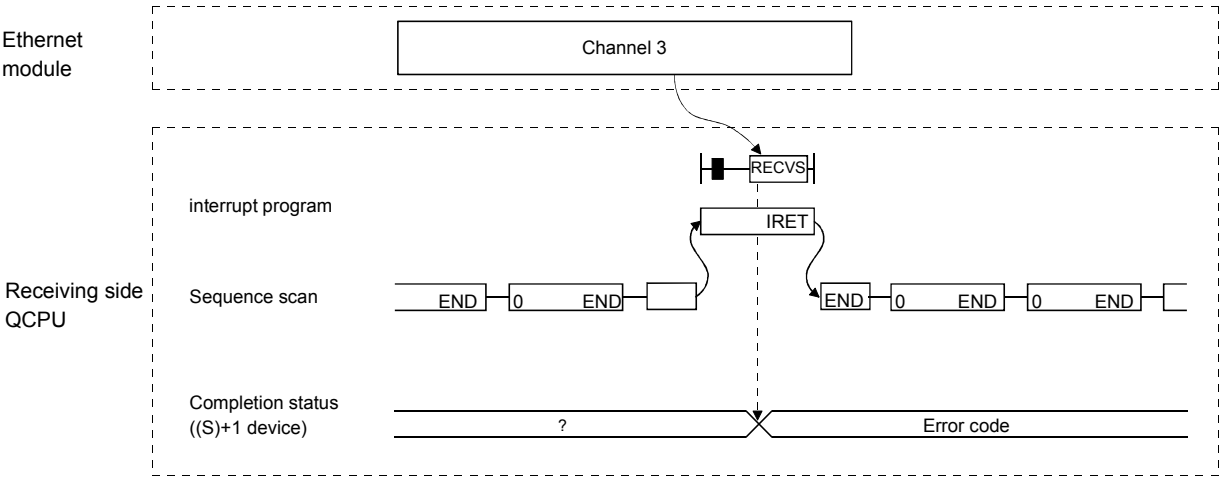
4 - 19

(b) When abnormal completion

1) In case of the SEND instruction

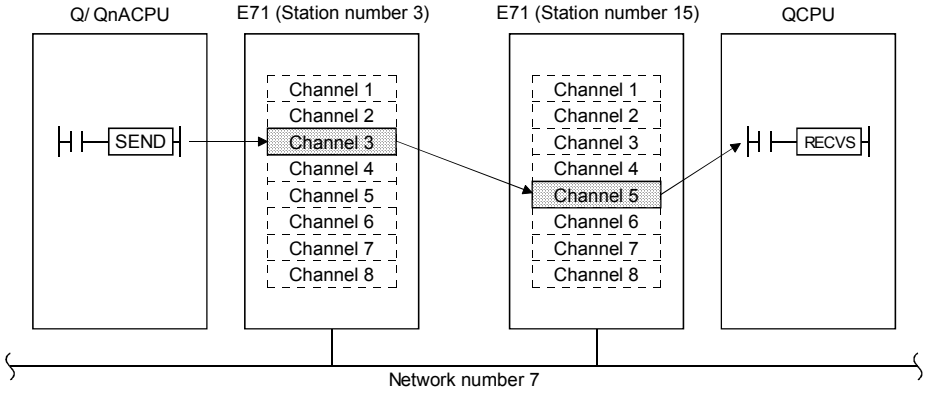


2) In case of the RECVS instruction



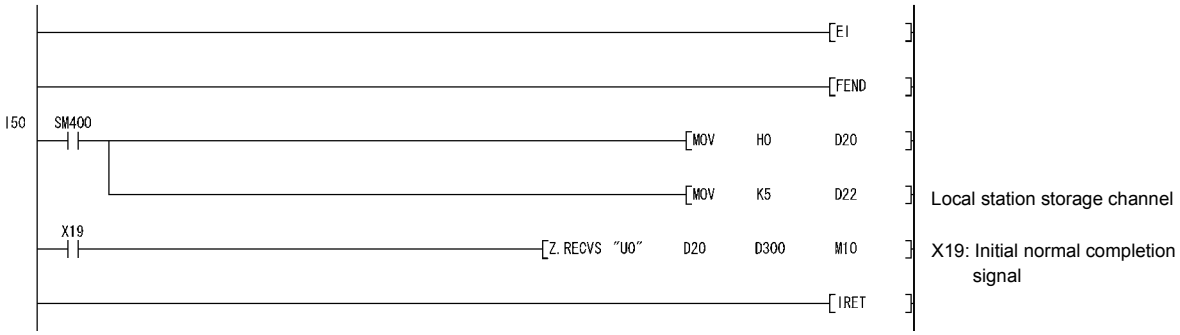
(3) Program examples

Station 3 uses channel 3 with an SEND instruction and sends data to station 15 using channel 5.
When data is received at station 15, data is read from channel 5.



(a) Station 3 program (SEND instruction)
Same as the program shown in Section 4.5.1.

(b) Program for station number 15 (RECVS instruction)
When the input/output signals of the Ethernet module are X/Y00 to X/Y1F



REMARKS

Create interrupt enable/disable programs in the main program in order to start the interrupt program.
Use the EI, DI and IMASK instructions for this.

To check the descriptions of errors, see the completion status (S1) + 1 indicated in the control data.

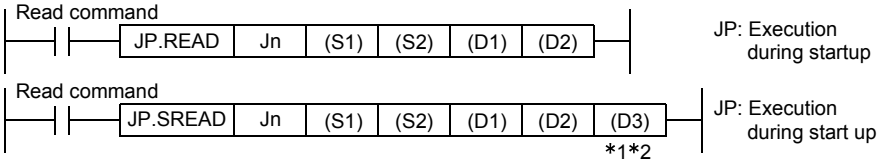
4.6 Reading/Writing Word Devices of Other Stations (READ/WRITE)

This section explains the format and program examples of the READ/WRITE instructions that are used to read and write data of word devices of other stations. For details, see Sections 6.4, and 6.10 to 6.12.

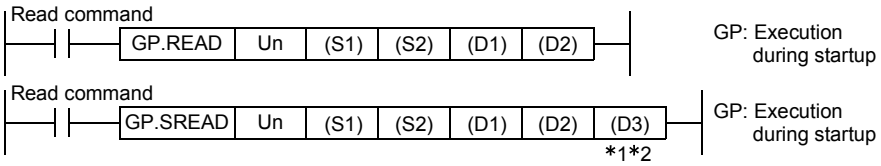
(1) Instruction format

(a) READ/SREAD instructions

[Network number designation]



[Network module/Ethernet module start I/O signal designation]



*1 The SREAD instruction can be programmed without argument (D3).
However, in such a case, the operation is identical to the READ instruction.
With the SREAD instruction, different operations are available depending on whether (D3) is omitted or not.

*2 When the target station is a Basic model QCPU or safety CPU, the read notification device set as argument (D3) for the target station is ignored. (Same operation as with the READ instruction)

	Setting details	Setting range
Jn	Local station network number	1 to 239: Network number 254: Network designated in a valid module for other station access.
Un	Start I/O signal of the local station network module/Ethernet module. Designate by higher two digits when the I/O signal is expressed by three digits.	0 to FE$_H$
(S1)	Control data storage head device Designate the head device of the local station 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 read.	Word device ＊3
(D1)	Read data storage head device (local station) Designate the head device of the local station that stores the data to read.	Word device ＊2
(D2)	Read completion device (local station) Designate the device of the local station to turn on one scan when the read is complete. (D2) ····· OFF: Incomplete ON: Complete (D2) + 1 ····· OFF: Normal ON: Abnormal	Bit device ＊1 Word device bit designation ＊4
(D3)	Read notify device (target station) Designate the device of the target station to turn on one scan when the read is complete. (Can recognize data of target station has been read from other station.) (D3) ····· OFF: Incomplete ON: Complete	Bit device ＊1 Word device bit designation ＊4

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

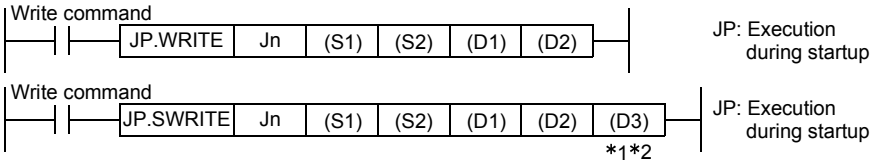
＊2: Word device ····· T, C, D, W, ST, R, ZR

＊3: Word device ····· T, C, D, W, ST, SD, SW, R, ZR

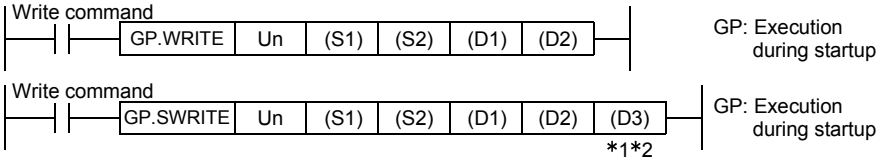
＊4: Word device bit designation ····· Word device . Bit number

(b) WRITE, SWRITE instructions

[Network number designation]



[Network module/Ethernet module start I/O signal designation]



＊1 The SWRITE instruction can be programmed without argument (D3).
However, in such a case, the operation is identical to the WRITE instruction.
With the SWRITE instruction, different operations are available depending on whether (D3) is omitted or not.

＊2 When the target station is a Basic model QCPU or safety CPU, the write notification device set as argument (D3) for the target station is ignored. (Same operation as with the WRITE instruction)

	Setting details	Setting range
Jn	Local station network number	1 to 239: Network number 254: Network designated in a valid module for other station access.
Un	Start I/O signal of the local station network module/Ethernet module. Designate by higher two digits when the I/O signal is expressed by three digits.	0 to FE_H
(S1)	Control data storage head device Designate the head device of the local station that stores the control data.	Word device ＊2
(S2)	Write data storage head device (local station) Designate the head device of the local station that stores the data to write.	Word device ＊2
(D1)	Write data storage head device (target station) Designate the head device of the local station where the data is written.	Word device ＊3
(D2)	Write completion device (local station) Designate the device of the local station to turn on one scan when the write is complete. (D2) ····· OFF: Incomplete ON: Complete (D2) + 1 ····· OFF: Normal ON: Abnormal	Bit device ＊1 Word device bit designation ＊4
(D3)	Write notify device (target station) Designate the device of the target station to turn on one scan when the write is complete. (Can recognize data of target station has been write from other station.) (D3) ····· OFF: Incomplete ON: Complete	Bit device ＊1 Word device bit designation ＊4

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

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

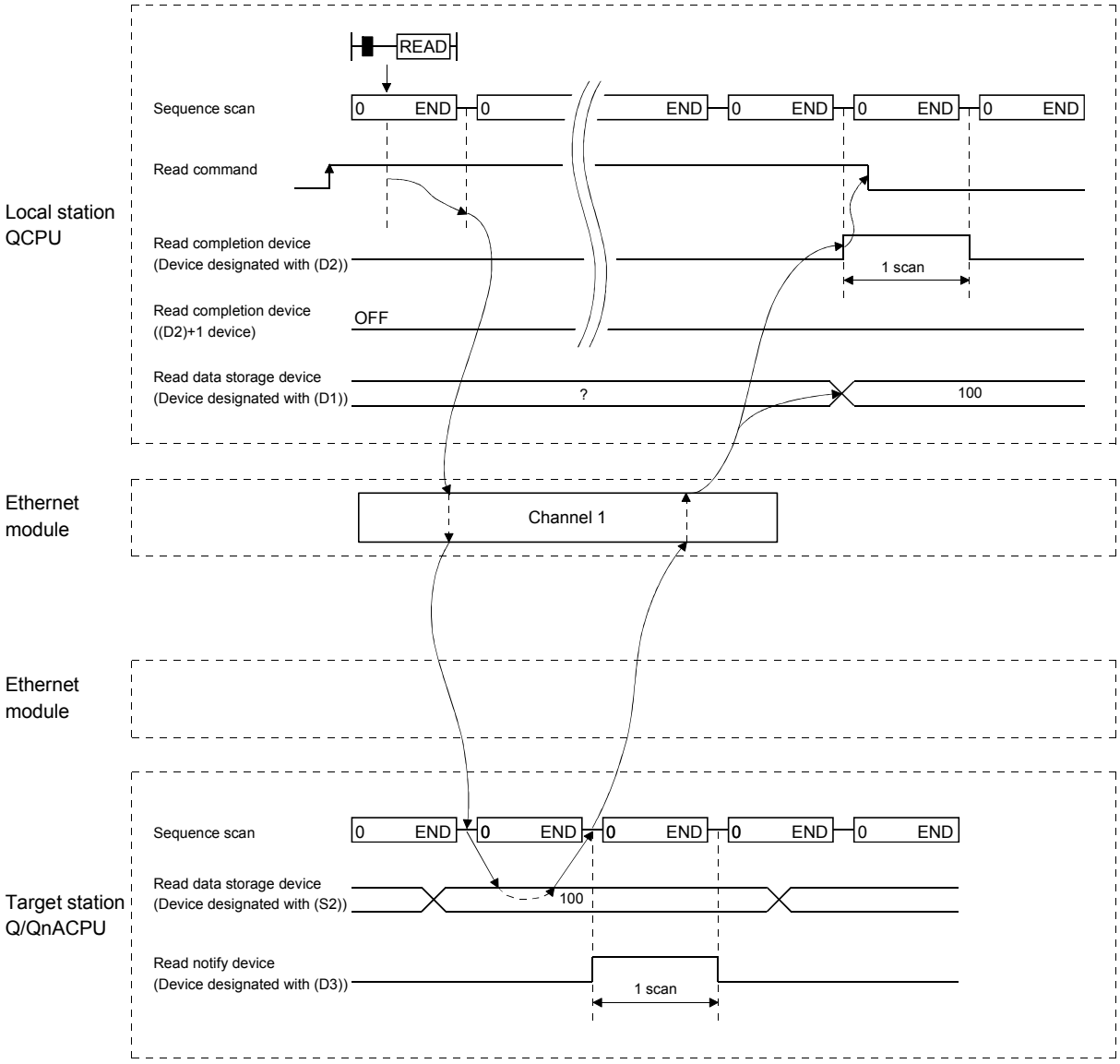
＊3: Word device ····· T, C, D, W, ST, SD, SW, R, ZR
For SD/SW, data can be written within the setting range allowed for the user.
For details on SD/SW, refer to the manual for the programmable controller CPU or N/W module of the target station.

＊4: Word device bit designation····· Word device, Bit number

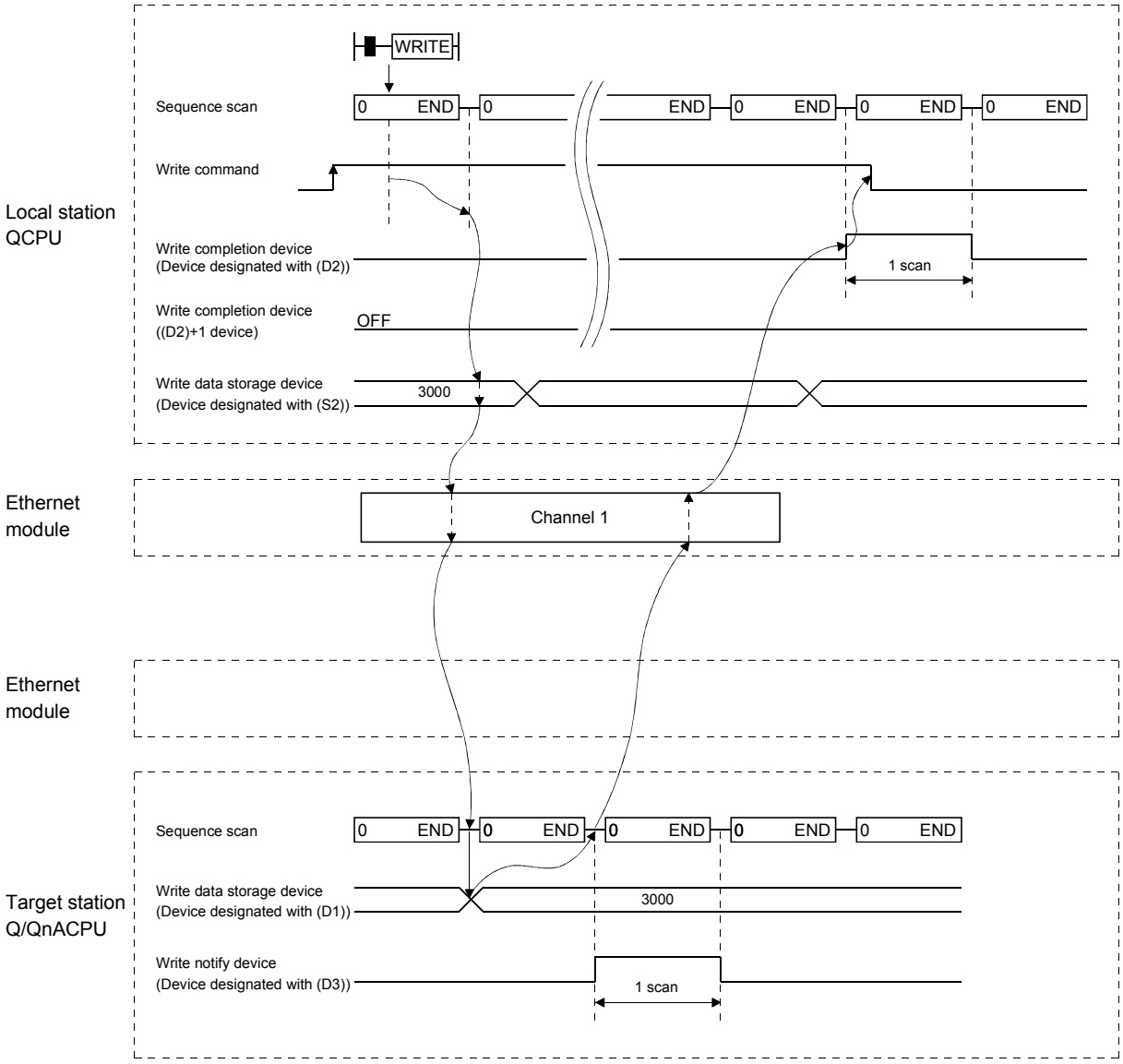
(2) Instruction execution timing

(a) When normal completion

1) READ instruction, SREAD instruction

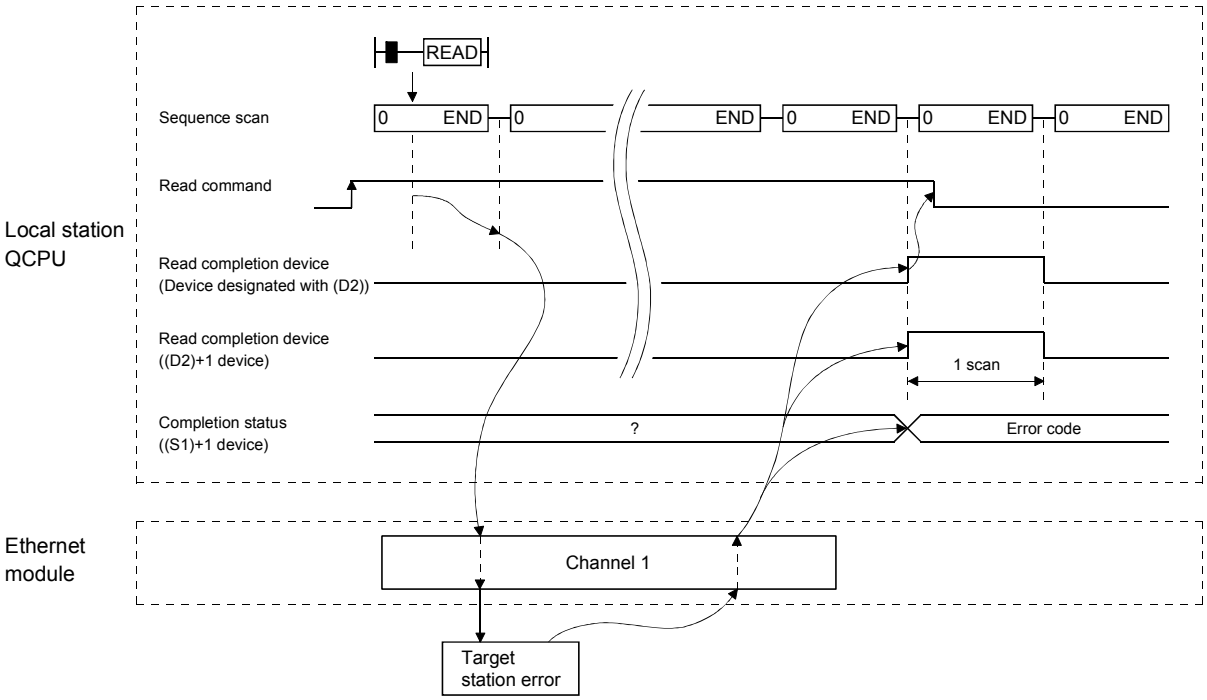


2) WRITE instruction, SWRITE instruction

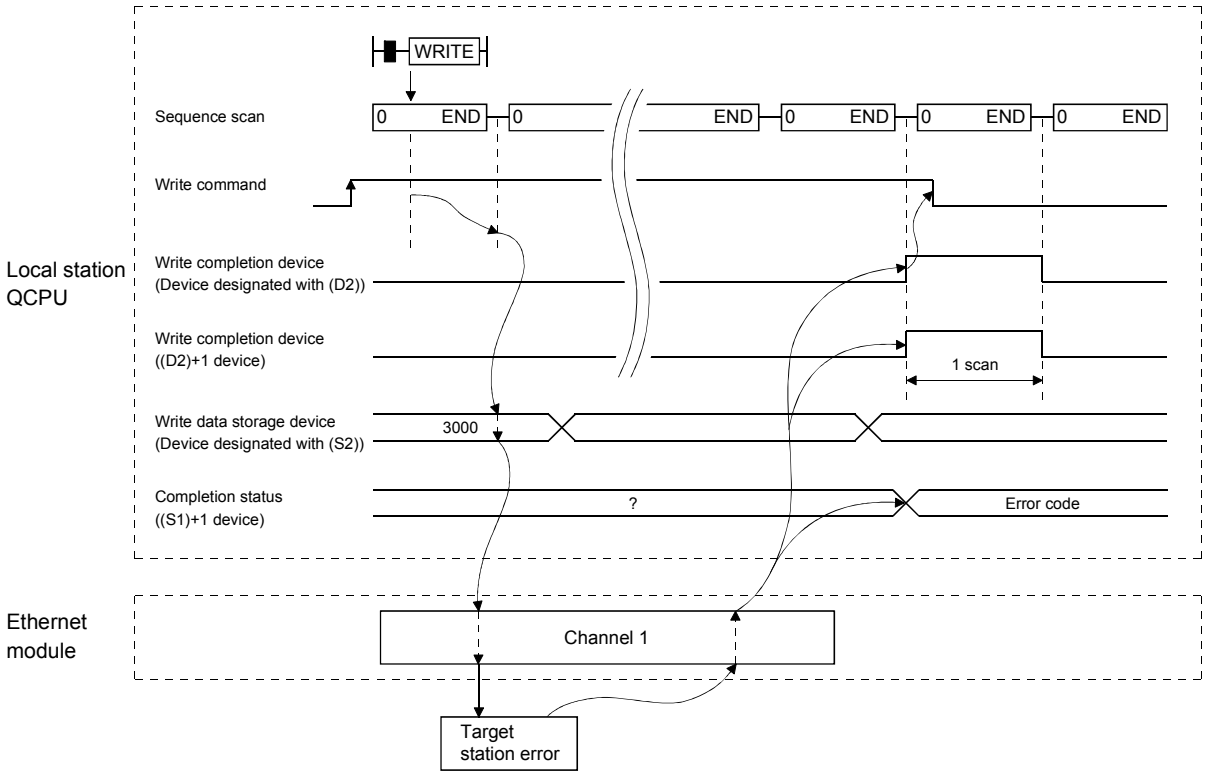


(b) When abnormal completion

1) READ instruction, SREAD instruction

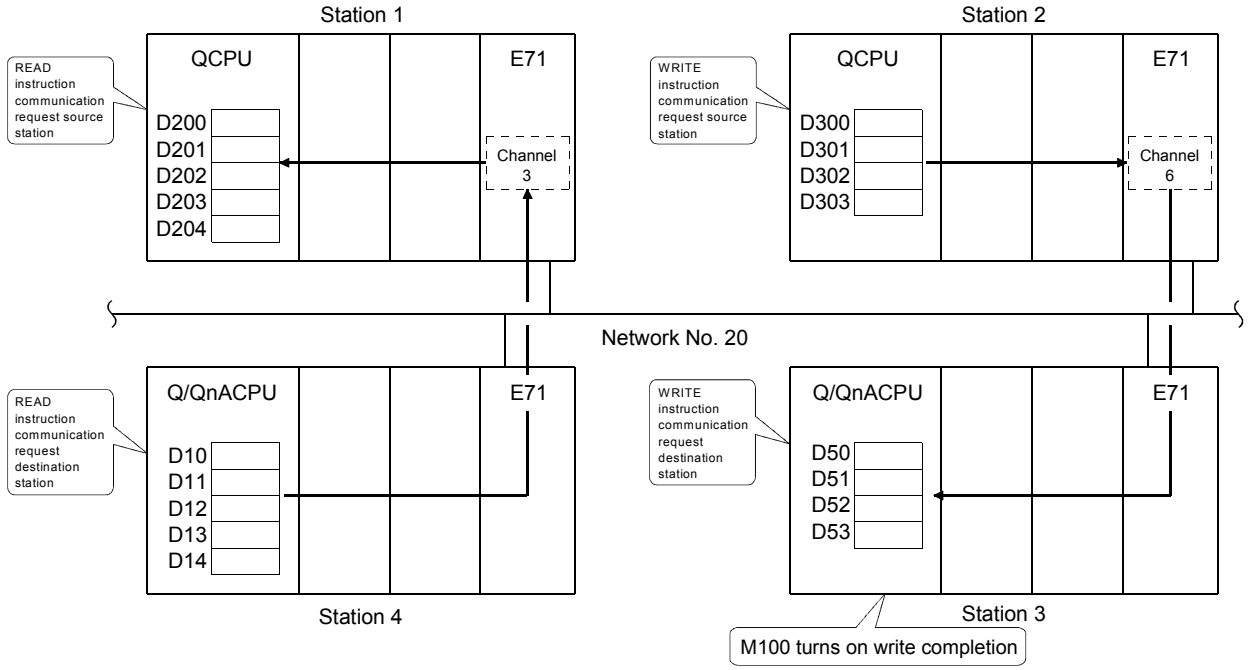


2) WRITE instruction, SWRITE instruction

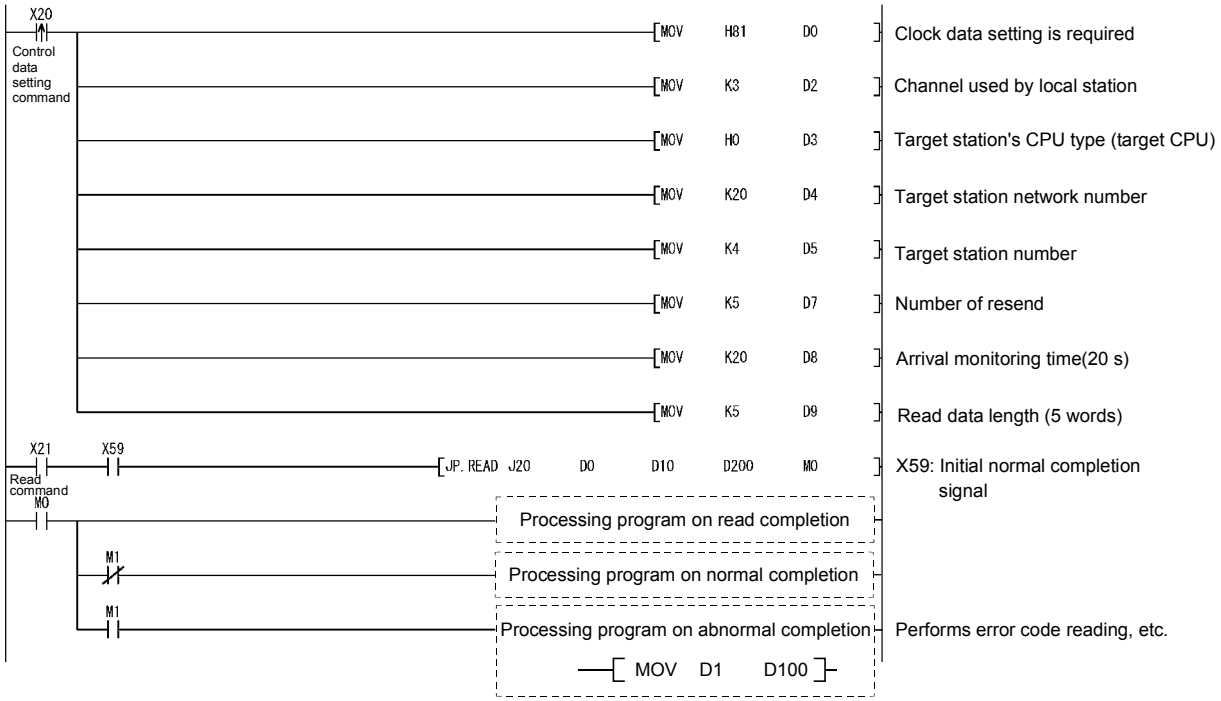


(3) Program example

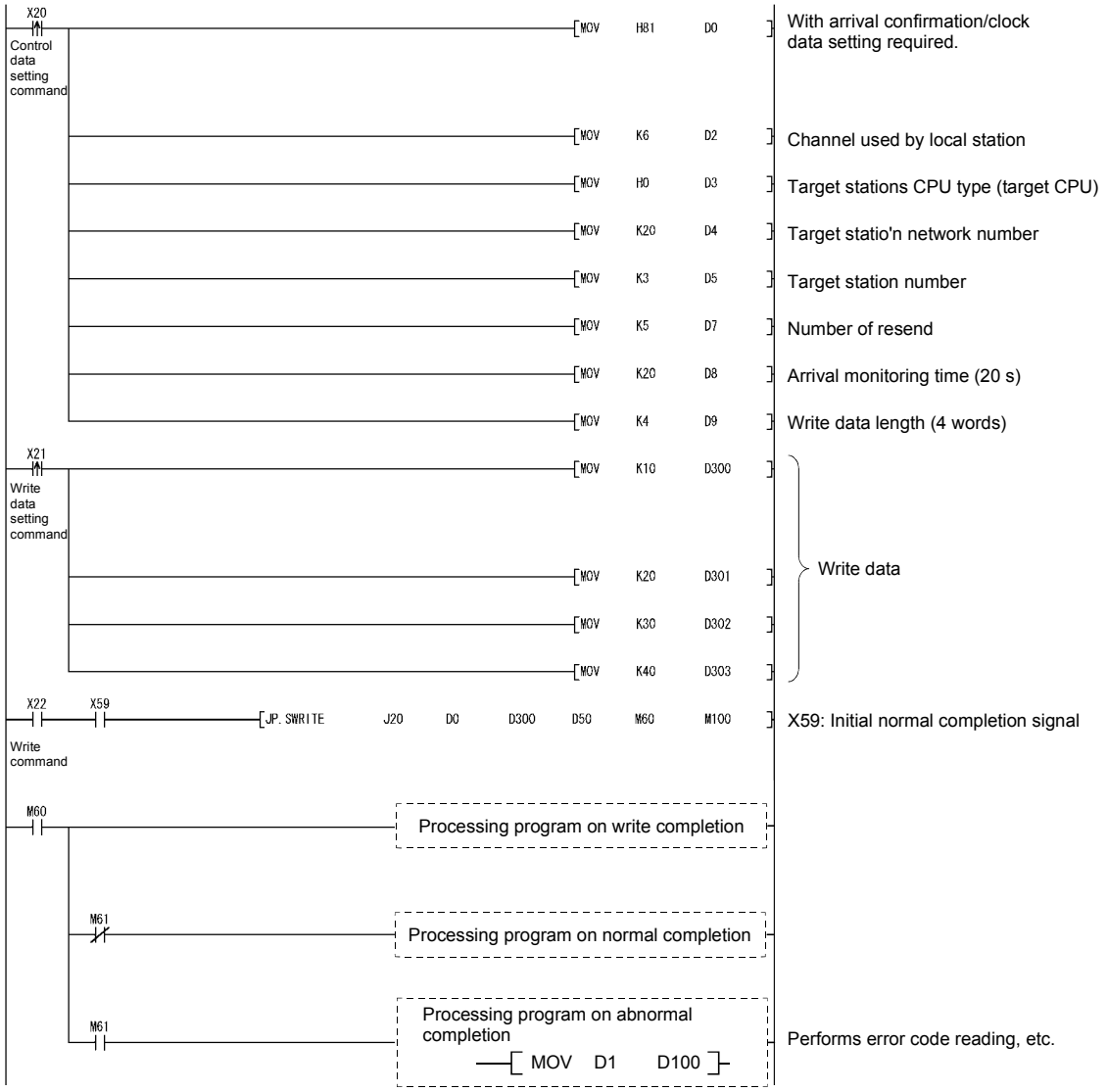
Read data from D10 to 14 of station 4 to D200 to 204 of station 1.
Write the data stored in D300 to 303 of station 2 to D50 to 53 of station 3.



(a) Station 1 program (READ instruction)
When I/O signals of Ethernet module are X/Y40 to X/Y5F



(b) Station 2 programs (SWRITE instruction)
When I/O signals of Ethernet module are X/Y40 to X/Y5F



4.7 Reading/Writing Word Devices of Other Stations (ZNRD/ZNWR)

This section explains the format and program examples of the ZNRD/ZNWR instructions that are used to read and write data of word devices of other station. For details, see Sections 6.13 and 6.14.

(1) Instruction format

(a) ZNRD instruction

[Network number designation]

	Setting details	Setting range
Jn	Target station network number Designate the target station network number.	1 to 239
n1	Target station number Designate the target station number.	1 to 64 (constant) Bit device digit designation ＊2 Word device ＊3
(S)	Read data storage head device (target station) Designate the head device of the target station that stores the data to read.	T, C, D, W
(D1)	Read data storage head device (local station) Designate the head device of the local station which will store the data to be read.	Word device ＊3
n2	Read data length Designate the number of data (words) to read.	When reading from Q/QnACPU 1 to 230 (constant) When reading from programmable controller CPU other than Q/QnACPU ＊5 1 to 32 (constant) Bit device digit designation ＊2 Word device ＊3
(D2)	Read completion device (local station) Designate the device of the local station to turn on one scan when the read is complete. (D2) ····· OFF: Incomplete ON: Complete (D2) + 1 ····· OFF: Normal ON: Abnormal	Bit device ＊1 Word device bit designation ＊4

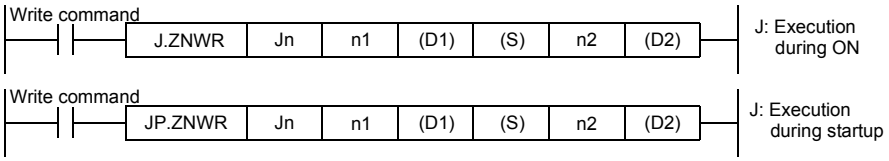
＊1: Bit device ····· X, Y, M, L, F, V, B
＊2: Bit device digit designation····· K Digit number Bit device head number
＊3: Word device····· T, C, D, W, ST, R, ZR
＊4: Word device bit designation····· Word device . Bit number

POINT

The normal or abnormal read completion status is stored in the data link instruction execution result (ZNRD instruction) storage area (address: 207).
When the read completion device ((D2) + 1) is on due to abnormal end, read the error code (See troubleshooting of User's Manual (Basic).) stored in the area mentioned above, and perform the necessary corrective action.

(b) ZNWR instruction

[Network number designation]



	Setting details	Setting range
Jn	Target station network number Designate the target station network number.	1 to 239
n1	Target station number Designate the target station number.	1 to 64 (constant): Stations of station number 81H to 89_H : All stations of group number FF_H : All stations on the target network number Bit device digit designation ＊2 Word device ＊3
(D1)	Write data storage head device (target station) Designate the head device of the target station that stores the data to write.	T, C, D, W
(S)	Write data storage head device (local station) Designate the head device of the local station which will store the data to write.	Word device ＊3
n2	Write data length Designate the number of data (words) to write.	When writing from Q/QnACPU 1 to 230 (constant) When writing from programmable controller CPU other than Q/QnACPU ＊5 1 to 32 (constant) Bit device digit designation ＊2 Word device ＊3
(D2)	Write completion device (local station) Designate the device of the local station to turn on one scan when the write is complete. (D2) ····· OFF: Incomplete ON: Complete (D2) + 1 ····· OFF: Normal ON: Abnormal	Bit device ＊1 Word device bit designation ＊4

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

＊2: Bit device digit designation····· K Digit number Bit device head number

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

＊4: Word device bit designation····· Word device, Bit number

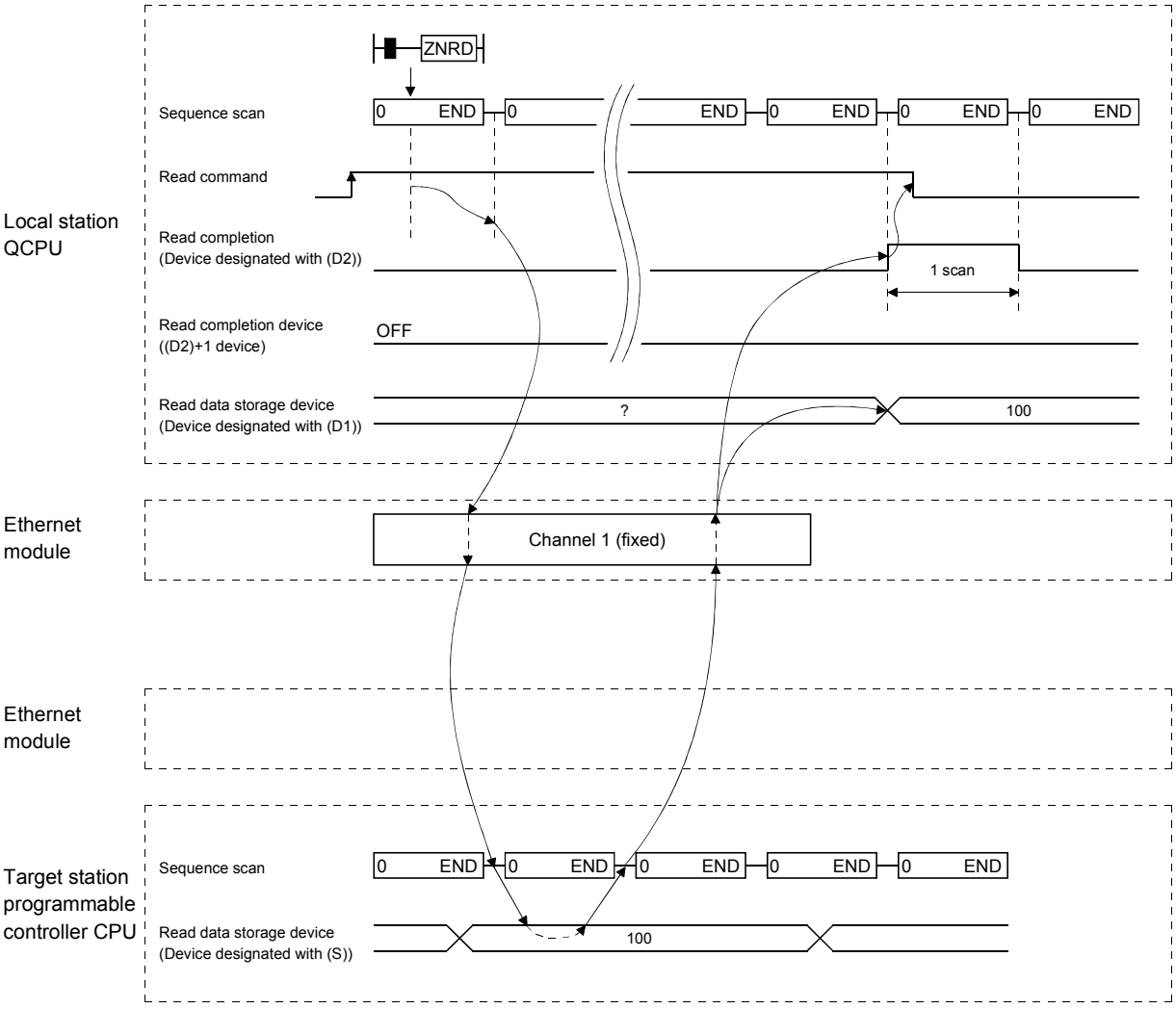
POINT

The normal or abnormal write completion status is stored in the data link instruction execution result (ZNWR instruction) storage area (address: 209).
When the write completion device ((D2) + 1) is on due to abnormal end, read the error code (See troubleshooting of User's Manual (Basic).) stored in the area described above, and perform the necessary corrective action.

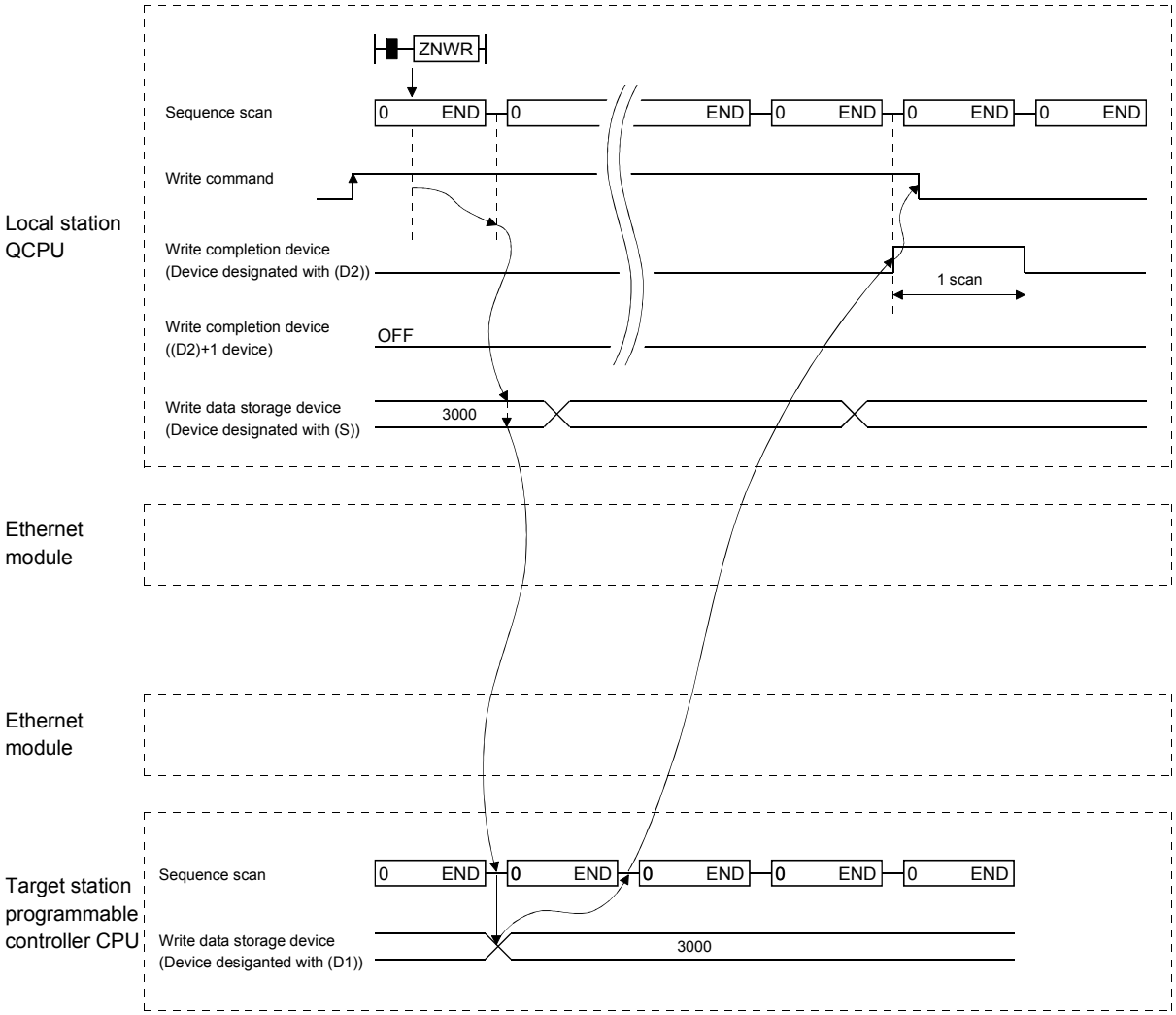
(2) Instruction execution timing

(a) When normal completion

1) ZNRD instruction



2) ZNWR instruction



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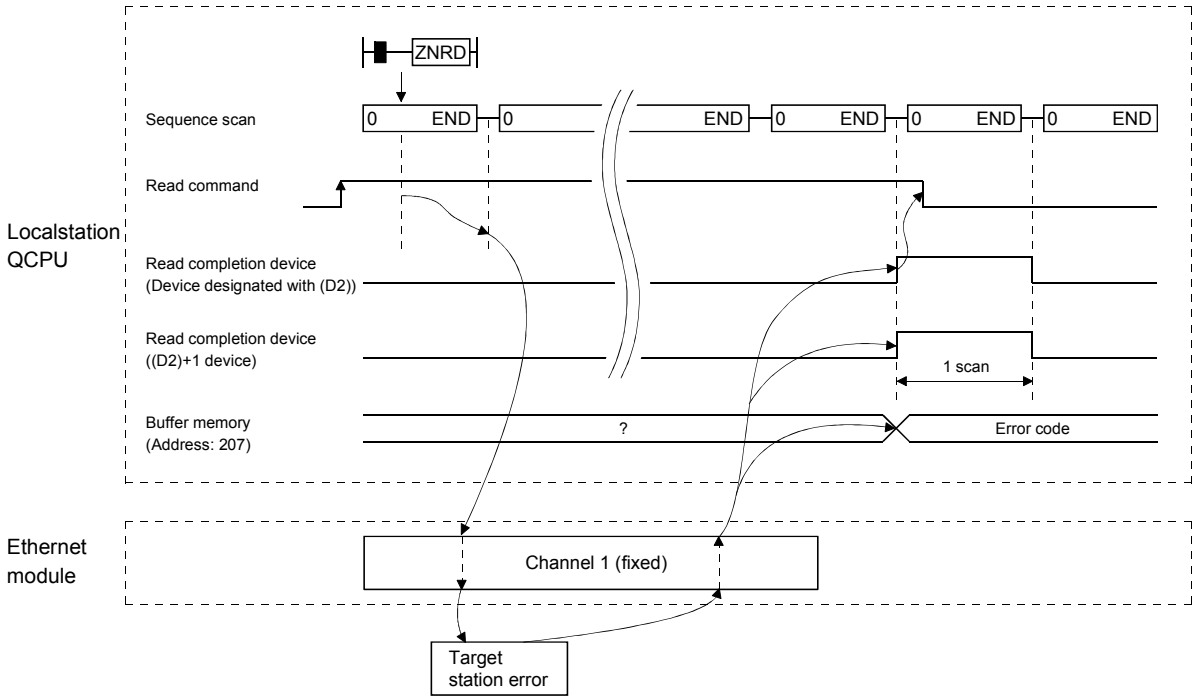
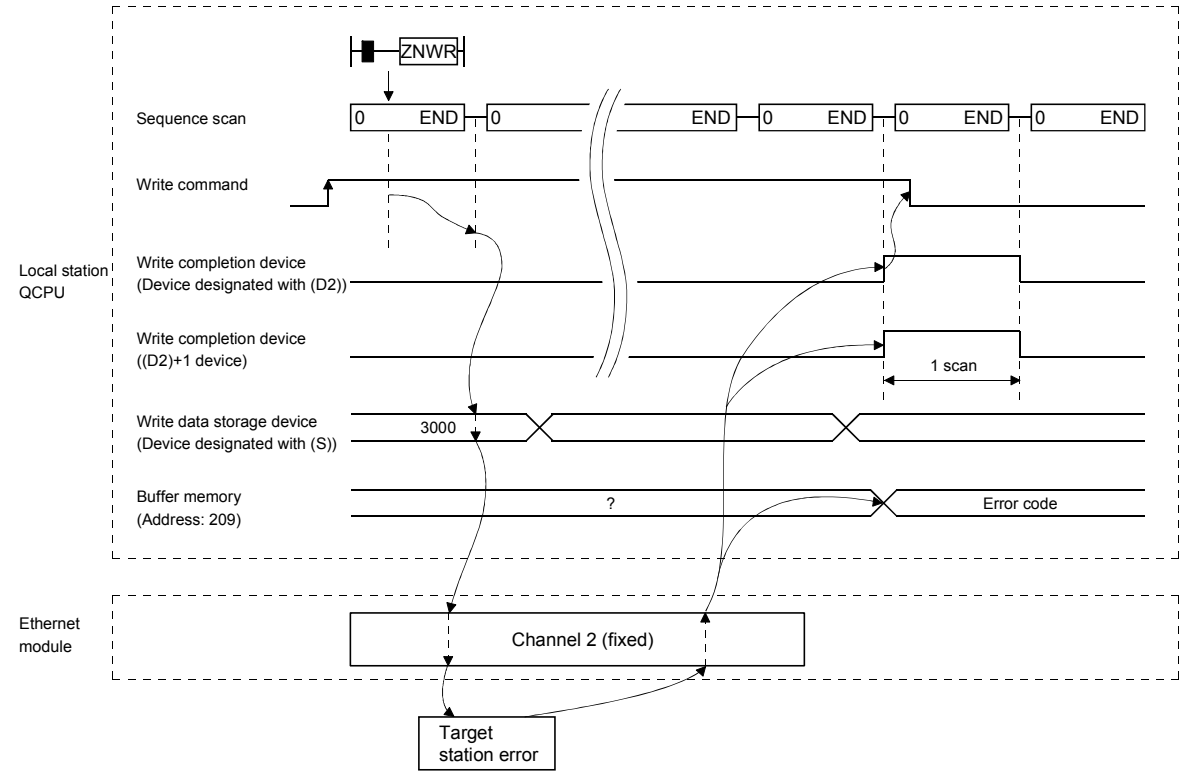
(b) When abnormal completion

1) ZNRD instruction

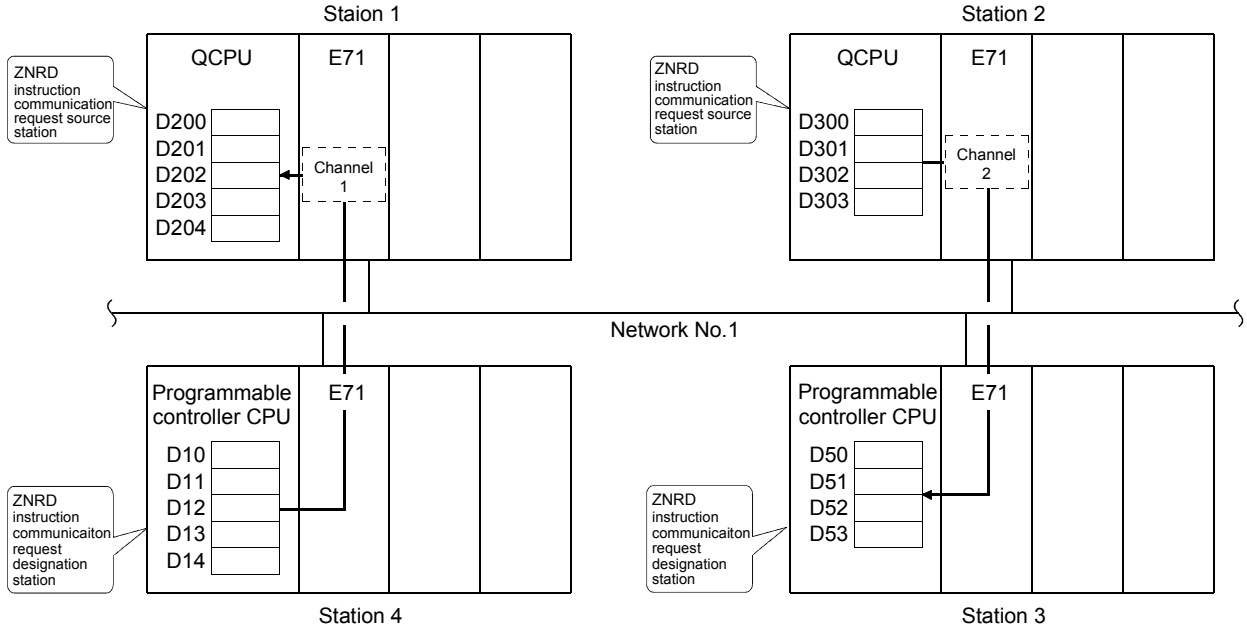


2) ZNWR instruction

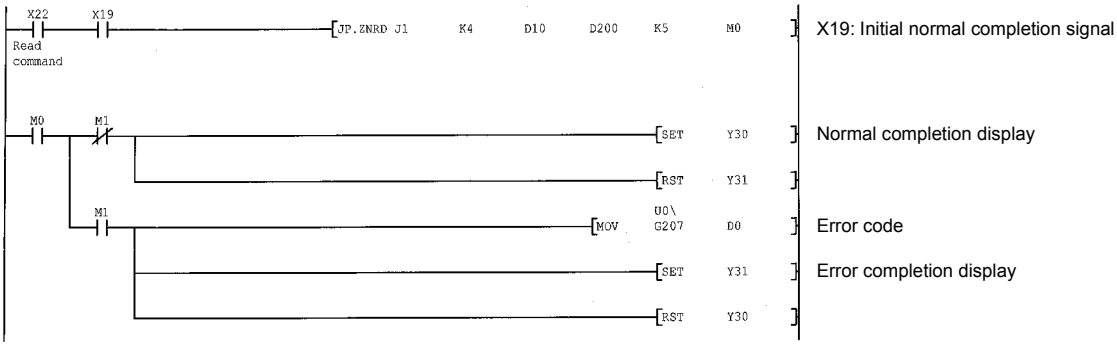


(3) Program example

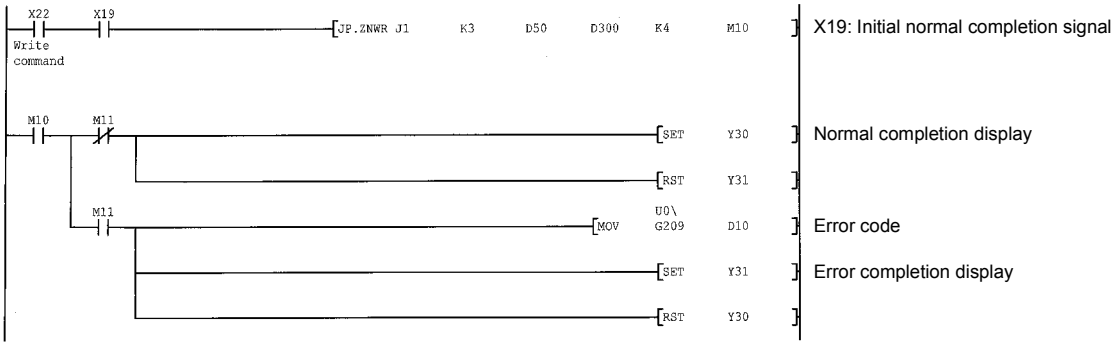
Contents of station 4 D10 to 14 are read to station 1 D200 to 204.
Contents of station 2 D300 to 304 are read to station 3 D50 to 53.



(a) Program of station 1 (ZNRD instruction)
When I/O signals of Ethernet module are X/Y00 to X/Y1F



(b) Program of station 2 (ZNWR instruction)
When I/O signals of Ethernet module are X/Y00 to X/Y1F

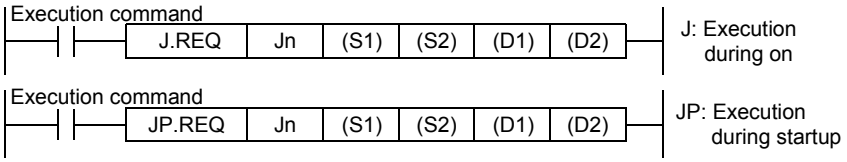


4.8 Reading/Writing Clock Data, Remote RUN/Remote STOP (REQ)

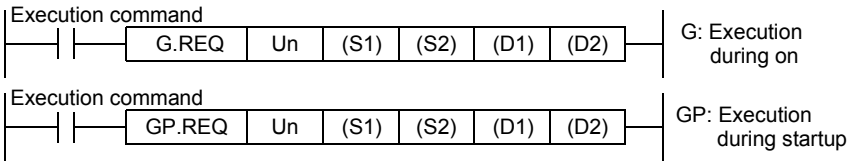
This section explains the format and program examples of the REQ instruction that is used to read/write clock data and remote RUN/remote STOP of the Q/QnACPU of other stations.
For details, see Sections 6.7 and 6.8.

(1) Instruction format

[Network number designation]



[Network module/Ethernet module start I/O signal designation]

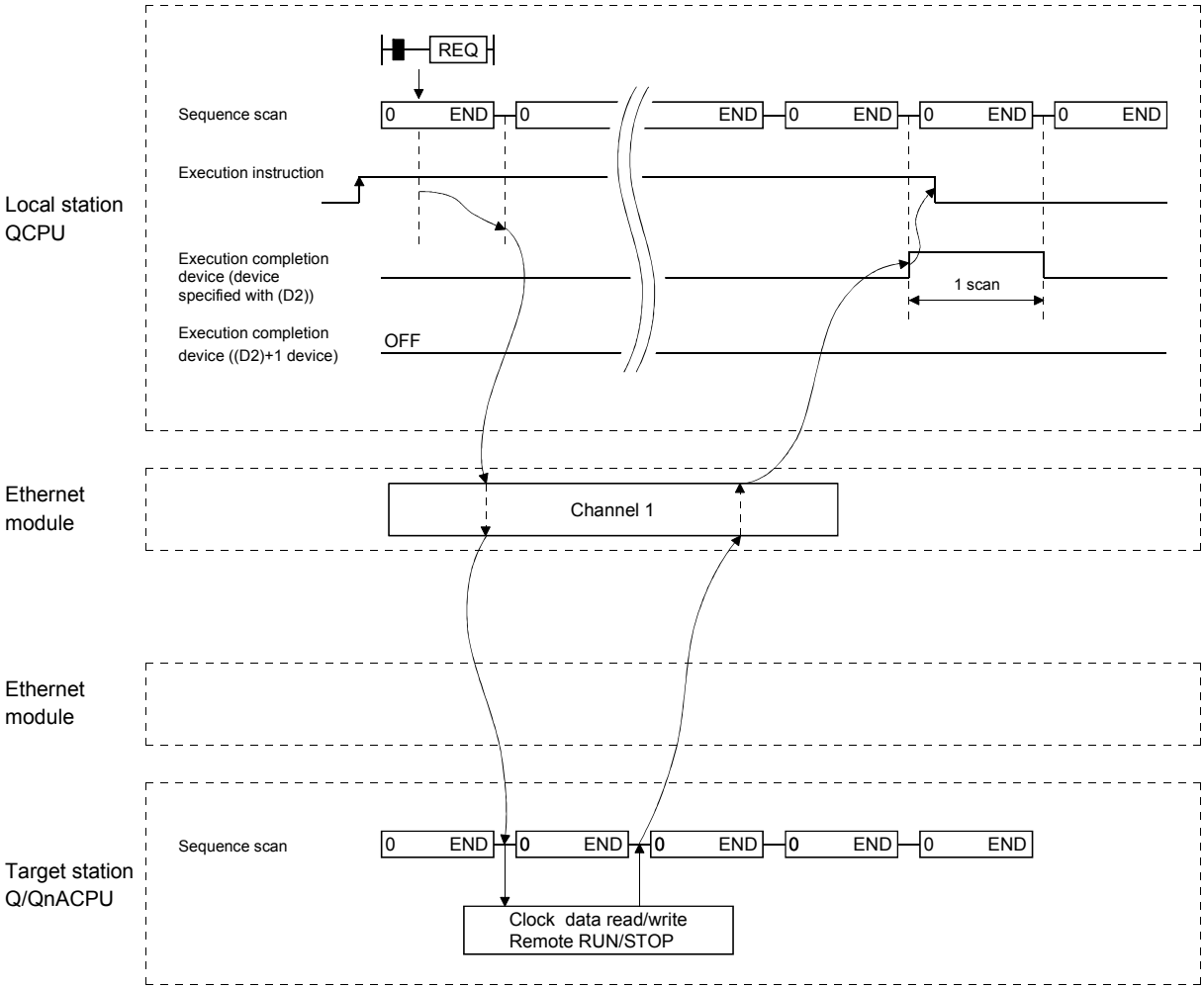


	Setting details	Setting range
Jn	Local station network number	1 to 239: Network number 254: Network designated in a valid module for other station access.
Un	Start I/O signal of the local station network module/Ethernet module. Designate by higher two digits when the I/O signal is expressed by three digits.	0 to FE_H
(S1)	Control data storage head device Designate the head device of the local station that stores the control data.	Word device ＊2
(S2)	Request data storage head device (local station) Designate the head device of the local station that stores the request data.	Word device ＊2
(D1)	Response data storage head device (local station) Designate the head device of the local station that stores the response data.	Word device ＊2
(D2)	Execution completion device (local station) Designate the device of the local station to turn on one scan when the execution is complete. (D2) ····· OFF: Incomplete ON: Complete (D2) + 1 ····· OFF: Normal ON: Abnormal	Bit device ＊1 Word device bit designation ＊3

＊1: Bit device ····· X, Y, M, L, F, V, B
＊2: Word device····· T, C, D, W, ST, R, ZR
＊3: Word device bit designation ····· Word device . Bit number

(2) Instruction execution timing

(a) When normal completion



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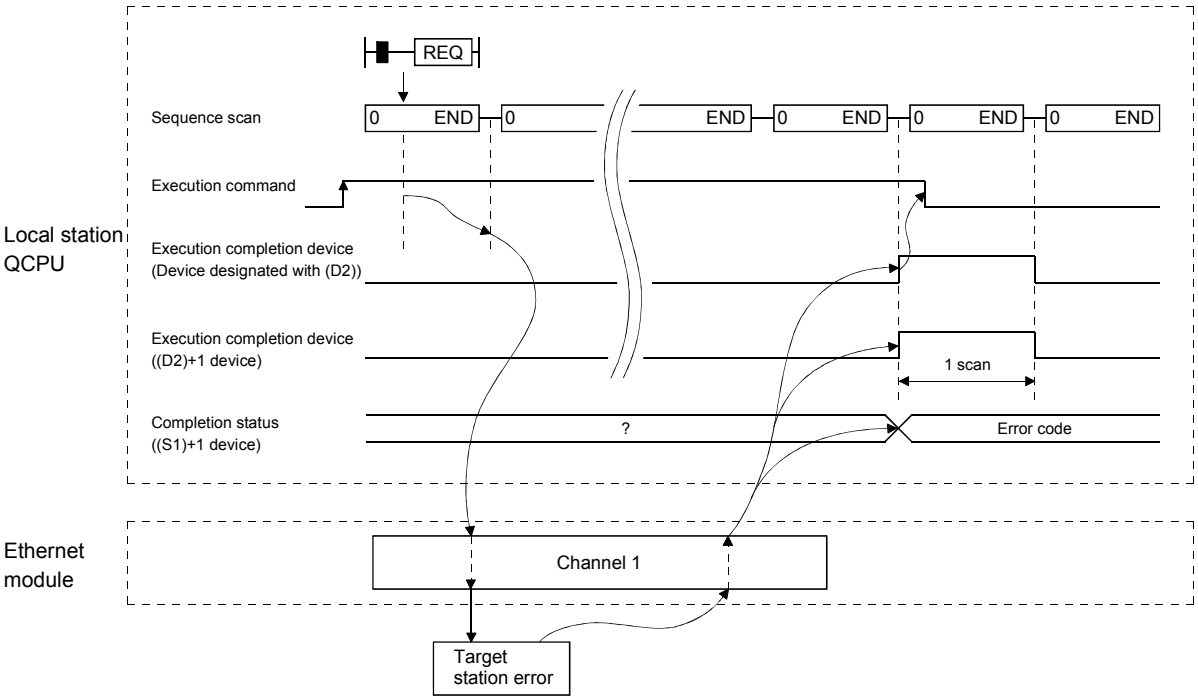
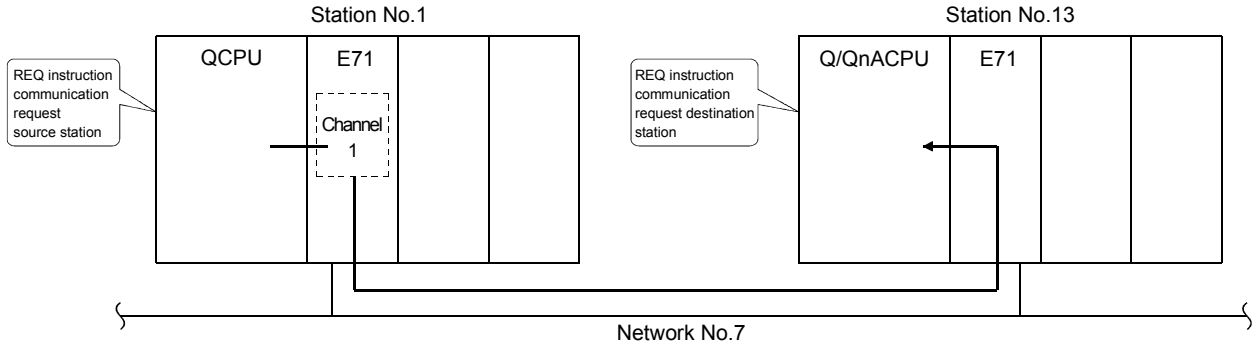
(b) When abnormal completion

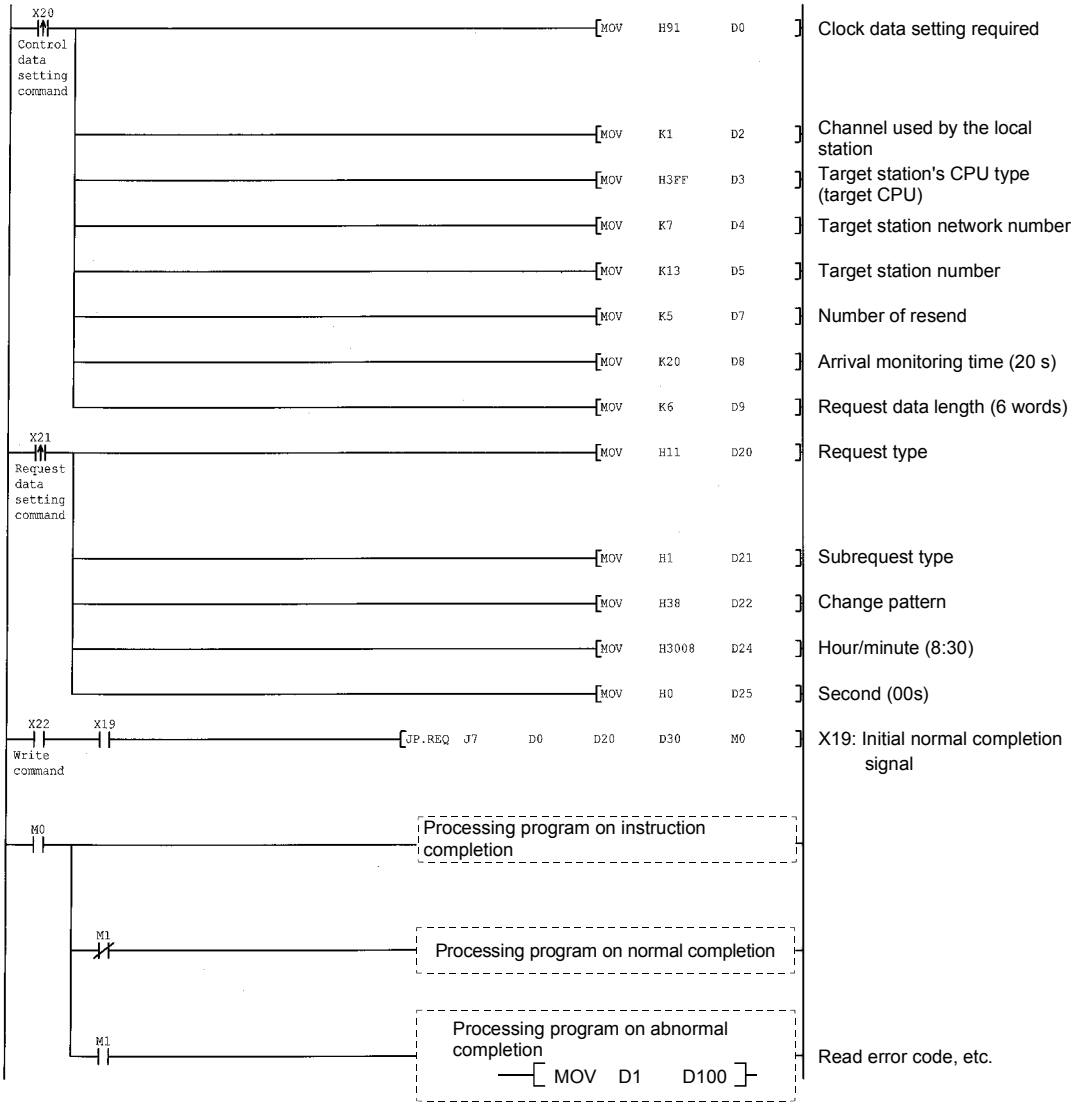


(3) Instruction examples

(a) A program that writes the clock data (8:30:00) to the Q/QnACPU of station number 13 using network number 7.

When I/O signals of the Ethernet module are X/Y00 to X/Y1F





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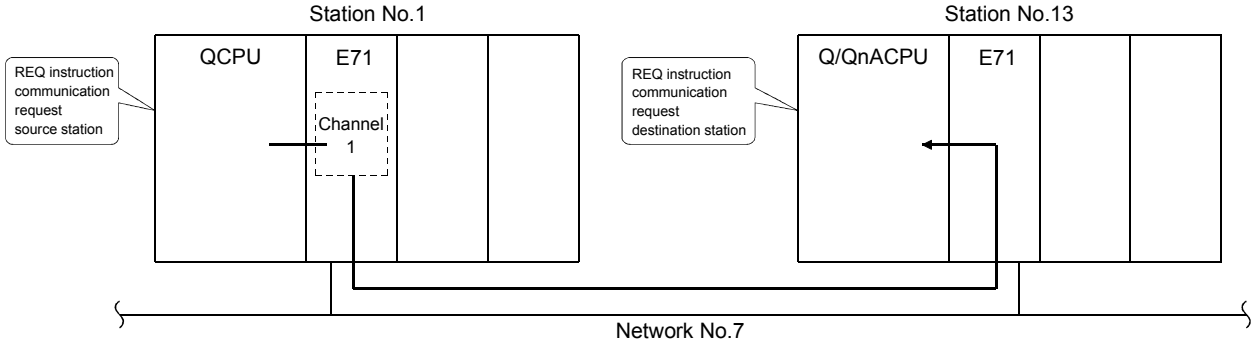
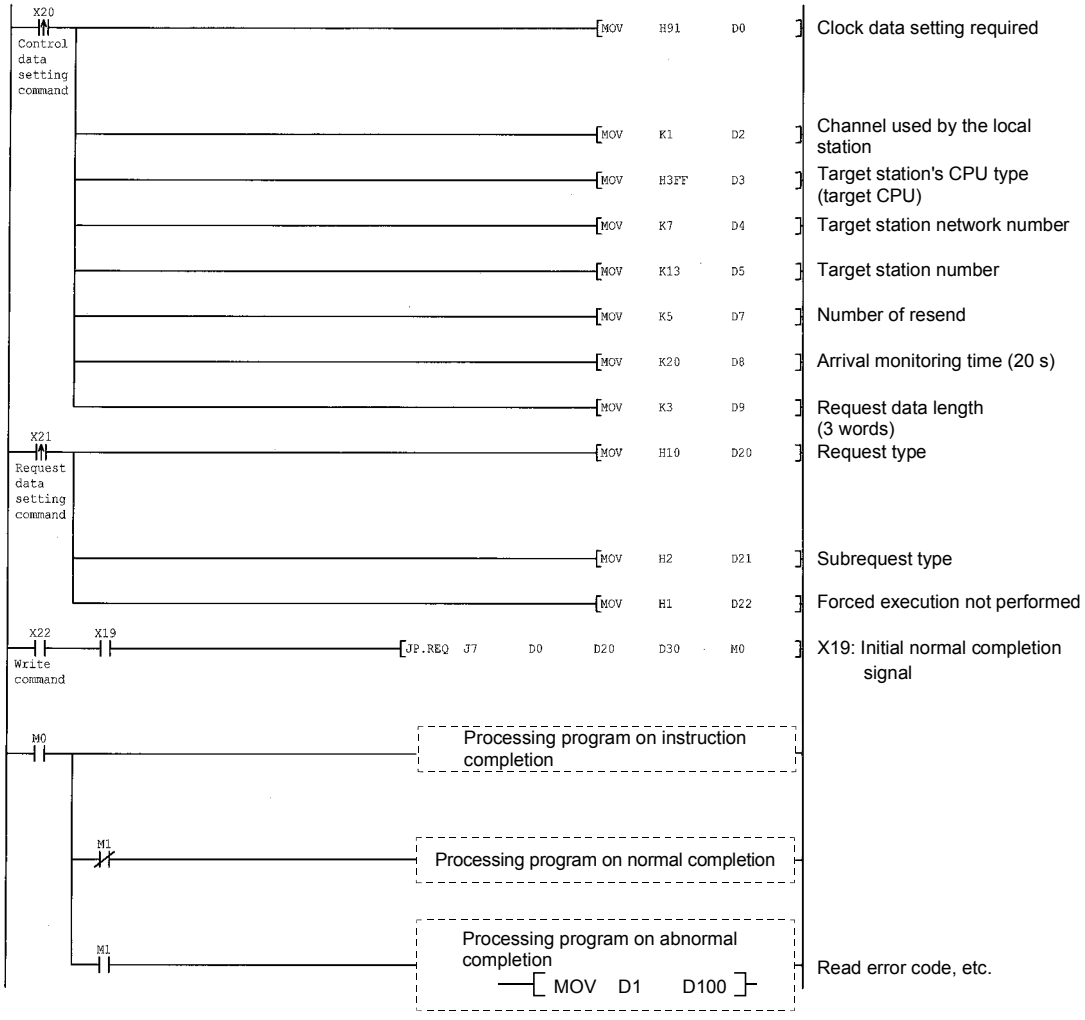
(b) This is a program to "Remote STOP" station number 13 on network number 7.

When I/O signals of Ethernet module are X/Y00 to X/Y1F





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4.9 Error Codes for Data Link Instructions

When the execution results of the data link instruction shown in this chapter end error, the returned error code is the same error code as is shown in the following manual.

Q corresponding Ethernet Interface module
Section 11.3.3 of User's Manual (Basic)

The error code for data link instruction is stored in the Ethernet module error log area and the following area:

1) SEND, RECV (RECVS), READ (SREAD), WRITE (SWRITE), REQ : Control data completion status ((S1) + 1)
2) ZNRD : Buffer memory (Address 207)
3) ZNWR : Buffer memory (Address 209)

5 WHEN USING FILE TRANSFER FUNCTIONS (FTP SERVER)

Files in the local station QCPU to which the Ethernet module is installed can be read and written from external device using the Ethernet module file transfer function.
In this chapter, how to use (command) the Ethernet module FTP function from external device (personal computer, workstations, etc.) is explained.

POINT
The access destination of files handled using the file transfer function is the local station QCPU in the station to which the Ethernet module is installed. Specify an access target CPU if the local station QCPU is included in a multiple CPU system.

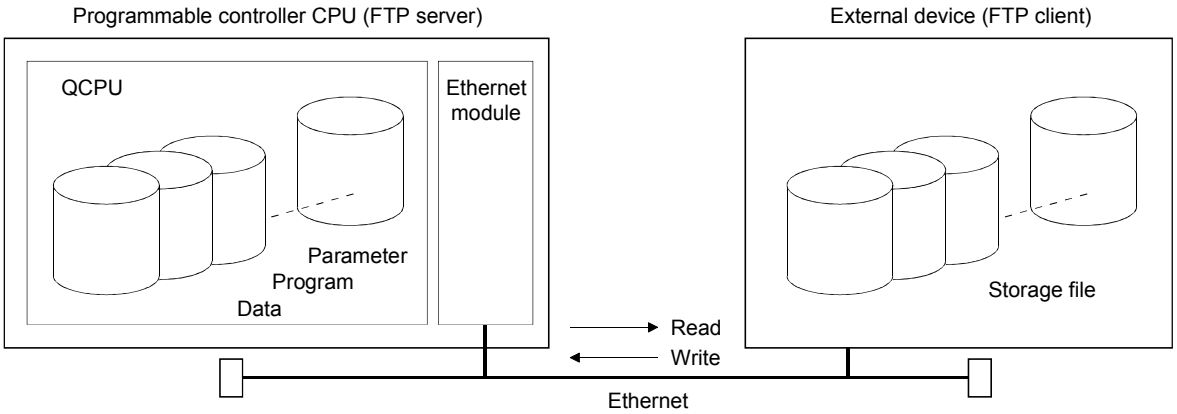
5.1 File Transfer Functions

The file transfer functions (hereinafter called FTP server) of the Ethernet module, to perform read/write to the files in the QCPU from a external device side is explained.

The Ethernet module supports the FTP (File Transfer Protocol) server function, which uses the protocol to transfer files between external devices. It functions as the file server for the files in the QCPU.
The FTP commands are used to direct data transfers in file units.
The external device with the FTP client functions, can easily access (read/write) the user-created files in the QCPU directly using the Ethernet module FTP server functions.

1) Reading a file from the QCPU (download)
   Reading function for storing the QCPU files in the external device.
2) Writing a file to the QCPU (upload)
   Writing function for registering the file in the external device to the QCPU.
3) Scanning QCPU files
   Scanning function for checking the files registered in the QCPU, from the external device.

   * With these Ethernet module FTP server functions, all user files in the QCPU (parameters, sequence programs, and data files) can be accessed using the FTP commands from the external device.



5.1.1 FTP server support functions of Ethernet module

The FTP commands supported by Ethernet module when it serves as the FTP server are indicated below:
"Write enable setting" and "Write disable setting" shown in the table indicate settings on the GX Developer "Ethernet operation settings" screen. (Set in the item, "Enable writing during RUN.")
The "Remote password" indicates whether the instruction can be executed when the FTP communication port is designated as a port subject to the remote password check in the remote password setting (parameter) for the QCPU of the station to which the Ethernet module is installed.
See Section 5.9 of User's Manual (Basic) for the remote password.

(1) Client-side user interface command list (supported by Ethernet module)

Command	Function	Programmable controller CPU status			Remote password		Remarks
		During STOP	During RUN		While unlocked	While locked	
			Write enable setting	Write disable setting			
binary	Notify to transfer without converting file	○	○	○	○	×	—
bye	Disconnect and end the connection with FTP server	○	○	○	○	○	
close	Disconnect the line with FTP server	○	○	○	○	○	
delete	Delete QCPU file	○	○ (＊1)	×	○	×	
dir	Display QCPU file information	○	○	○	○	×	
get	Read file from QCPU	○	○	○	○	×	
ls	Display QCPU file names	○	○	○	○	×	
mdelete	Delete QCPU file	○	○ (＊1)	×	○	×	
mdir	Store QCPU file information to display file	○	○	○	○	×	
mget	Read file from QCPU	○	○	○	○	×	
mls	Store QCPU file names to a file	○	○	○	○	×	
mput	Write file to QCPU	○	○	×	○	×	
open	Connect with FTP server	○	○	○	○	○	
put	Write file to QCPU	○	○	×	○	×	
pwd	Display QCPU current directory	○	○	○	○	×	
quit	Disconnect and end the connection with FTP server	○	○	○	○	○	
quote	Send FTP server sub-command	○	○	○	○	○	Can only use Ethernet module dedicated commands (＊2)
rename	Change QCPU file name	○	○	×	○	×	—
user	Enter user name and password for Ethernet module	○	○	○	○	○	

＊1 The parameter file and the sequence program file cannot be deleted during RUN.

＊2 The list of Ethernet module dedicated commands used along with the quote command is described.
When executing the commands from the FTP client, attach the command after the "quote" command.
(Example) When executing the stop command.
Enter the following in the command prompt.
quote stop <ret>

Command	Function	Programmable controller CPU status			Remote password		Remarks
		During STOP	During RUN		While unlocked	While locked	
			Write enable setting	Write disable setting			
status	Display QCPU operation information	○	○	○	○	×	Ethernet module-FTP server dedicated commands
stop	Set QCPU to STOP state	○	○	○	○	×	
run	Set QCPU to RUN state	○	○	○	○	×	
change	Display/change QCPU file attributes	○	○	×	○	×	
cpuchg	Designates an access target CPU when configurating the multiple CPU system or displays the present access target CPU.	○	○	○	○	×	
keyword-set	Set/display/clear QCPU file access keywords	○	○	○	○	×	
Password-lock	Change status of remote password from unlock to lock	○	○	○	○	×	
Password-unlock	Change status of remote password from lock to unlock	○	○	○	○	○	

POINT

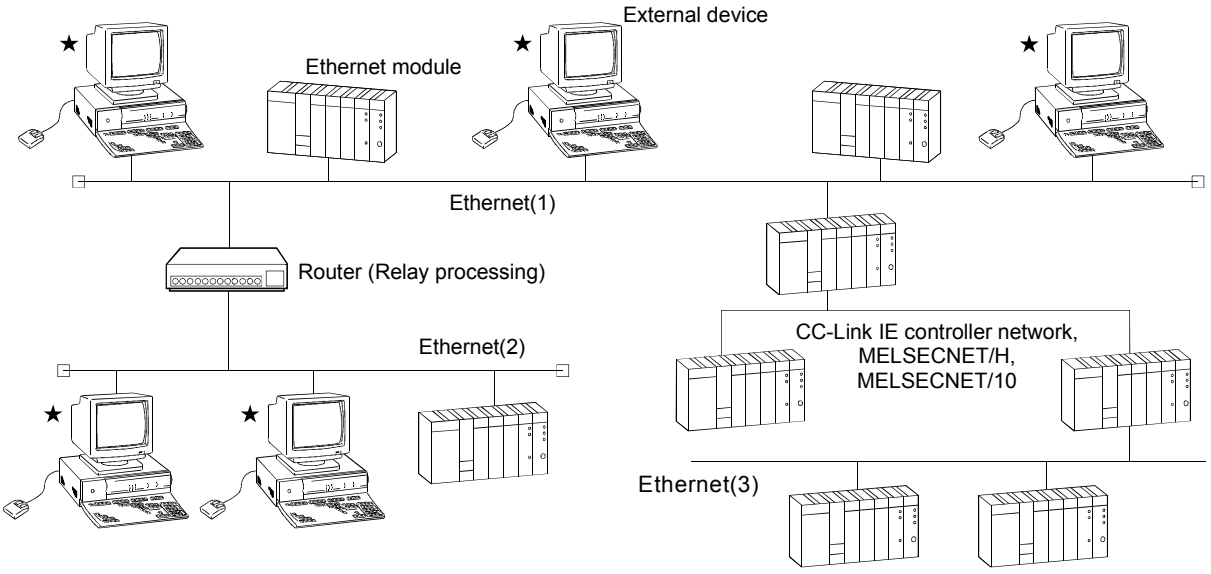
Some of the commands in the table may not operate as described in this manual depending on the client-side FTP application.
See the manual for the FTP client side (external device), and confirm the functions and operation methods as well.

5.2 File Transferable Range

The file transferable range from the external device (QCPU with Ethernet module installed station) is explained.

The file transfer operation from the external device using the Ethernet module FTP server function can be performed from any external device with Ethernet module on the Ethernet.
When the router relay function is used, the external device on the Ethernet connected via the designated router can perform FTP functions.

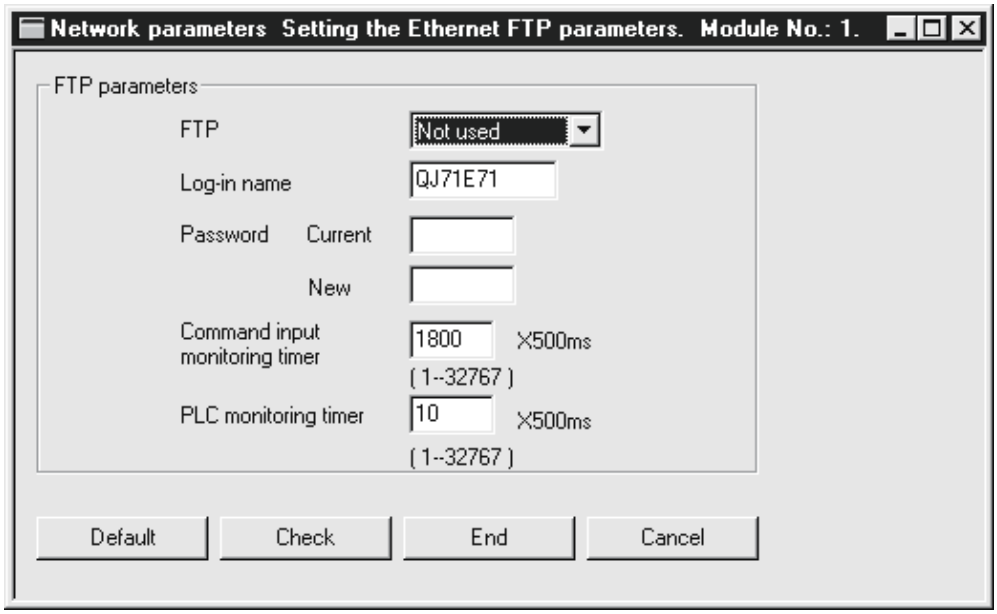
File transfers can be performed from the following external device with the ★ symbol.



✻ File transfers cannot be performed from the external device on the Ethernet (3) which is connected via CC-Link IE controller network, MELSECNET/H, MELSECNET/10.

5.3 FTP Parameter Settings for File Transfer from GX Developer

This section explains how to set the Ethernet FTP parameters for the file transfer (FTP).
Select [GX Developer] - [Network parameters] to start the [Setting the Ethernet FTP parameters] screen. For details on how to display this screen, see the GX Developer Operating Manual.



FTP parameter settings

Item name		Description of setting	Setting range/Selections
FTP		Select whether or not to use the FTP function.	• Do not use • Use
Log-in name		Set the log-in name when a communication destination requests (log-in) file transfer to the Ethernet module by external device.	"QJ71E71"
Password	Current	Set the password when a communication destination requests file transfer to the Ethernet module by external device.	—
	New	Set the new password when a communication destination requests file transfer to the Ethernet module by external device.	—
Command input monitoring timer		Set the monitoring time for the Ethernet module to monitor the command input time from the FTP client.	1 to 32767
PLC monitoring timer		Set the monitoring time for the Ethernet module to monitor the operation of the local station's CPU.	1 to 32767

(1) FTP (Address: 4H ... b8, b9); Default value: Do not use the FTP function

Set whether or not to use the FTP function of the Ethernet module.

Item	Explanation
FTP	Use the FTP function.
	Do not use the FTP function.

(2) Log-in name and password (Address: 3B0H), (3B6H); Default value: QJ71E71

(a) Set the log-in name and password for the external device to request (log-in) file transfer to the Ethernet module in order to use the FTP server function of the Ethernet module.

(b) If the FTP log-in name is changed and invalid characters are entered, "QJ71E71" is set as the log-in name.

(c) If the password is changed and invalid characters are entered, "QJ71E71" is set as the password.

(3) Command input monitoring timer (address: 3BAH); Default value: 1800 (0708H) (15 min)

(a) Set the monitoring time for the Ethernet module to monitor the command input time from the FTP client when it operates as the FTP server.

(b) It is recommended to use the default value for this timer value as much as possible.
When changing the setting value, determine the command input monitoring timer value upon consulting the administrator of the external device or system.

(c) Designate the setting value in the range of <1H to 7FFFH/1 to 32767>.
(15 min at the default value of 1800)
The FTP connection is disconnected if there is no command input from the FTP client side within the time designated by the command input monitoring timer value after the FTP client log-in.
When restarting the file transfer, start over from the log-in operation again.

(4) PLC monitoring timer (address: 3BBH); Default value: 10 (000AH) (5 s)

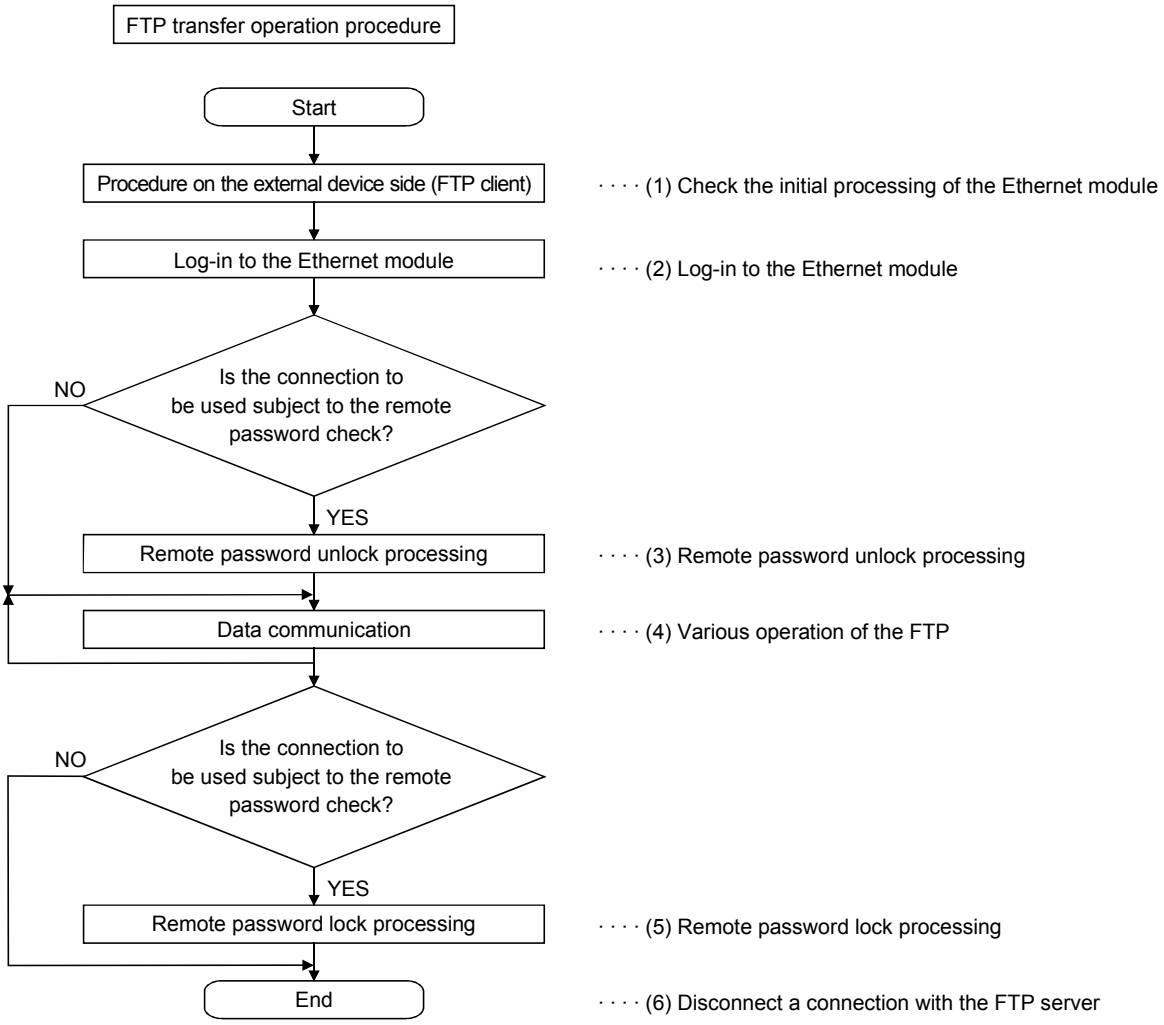
(a) Set the monitoring time for the Ethernet module to monitor the operation of the local station's QCPU when the Ethernet module is operating as the FTP server.

(b) It is recommended to use the default value for this timer value as much as possible.
When changing the setting value, determine the CPU monitoring timer value upon consulting the system administrator.

(c) Designate the setting value in the range of <1H to 7FFFH/1 to 32767>.
The FTP connection is disconnected if an ACPU monitoring error is detected after the FTP client log-in.
When restarting the file transfer, make sure that the local station's QCPU is operating normally and then start over from the log-in operation again.

5.4 Procedure and Required Processing on the External Device Side (FTP Client)

This section explains the procedure and required processing on the external device side for using the FTP server function of the Ethernet module.
In the explanation, the FTP operation commands and input formats used for the applicable operations are shown.
(<ret> indicates input using the CR, Enter, or Return key.)



(1) Checking the initial processing of the Ethernet module

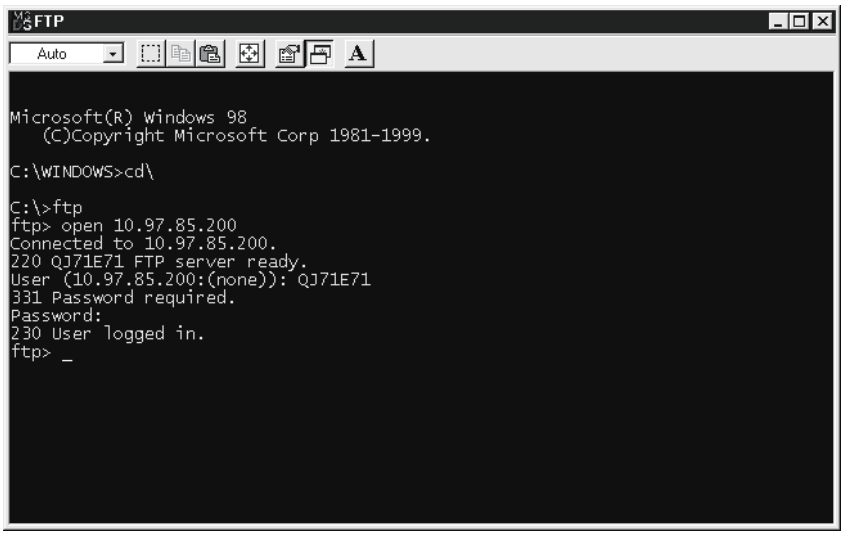
Make sure that the Ethernet module's initial processing has normally completed by checking the LED display/input signal of the Ethernet module.

- LED display: The [INIT.] LED on the front of the Ethernet module flashes.
- I/O signal: The initial normal completion signal (X19) turns on.

(2) Log-in to the Ethernet module

Once the Ethernet module's initial processing has completed normally, log in to the Ethernet module.

(Example) Start FTP from MS-DOS prompt of Microsoft® Windows® 98 Operating System



1) Start FTP (ftp<ret>).
2) Connect with the FTP server (open IP address of the FTP server <ret>).
3) Designate the log-in name (log-in name (default value: QJ71E71) <ret>).
   Designate the password (password (default value: QJ71E71) <ret>).

* When logging in, use the FTP log-in name and password set on the "Ethernet FTP parameter settings" screen for setting the log-in name and password. Upon receiving the log-in name and password from the external device (FTP client), the Ethernet module (FTP server) checks whether they match with the FTP log-in name and password set in the FTP parameter setting area of the buffer memory.
  File transfer to the Ethernet module is allowed when the log-in name and password match, and not allowed if they do not match.

(3) Remote password unlock

Changes the status of the remote password from lock to unlock if the FTP communication port has been designated as a port subject to the password check using the remote password setting. (quote password-unlock remote password <ret>)

POINT
If the FTP communication port has been designated as a port subject to the password check, other commands cannot be used until the remote password status is unlocked.

(4) Various operation of the FTP

1) Designate an access target CPU if the QCPU is configured as a multiple CPU system.
   * The control CPU of the Ethernet module will be the access target CPU after login.
   (quote cpuchg access target CPU <ret>)
2) Notifies file transfer to a target file without converting the file.
   (binary <ret>)
3) If a password is registered in the QCPU file for file transfer, sets that password in the Ethernet module.
   (quote keyword-set password <ret>)
4) Performs the file transfer operation using the FTP commands described in Section 5.6.

POINT
Writing to a parameter file used in the current operation of the QCPU and to a file of the running sequence program that is stored in the QCPU program memory is performed after placing the QCPU in the STOP status.

5) Remote password lock

Changes the status of the remote password from unlock to lock if the FTP communication port has been designated as a port subject to the remote password check using the remote password setting. (quote password-lock <ret>)

6) Disconnecting a connection with the FTP server

The connection with the FTP server is disconnected and various FTP operations ends. (bye <ret>)

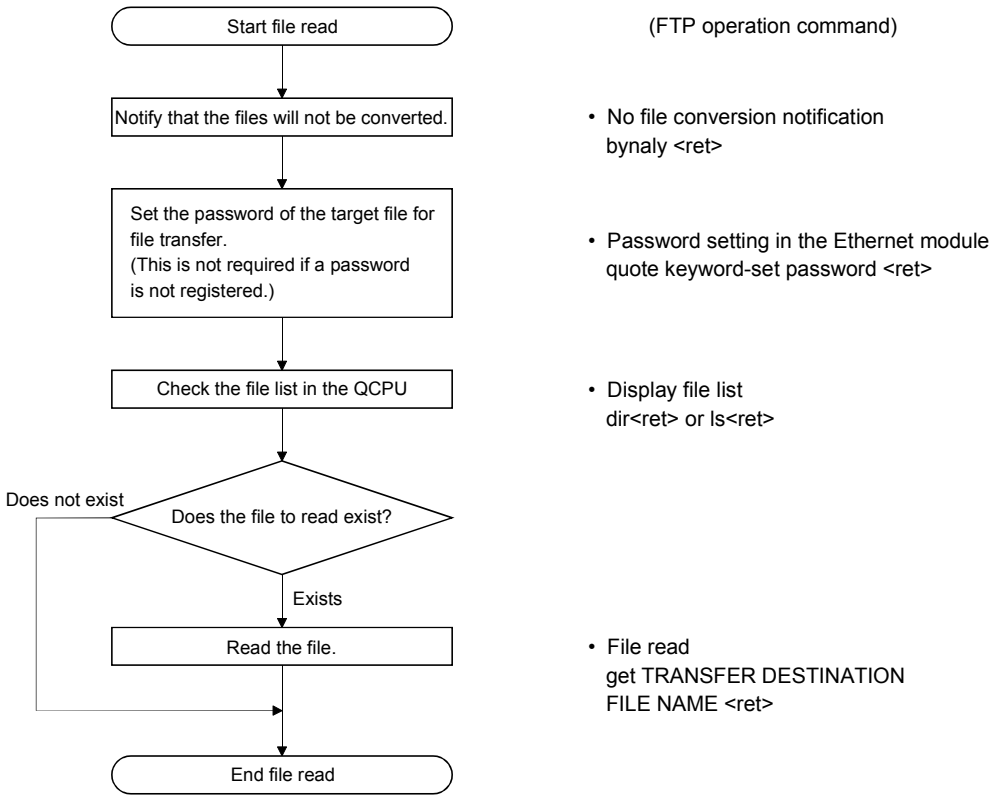
File transfer operation procedure example

The following two procedures performed between log in and log out are explained as FTP operation examples:

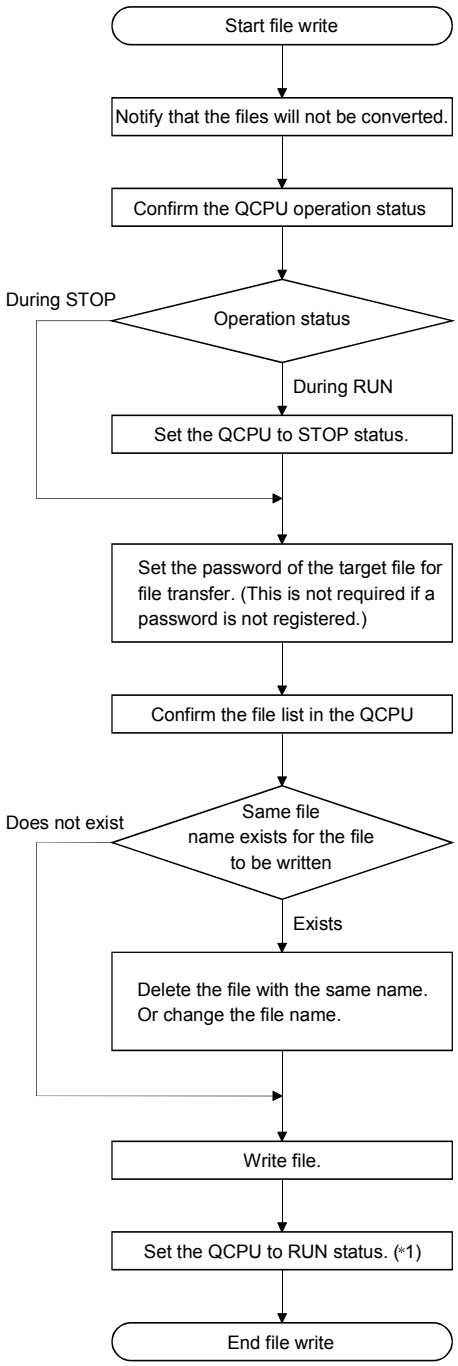
- Read the sequence program file from the QCPU
- Write the sequence program file to the QCPU

* If the FTP communication port has been designated as a port subject to the remote password check, perform the remote password unlock processing/lock processing, in compliance with the FTP transfer operation procedure described in Section 5.4.

1) The procedure to read the sequence program file from the QCPU (FTP client ← FTP server)



2) Procedure to write the sequence program file to QCPU
(FTP client → FTP server)



(FTP operation command)

- No file conversion notification
  binary <ret>
- Display operation status
  quote status <ret>
- Change operation status
  (RUN → STOP status)
  quote stop <ret>
- Password setting in the Ethernet module
  quote keyword-set password <ret>
- Display file list
  dir<ret> or ls<ret>
- Delete file
  delete FILE TO DELETED <ret>
- Change file
  rename CURRENT FILE NAME
  NEW FILE NAME<ret>
- Write file
  put WRITE SOURCE FILE NAME <ret>

*1 The QCPU must be set to STOP → RUN → STOP → RUN.
When restarting the QCPU operation after writing a file, it is recommended to set QCPU to RUN with the key switch.
The QCPU can change its status from STOP → RUN from the FTP command, but caution must be taken to the programmable controller system operations.

5.5 Precautions when Using the File Transfer Functions

The precautions when using the Ethernet module FTP server functions are explained.

(1) Precautions when designing a system which uses file transfer functions

(a) For the system
When performing file transfers with the system in operation or controlling the status of the programmable controller, design the system (such as configuring an interlocking circuit in the sequence program) so that the safety of the overall system is always maintained.

(b) For external devices
Some of the FTP operation commands on the FTP client (external devices) supported by the Ethernet module as a FTP server may not operate as described in this manual, depending on the client side FTP application.
See the manual on the FTP client (external devices), and confirm the functions and operation methods.

(c) For the QCPU

1) Only files that can be created/generated by the user with GX Developer can be transferred. (See section 5.6.2.)

2) File transfers can only be performed to the local station QCPU with the Ethernet module installed.
Designate an access target CPU if the local station's QCPU is configured as a multiple CPU system.

3) When file read/write is performed by the file transfer functions while QCPU is running, the QCPU's sequence scan time may take longer than when using Ethernet module's other functions, and the file read/write take a few minutes or longer depending on the file size or sequence scan.
The file read/write processing time may take even longer depending on various conditions such as the Ethernet line load (line traffic), number of connections used at the same time (exchange processing which uses another connection), and the system configuration.

(2) Precautions when starting up the Ethernet module

When the QCPU is write-protected (DIP switch 1 is on), file transfers which perform write (attribute change, file write, etc.) cannot be performed.
(Excluding the Universal model QCPU.)

(3) Precautions common to any usage of the file transfer functions

(a) For external device

When a time-out error occurs during file transfer using the FTP function, the FTP function line is closed (disconnection) regardless of the GX Developer setting.

When restarting the file transfer, perform the log-in operation to the Ethernet module from the FTP client again.

(b) For the QCPU

1) If a password is registered in the target file for file transfer, transfer that password (set in the Ethernet module) using the FTP operation command, quote keyword-set, after log-in.

   * If a password is registered, that file cannot be accessed unless a password of the same character string is designated.
     The password is a character string for file access that the user registers in the QCPU and it allows/prohibits access to the target file.

2) The QCPU files of target file transfer must be only the files in the root directory for each memory.

3) When the QCPU file begin accessed, do not perform any QCPU key switch operations, change operation status with GX Developer (such as RUN → STOP and STOP → RUN), turn off power, reset power, or install/remove the memory card.
   If any of these operations are performed, the QCPU files will corrupt and the QCPU may not be able to start again.

4) Do not perform any file operations (read/write/change file information) from GX Developer, etc. when the FTP function is in operation.
   When file operations are performed from a peripheral device, etc. while the FTP function is in operation, the FTP function may abnormally end.

5) If the FTP communication port is designated as a port subject to the remote password check, perform the file transfer operation after changing the remote password status from lock to unlock.
   Perform the lock processing for the remote password when the file transfer processing is completed.

   * If the FTP communication port is not designated as a port subject to the remote password check, the operation is completed normally when the remote password unlock processing is performed.
   * The remote password is a character string registered in the QCPU with the GX Developer by user and data to allow/prohibit access to the QCPU of another station via the QCPU of the station installed Ethernet module or via the station installed Ethernet module.

(4) Precaution when logging in to the Ethernet module (FTP server)

Only one external device (FTP client) can log in to the Ethernet module at a time.

(5) Precautions when writing a file

1) Operation to overwrite an existing file cannot be performed.
   Either delete corresponding file using the file delete command (delete, mdelete), or change the file name using rename command before the file is written.
2) The sequence program file set in the parameter file currently used for the QCPU operation cannot be written.
   Set the QCPU to the stop state, then write in the file.
3) File transmission (attributes change, file write, etc.) for file write can only be conducted for the QCPU program memory or the memory card RAM area.
4) Check the number of files that can be registered to the drive for the files to be stored.
   File write cannot be performed to a drive where the number of files has already reached the allowed number of registered files.
   * The files are stored in the designated drive's cluster size units.
5) Any drives which fit in the size of the continuous unused clusters in the designated drive memory can be written.
6) When restarting the QCPU operation after writing a file, it is recommended to set to the run status using the QCPU key switch.
   The QCPU can be switched from STOP to RUN using the FTP command, but sufficient caution must be taken for the programmable controller system operations.
7) When writing files, the Ethernet module creates temporary work files (FTP_Ixxx.TMP) in the QCPU.
   The temporary files are automatically created in the designated drive during the file write (put or mput), and the file name is changed to the designated file name after the operation is completed.
   The "xxx" in the temporary file name "FTP_Ixxx.TMP" is the upper three digits of the four digits representing the Ethernet module's I/O signals from the QCPU.
   * The temporary file is automatically deleted when the file write is successfully completed, line is shut down during transfer, or a file capacity error occurs with the QCPU.
8) The temporary work file may remain in the designated drive when the QCPU power is disconnected or reset during the file write.
   When the temporary file remains in the drive, delete the file using the FTP command.
9) In the case where file deletion and file writing are repeated while the QCPU is in RUN status, the file size must be fixed in advance. If a file is deleted and then writing of another file larger than the deleted one is attempted, a 402B error will occur disabling the file writing.

(6) Precautions when deleting files

1) When determining the timing to delete files, consider the system operation as a whole including the functions of QCPU and GX Developer.
2) The parameter file and sequence program file can not be deleted during the QCPU is performing "RUN".
   Delete these files after setting the QCPU to the stop status.
3) Files with read-only attribute and files that are locked from another device or function cannot be deleted.
   * The file attributes can be changed using the FTP operation command, "quote change" .
4) File deletion can only be conducted for the QCPU program memory or memory card RAM area.
5) After deleting a file with the QCPU in RUN status, do not read or write the data of the deleted file by the sequence program. Doing so may result in an operation error detected in the QCPU.

5.6 FTP Commands

The FTP operation commands on the FTP client side (external devices) supported by the Ethernet module FTP server are described.

5.6.1 File designation method

The file designation method in the FTP operation command from the FTP client side is explained.

Designation descriptions
' ': The part with the single quotation mark ' ' indicates one argument. [ ] : The part with the brackets [ ] indicates that it is optional.

(1) Password

If a password is registered in the target file for file transfer, the password must be set in the Ethernet module prior to file transfer.
See the "quote keyword-set" command in Section 5.6.4.

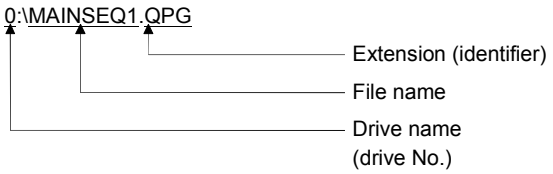
(2) File path

(a) The QCPU designates the file by differentiating the drive name and file name.

(b) When designating a file in the QCPU using the FTP functions, designate the file in the following manner:

[Designation format] ['drive name': \ ] 'file name' . 'extension'

[Designation example]



[Designation details]

1) Drive name (drive No.)

- Designates the drive name for the memory used for file transfer.
- The relationships between the QCPU memory used and drive name are as follows.

Drive name	Memory used
No designation	Parameter valid drive designated with DIP switches
0	QCPU built-in program memory
1	Memory card (RAM) · · · · · SRAM card
2	Memory card (ROM) · · · · · Flash card, ATA card
3	QCPU built-in standard RAM
4	QCPU built-in standard ROM

2) File name, extension

- The corresponding file for the file transfer is designated.
- The file name must be designated according to the GX Developer file name rules.
  Alphabets (uppercase), numbers, symbols, can be used. Alphabets (lowercase) cannot be used.
  File name: Max. 8 characters
  Extension: Max. 3 characters
- For the extension (identifier), the name fixed by the QCPU must be used.
  The corresponding file extension is designated as seen in section 5.6.2.
- See the GX Developer Operating Manual for the details about the file names and extensions.
- When using a FTP operation command which can designate multiple files, the files (file names and extensions) are designated using wild card symbols, "＊ / ?."

  ＊: Files containing the characters before "＊" and any set of characters (including none) replacing the "＊" are designated.
  (Example. 1) When designating all files with the "QPG" extension
  ＊.QPG
  (Example. 2) When designating file names which start with "MAIN" and the extension is "QPG"
  MAIN＊.QPG

  ? : The files containing the text string designated (including none), replacing ? with any character including none. ("?" can be used multiple times.)
  (Example. 1) The letter after "MAIN" is any character and the extension is "QPG"
  MAIN?SEQ.QPG
  (Example. 2) To designate all files whose extension start with "QP"
  ＊.QP?
  (Example. 3) To designate all files whose extension start with "Q"
  ＊.Q??

POINT

(1) In the description of the FTP operation commands, the file name indicates both the file name and extension.

(2) It is recommended to use the following method to treat the file name from the external device.
- Use the ASCII code characters (upper case for the alphabet letters) for the file to be written to the FTP server.
- Do not change the file name for the file read from the QCPU.

(3) Each memory for QCPU does not have any sub-directories.
Each file is stored in the root directory.

(3) Attributes

The following is designated when changing the attributes of the file stored in the QCPU drive to be transferred:
"r" (Read Only) ↔ "w" (read/write enabled)
See the "quote change" command in section 5.6.4.

5.6.2 QCPU user file list

The user-created files (files that are/can be created by the user with GX Developer) that can be designated for file transfer are described below:

Type	File type	File identifier	Drive that can store the file (See section 5.6.1.)					Remarks
			0	1	2	3	4	
For programs	Parameters	QPA	○	○	○	○	○	1 file/1drive
	Sequence program (＊1)	QPG	○	○	○	○	○	—
	SFC program							
For device	Device comments (＊1)	QCD	○	○	○	○	○	Max. 124 files
	Device initial values (＊1)	QDI	○	○	○	○	○	
	File registers	QDR	×	○	○	○	○	
	Local device	QDL	×	○	×	○	×	1 file/CPU
For debugging	Sampling trace data	QTD	×	○	×	○	×	—
For diagnosis	Error log data	QFD	×	○	×	○	×	—

○ :Can be stored × : Cannot be stored

＊1 A password can be registered in program files, device comment files and device initial value files of the designated memory (program memory/standard ROM/memory card).
See the QCPU (Q mode) User's Manual (Function Explanation/Program Fundamentals) for details on the password.

POINT

(1) Each memory for QCPU does not have any sub-directories. The files are all stored in the root directory.

(2) See the QCPU User's Manual for the restrictions and details of the QCPU user files.

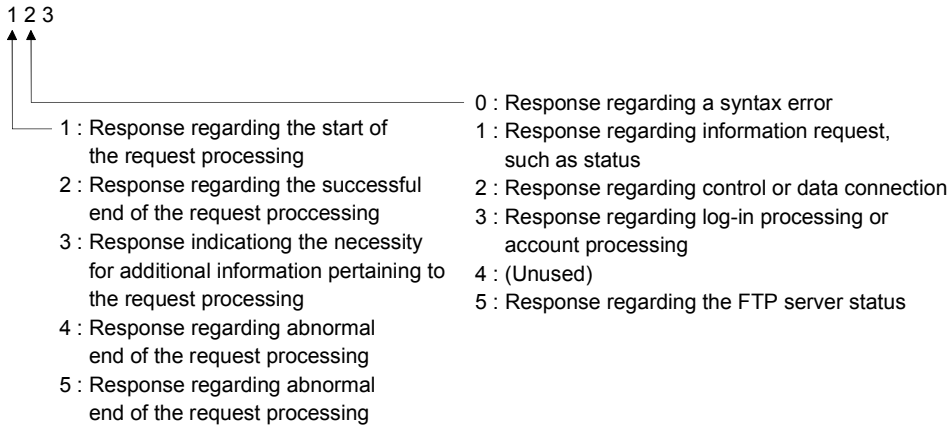
5.6.3 Response code

For information regarding the response codes that are returned to the external device (FTP client) by the Ethernet module (FTP server), see the manual for the FTP client for the codes except the following 4000H.

Response code	Reference
Other than the following	See the manual for the FTP client.
4000H to 4FFFH	See the QCPU User's Manual and correct.
C000H to CFFFH	See Section 11.3.3 of User's Manual (Basic) and correct.

REMARKS

The first two digits of the response code is described below:



5.6.4 FTP operation command

The FTP operation command functions and usage on the FTP client (external device) side supported by the Ethernet module FTP server are explained.

CAUTION

- Some of the FTP operation commands on the FTP client (external device) side supported by the Ethernet module may not perform as explained in this manual, depending on the FTP application used on the client side.
  See the manual for the FTP client (external device) as well, and confirm the functions and operation methods.

(1) FTP server support commands

● binary

[Function]	Notifies to the FTP server that the file transfer is performed without converting the file. The carriage return code and kanji code are not converted, either. The Ethernet module is automatically set to this.
[Designation format]	binary (Abbreviated as bin)

● bye

[Function]	Disconnects the FTP server connection, and ends FTP.
[Designation format]	bye
[Same function]	quit

● close

[Function]	Disconnects the FTP server connection.
[Designation format]	close

● delete

[Function]	Deletes the file stored in the QCPU.
[Designation format]	delete FILE PATH
[Designation example]	To delete a file stored in the RAM of memory card: delete 1:\MAINSEQ1. QPG.
[Caution]	• See section 5.5 and 5.6.1.
[Similar function]	mdelete

● dir

[Function]	Displays the file names, created dates, and sizes of the files stored in QCPU.
[Designation format]	dir [drive name:\]
[Designation example]	To display detailed information of files stored in the RAM of memory card: dir 1:\
[Similar function]	ls

● get

[Function]	Reads the file from the QCPU.
[Designation format]	get TRANSFER SOURCE FILE PATH [transfer destination file path]
[Designation example 1]	Reads the file stored in the RAM area of memory card, and stores using the same file name: get 1:\MAINSEQ1.QPG
[Designation example 2]	To read the file stored in the RAM area of memory card, and store using a different file name: get 1:\SEQ1BAK.QPG \SEQ\SEQ1OLD.QPG
[Caution]	• When the transfer destination file path (FTP client side) is not designated, the file is stored in the FTP client side with the same name as the transfer source file name (on the QCPU side). The transfer destination is the connected current directory of the FTP startup connection. • See sections 5.5 and 5.6.1.

● ls

[Function]	Displays the file names of the files stored in the QCPU.
[Designation format]	ls [drive name:\]
[Designation example]	To display the file names of the files stored in the RAM area of memory card: ls 1:\
[Similar function]	dir

● mdelete

[Function]	Deletes the file stored in the QCPU. When deleting the multiple files, the file name and extension are designated using wild cards (* or ?).
[Designation format]	mdelete FILE PATH (abbreviated as mdel)
[Designation example]	To delete all files with the extension "QPG" in the files stored in the RAM area of memory card: mdelete 1:\ *.QPG
[Caution]	• See sections 5.5 and 5.6.1.
[Similar function]	delete

● mdir

[Function]	Stores the detailed information (file name, created date, and size) of the files stored in the QCPU to the FTP client-side file as log data.
[Designation format]	mdir transfer source drive:\ transfer destination file path
[Designation example]	To store the detailed information of the files stored in the RAM area of memory card to S990901.LOG file: mdir 1:\ S990901.LOG
[Caution]	• Always designate "\" directly after the drive name of the transfer source. • When designating the transfer destination file path (FTP client side), always designate the transfer source drive name. • When the transfer destination file path is not designated, the file name set by the FTP application on the FTP client side is used to save the file. • The transfer destination is the connected current directory of the FTP startup connection.
[Similar function]	mls

● mget

[Function]	Reads a file from QCPU. When reading multiple files, the file name and extension for the file path is designated using wild cards (* or ?). Receive confirmation is performed for each file transfer.
[Designation format]	mget FILE PATH
[Designation example]	To read all files with extension "QPG" from the files stored in the RAM area of memory card : mget 1:\ *.QPG
[Caution]	• The files read are stored on the FTP client side with the same file name. The destination is the connected current directory of the FTP startup connection. • See sections 5.5 and 5.6.1.

● mls

[Function]	Stores file names of the files stored in the QCPU in a file on the FTP client side as log data.
[Designation format]	mls transfer source drive name:\ transfer destination file path name
[Designation example 1]	To store the file names of the files stored in the RAM area of memory card to the file S990901F.LOG: mls 1:\ S990901F.LOG
[Designation example 2]	To store the file names of the files in the memory where the parameter file used for the current operation of QCPU is stored to the file S990901F.LOG: mls \ S990901F.LOG
[Caution]	• Always designate "\" directly after the drive name of the transfer source. • When designating the transfer destination file path (FTP client side), always designate the transfer source drive name. • When the transfer destination file path is not designated, the file name set by the FTP application on the FTP client side is used to store the file. • The transfer destination is the connected current directory of the FTP startup connection.
[Similar function]	mdir

● mput

[Function]	Writes a file to the QCPU. When writing multiple files, the file name and extension are designated using wild cards (* or ?). When writing multiple files, the send confirmation is performed for each file transfer.
[Designation format]	mput TRANSFER source file path
[Designation example]	When writing all files with extension "QPG": mput *.QPG
[Caution]	• The transfer destination is the memory where the parameter file used for the current operation of QCPU is stored. The destination file name is the same as the file name on the FTP client side. • See sections 5.5 and 5.6.1.

● open

[Function] Connects to the FTP server by designating the host name or IP address for the FTP server, along with the FTP log-in name and password.
FTP server host name is displayed while connected to the server.

[Designation format] open HOST NAME [user name [password]]
open IP ADDRESS [user name [password]]
Host name: Host name, domain name or synonym of the host name
IP address: IP address for Ethernet module (designated within brackets [ ])
User name: FTP log-in name set during Ethernet module initial processing
Password : Password set during Ethernet module initial processing
(See section 5.3 for the FTP log-in name and password)

[Designation example 1] To connect to the FTP server by designating the host name:
open HOST

[Designation example 2] To connect to the FTP server by designating the IP address:
open [192.0.1.254]

[Designation example 3] To connect to the FTP server by designating the host name and user name:
open HOST QJ71E71

[Designation example 4] To connect to the FTP server by designating the host name, user name, and password:
open HOST QJ71E71 QJ71E71

[Caution]
- Normally, the connection can be established by designating the FTP server IP address during FTP startup.
- When designating the domain name, the DNS environment must be set using the network parameters on the FTP client side.
- The password entered from the keyboard is not displayed on the screen.

● put

[Function] Writes a file to the QCPU.

[Designation format] put TRANSFER SOURCE FILE PATH [transfer destination file path name]

[Designation example 1] To write the file MAINSEQ1.QPG to the RAM area of memory card with same file name:
put MAINSEQ1.QPG 1:\MAINSEQ1.QPG

[Designation example 2] To write the file MAINSEQ.QPG file to the RAM area of memory card with different file name:
put MAINSEQ.QPG 1:\MAINSEQ1.QPG

[Caution]
- When the directory is not designated for the transfer source file path (FTP client), the file is written to the connected current directory at FTP server startup connection.
- When the transfer destination file path (FTP server side) is not designated, the file is stored to the memory where the parameter file used for the current QCPU operation is stored.
- See sections 5.5 and 5.6.1.

● pwd

[Function] Displays the QCPU current directory.

[Designation format] pwd

[Caution]
- The QCPU disks do not have any sub-directories, and the files are stored in the root directory.
  Therefore, "\" is displayed as the execution result of the pwd command.

● quit

[Function] Disconnects the connection to the FTP server, and ends FTP.

[Designation format] quit

[Same function] bye

● quote

[Function] Sends the FTP server subcommand (Ethernet module dedicated command).

[Designation format] quote Ethernet module DEDICATED COMMAND
Ethernet module dedicated command: See (2).

[Designation example] quote status

[Caution]
- Only the Ethernet module dedicated command shown in (2) can be designated directly after the quote command.

● rename

[Function] Changes the QCPU file name.

[Designation format] rename FILE PATH BEFORE CHANGE FILE PATH AFTER CHANGE (abbreviated as ren)

[Designation example] To change the file name of the file stored in the RAM of memory card:
rename 1:\MAINSEQ1.QPG 1:\SEQ1OLD.QPG

[Caution]
- Upon normal completion, either of the following response codes is shown.
  350 Need more info.
  250 Rename successful
- See sections 5.5 and 5.6.1.

● user

[Function] Enter the user name and password for the connected FTP server.

[Designation format] User : User name [Password]
User name: FTP log-in name set during Ethernet module "FTP parameter setting"
Password : Password set during Ethernet module "FTP parameter setting"
(See sections 5.3 for the FTP log-in name and password.)

[Designation example 1] To designate the user name:
user QJ71E71

[Designation example 2] To designate both user name and password:
user QJ71E71 QJ71E71

[Caution]
- The password entry from the keyboard is not displayed.

(2) Ethernet module dedicated commands

The Ethernet module dedicated commands to be attached to the FTP operation command "quote" are explained.

● change (Ethernet module dedicated command)

[Function]	Displays/changes the file attribute for the file stored in the QCPU.
[Designation format]	When displaying the file attribute: quote change FILE PATH Either of the following is displayed as the execution result after a successful completion: • When the designated file is a read-only file : "-----R" • When the designated file is a file with read/write enabled : "-----W"
[Designation format]	When changing the file attribute quote change FILE PATH ATTRIBUTE Designate either of the following for the attribute: • To change to read-only file : r • To change to read/write enabled : w
[Designation example 1]	To display the file attribute for the file stored in the RAM area of memory card: quote change 1:\MAINSEQ1.QPG
[Designation example 2]	To change the file attribute of the file stored in the RAM area of memory card: quote change 1:\MAINSEQ1.QPG r
[Caution]	• When the programmable controller CPU is set to RUN, an error occurs when the following files are designated: Parameter file File currently being executed by the program memory (drive name:0) • The attribute changing is possible between read-only file and read/write enabled file. • See sections 5.5 and 5.6.1.

POINT

The file attributes designated using the quote change command are explained.

(1) When changing the attribute of the file for file transfer, designate the attribute after the change.

(2) The attributes are for changing the file to read-only or read/write enabled file.

(3) The attribute can be changed to the following for the files stored in the QCPU memory using this command:
"r" (read-only) ↔ "w" (read/write enabled)

(4) An user-created file has the read/write attribute, if it has not been changed.

● cpuchg (Ethernet module's dedicated command)

[Function] This command designates an access target CPU with a multiple CPU system configuration. Alternatively, it displays the current access target CPU.

[Designation format] quote cpuchg [access target CPU]

Access target CPU: Designate the CPU to which file access is to be performed.

Command	Description
quote cpuchg	Checks the current access target CPU.
quote cpuchg controlPLC	Designates the control CPU as the access target CPU.
quote cpuchg no1	Designates the CPU No. 1 as the access target CPU.
quote cpuchg no2	Designates the CPU No. 2 as the access target CPU.
quote cpuchg no3	Designates the CPU No. 3 as the access target CPU.
quote cpuchg no4	Designates the CPU No. 4 as the access target CPU.

- When the command is successfully completed, the execution result is displayed as follows:
  When setting the access target CPU:
  200 Command Okey
  When displaying the access target CPU:
  200 Target cpu is "access target CPU"
- If the designated access target CPU does not exist, the following message is displayed.
  557 Cpu not found

[Designation example 1] When designating the access target CPU as the control CPU
quote cpuchg controlPLC

[Designation example 2] When displaying the currently selected access target CPU
quote cpuchg

[Caution] The control CPU of the Ethernet module will be the access target CPU after logging in when the OPEN/USER command is executed to the Ethernet module.

● keyword-set (Ethernet module dedicated command)

[Function] Sets the registered password of the target file for file transfer in the Ethernet module.
Or, display/clear the current password set in the Ethernet module.
* Use this command only if a password is registered in the target file of file transfer.
The Ethernet module performs a password check when the designated file is accessed.

[Designation format] quote keyword-set [password]
Password: To set a password, designate the password registered in the file of the target QCPU memory.
Designate "＊＊＊＊" to clear a password set in the Ethernet module.
One of the following is displayed as the execution result for a successful completion.
- When setting a password : 200 Command successful
- When displaying a password : 200 keyword is “password”
- When clearing a password : 200 Command successful

[Designation example 1] To set the password (1234) to the Ethernet module:
quote keyword-set 1234

[Designation example 2] To display the password currently set in the Ethernet module:
quote keyword-set

[Designation example 3] To clear the password currently set in the Ethernet module:
quote keyword-set ＊＊＊＊.

[Caution]
- If a password is registered in the target file for file transfer, set the password in the Ethernet module prior to file transfer.
Designating the password registered in the QCPU target file enables QCPU file operation.
- One password can be set in the Ethernet module. If the target file for file transfer changes and a password is registered in the file which is at the changed destination, reset the password for the new target file in the Ethernet module.
- When logging into the Ethernet module from the external device, the password set in the Ethernet module changes to "＊＊＊＊" (clear)

POINT

The password designated using the quote keyword-set command is explained.

(1) If a password is registered in the target file for file transfer, use this command to set the password in the Ethernet module after logging into the Ethernet module prior to file transfer.

(2) The password is used so that the QCPU can allow/prohibit access to the target file from outside.

(3) The password for file access to the QCPU is registered with the GX Developer. The password designated by this command is for operations with the Ethernet module.
The user designates the same character string as that registered with the GX Developer to the QCPU designated file.

● password-unlock (Ethernet module dedicated commands)

[Function] Designate the remote password set in the QCPU and perform the unlock processing.
* This command is used when the FTP communication port is designated as a port subject to the remote password check.

[Designation format] quote password-unlock [remote password]
Remote password: Designate the remote password set in the QCPU parameter.
- The following is displayed as the execution result for a successful completion.
  200 Command 0key
- The following is displayed if the remote password does not match.
  556 Password Error
- The following is displayed if another command is requested before the remote password unlock processing is performed.
  555 Password Locked

[Designation example 1] To designate the remote password (1234)
quote password-unlock 1234

[Caution]
- If the FTP communication port is designated as a port subject to the remote password check, the status will be "locked" when the user logs into the Ethernet module from an external device.
- Executing this command and performing the unlock processing prior to various operation of the FTP enables QCPU file operation.
- If the FTP communication port is not designated as a port subject to the remote password check, the operation is completed successfully when the remote password unlock processing is performed.

● password-lock (Ethernet module dedicated commands)

[Function] Designates the remote password set in the QCPU as unlocked and performs the lock processing.
* This command is executed if the FTP communication port is designated as a port subject to the remote password check.

[Designation format] quote password-lock
The following is displayed as the execution result for a successful completion.
200 Command 0key
[Designation example 1] To designate the remote password (1234)
quote password-lock

● run (Ethernet module dedicated command)

[Function] Sets the QCPU to the run status (remote run).
Device memory clear can be designated when setting to the run status.
[Designation format] quote run [mode [clear mode]]
Mode: Designate whether to force a remote run.
0 : Normal run (default value)
1 : Forced run
Clear mode: Designate whether to clear (initialize) the QCPU device memory when starting the remote run operation.
0 : Do not clear the device (default value)
1 : Clear everything except for the latch range
2 : Clear everything including the latch range
The following message is displayed as the execution result when completed successfully.
• Displayed message: 200 Command successful
[Designation example 1] To perform a normal remote run with the designation not to clear the device memory.
quote run
[Designation example 2] To perform a forced remote run with the designation not to clear device memory.
quote run 1
[Designation example 3] To perform a forced remote run with the designation to clear all device memory except for the latch range.
quote run 1 1
[Caution]
• The forced execution mode is only used to allow forced remote runs from another device when the QCPU cannot perform remote runs due to problems in the device which issued the remote stop for the QCPU.
When a normal run is designated and the system is already set to the stop or pause status by another device, the system is not set to the run status.
• Designate the clear mode of the device memory during the operation startup depending on the system configurations.
After the QCPU performs the clear operation, the system runs according to the PLC parameter settings (PLC file → Initial Device value).

● status (Ethernet module dedicated command)

[Function] Displays the QCPU operation information is displayed. This is a command to check the QCPU operation information before executing file transfer to the QCPU.

[Designation format] quote status

One of the following is displayed as the execution result for a successful completion.

- When the QCPU is at a run status : "RUN"
- When the QCPU is at a stop status : "STOP"
- When the QCPU is a pause status : "PAUSE"

● stop (Ethernet module dedicated command)

[Function] Set the QCPU to the stop status (remote stop).

[Designation format] quote stop

The following message is displayed as the execution result for a successful completion.

- Displayed message: 200 Command successful

[Caution]

- For the QCPU program file, etc., write this command after the QCPU is in the stop status.

6 DEDICATED INSTRUCTIONS

The dedicated instructions are used to simplify programming for using the functions available for the intelligent function module.

This chapter explains the dedicated instructions for the functions that are explained in this manual, among those dedicated commands available for the Ethernet module that can be used by QCPU.

6.1 Dedicated Instruction List and Available Devices

(1) Dedicated Instruction List

The following table lists the dedicated instructions explained in this chapter.

Application		Dedicated instruction	Functional description	Reference section
For E-mail sending/receiving		MRECV	Reads received e-mails. ＊1	Section 6.2
		MSEND	Sends e-mails. ＊1	Section 6.3
For communication with the programmable controller CPU of other station ＊ Data link instruction	For reading/writing device data (For Q/QnA series)	READ	Reads data from word devices of other station.	Section 6.4
		SREAD	Reads from other station's device (with completion device).	Section 6.10
		WRITE	Writes to other station's device. ＊2	Section 6.12
		SWRITE	Writes to other station's device (with completion device). ＊2	Section 6.11
	For reading/ writing device data (For A series)	ZNRD	Reads from other station's device. ＊1	Section 6.13
		ZNWR	Writes to other station's device. ＊1	Section 6.14
	For message (any data) sending/ receiving	SEND	Sends data to other station. ＊1	Section 6.9
		RECV	Reads receive data from other station. (For the main program) ＊1	Section 6.6
		RECVS	Reads receive data from other station. (For interrupt programs) ＊1	Section 6.6
	For reading/writing clock data Remote RUN/STOP	REQ	Issues a remote RUN/STOP request to other station. ＊1	Section 6.7
			Reads/writes clock data of other station. ＊2	Section 6.8

＊1 Cannot be used if the source or target station is a safety CPU.

＊2 Writing to a safety CPU is not allowed from other stations.

6

6 - 1

POINT

(1) The user should not change data (control data, request data, etc.) designated with any of the dedicated instructions until the execution of that instruction is completed.

(2) Only programmable controller CPUs of QCPU modules can handle the higher two digits of the year (Gregorian calendar) in the clock data that are processed with dedicated instructions.
Thus, when executing dedicated instructions on programmable controller CPUs other than QCPUs, the data portion of the higher two digits of the year is treated as "00H."

(3) All dedicated instructions must be executed online.
If any of the dedicated instructions is executed offline, no error will occur, but the execution of the dedicated instruction will not be completed.

(4) When accessing another station via an Ethernet module using a data link instruction, set the following parameters. (Refer to Section 3.3.)
- Station No. <-> IP information settings
- Routing parameter settings

(2) Available devices

The following devices are available for the dedicated instructions:

Internal devices		File register	Constant *2
Bit *1	Word		
X, Y, M, L, F, V, B	T, ST, C, D, W	R, ZR	K, H

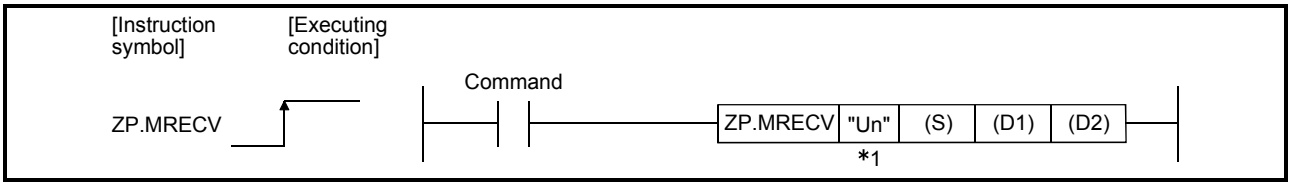
*1 Word device bit designation can be used as bit data.
Word device bit designation is done by designating Word device . Bit No..
(Designation of bit numbers is done in hexadecimal.)
For example, bit 10 of D0 is designated as D0.A.
However, there can be no bit designation for timers (T), retentive timers (ST) and counters (C).

*2 Available devices are given in each of the Constant field.

6.2 ZP.MRECV

This instruction reads received e-mails.

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
(S)	—	○		—				—	—
(D1)	—	○		—				—	—
(D2)	○	○		—				—	—



*1 If the originating station is a Basic model QCPU (function version B or later) or Universal model QCPU, " " (double quotation) of the first argument can be omitted.

Set data

Set data	Description	Set by	Data type
"Un"/Un	Start I/O signal of the local station's Ethernet module. (00 to FE$_H$: Higher 2 digits of the 3-digit I/O signal)	User	String/Binary 16 bits
(S)	Head device of the local station that stores the control data.	User, system	Device name
(D1)	Head device of the local station that stores the contents of the received e-mail (header + attached file).	System	
(D2)	Local station device that is turned on for one scan by the completion of the instruction. (D2)+1 is turned on if the instruction execution completes abnormally.	System	Bit

The local devices and the file register for each program cannot be used as devices used in setting data.

POINT

The MRECV instruction can be executed only when the local station is a QCPU.

REMARKS

The number of steps for the MRECV instruction is 10.

Control data

Device	Item		Set data	Setting range	Set by (*1)
(S) + 0	Execution type/complete type		b15 to b10 b9 b8 b7 to b0 0 | 2) | 0 | 1) | 0 1) Complete type (bit 7) Designate whether or not the setting of the clock data is required at abnormal completion. 0: Clock data setting is not required. The clock data at error occurrence is not set in (S) + 11 to (S) + 15. 1: Clock data setting required. The clock data at error occurrence is set in (S) + 11 to (S) + 15. 2) Execution type (bit 9) (*2) Designate whether or not to inquire if there are more mails on the server after reading receive mails. 0: Do not inquire. (Do not read the receive mail information.) 1: Inquire (Read the receive mail information)	0000_H 0080_H 0200_H 0280_H	User
(S) + 1	Completion status		Store the status at completion of the instruction. 0: Normal Other than 0: Abnormal (error code) (*3)	—	System
(S) + 2	Mail number to be read		Designate the mail number to be read when multiple mails are received. 0: Head mail 1 or higher: Designated mail	0 or higher	User
(S) + 3 to (S) + 8	System area		—		—
(S) + 9	Receive data length	At instruction execution	Designate the data length (header + attached file) of the e-mail that can be stored in (D1) + 0 to (D1) + n (header: 1 to 373, attached file: 1 to 6144). 0: Adjust to the data length of the received e-mail. 1 to 6517: The number of data that can be stored in (D1 to D1 + n)	0 to 6517 (Words) * Including the header length described below	User
		At instruction completion	This stores the data length (header + attached file) of the e-mail stored in (D1) + 0 to (D1) + n. 1 to 6517: The number of received data stored in (D1) + 0 to (D1) + n		System
(S) + 10	Header length	At instruction execution	Designate the data length of the mail's header that can be stored in (D1) + 0 to (D1) + n. 0: Adjust to the header data length of the received mail. 1 to 373: The number of data that will be stored in (D1 to D1 + n).	0 to 373 (Words)	User
		At instruction completion	Store the data length of the mail's header that was stored in (D1) + 0 to (D1) + n. 1 to 373: The number of receive data that was stored in (D1 to D1 + n).	—	System
(S) + 11	Clock set flag		Store the valid/invalid status of the clock data in ((S) + 12 to (S) + 15). 0: Invalid 1: Valid	—	System
(S) + 12	Clock data (set only when abnormal)		Higher 8 bits: month (01_H to 12_H), lower 8 bits: last 2 digits of year (00_H to 99_H)	—	System
(S) + 13			Higher 8 bits: hour (00_H to 23_H), lower 8 bits: date (01_H to 31_H)		
(S) + 14			Higher 8 bits: second (00_H to 59_H), lower 8 bits: minute (00_H to 59_H)		
(S) + 15			Higher 8 bits: first 2 digits of year (00_H to 99_H), lower 8 bits: day of the week (00_H (Sunday) to 06_H (Saturday))		

Receive data

Device	Item	Set data	Setting range	Set by (*1)
(D1) + 1 to (D1) + n	Receive data	This stores the contents (header + attached file) of the received e-mail.	—	System

POINT

The receive data storage device (D1) requires a contiguous free area equal to or greater than the receive data length ((S) + 9) (maximum of 6517 words).

*1 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

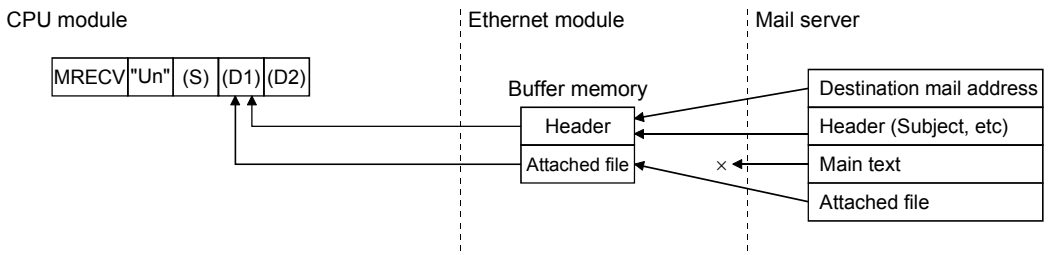
*2 The following shows a description of the processing after the MRECV instruction is executed by selecting the execution type.

Setting option	Description of processing	Merit	Demerit
Do not inquire (Do not read)	• Execute only the read processing of e-mails from the mail server. • Inquire (read) about information on receive mails remaining on the mail server after the time set in a GX Developer parameter has elapsed.	No extra read processing is executed when there are no mails on the mail server.	Even if mails remain on the mail server, they cannot be read immediately. Mails tend to accumulate on the mail server.
Inquire (Read)	• Execute the read processing of e-mails from the mail server. • After executing the MRECV instruction, the inquiry (read) processing of information on receive mails remaining on the mail server is also executed. (Inquire whether or not mails are received immediately.)	Receive mails stored on the mail server can be read in succession.	Inquiries to the mail server are more frequent. More processing in the module affects other internal processing.

*3 For a list of error codes , see Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Functions

(1) This instruction reads receive mails from the mail server.



(2) If a received e-mail contains data exceeding the reception data length ((S) + 9) designated in the control data of the MRECV instruction, only the data equivalent to the designated reception data length will be stored and the remaining data will be ignored.

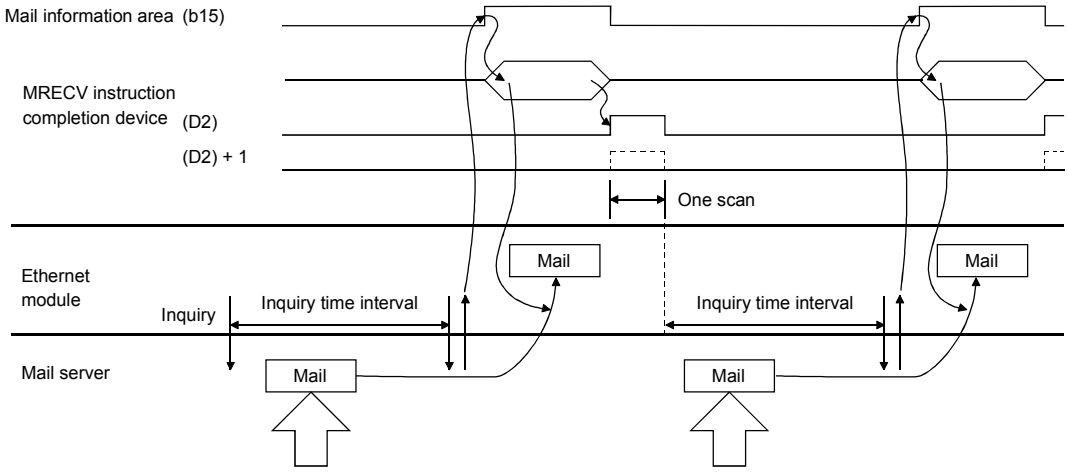
(3) Whether or not there are mails on the mail server can be determined by the on (receive mail)/off (no receive mail) of bit 15 of the mail information area (address: 2682H (9858)) in the buffer memory.
* The information in the mail information area is updated when the MRECV instruction execution completes.

(4) Whether the MRECV instruction is being executed or has been completed normally or abnormally can be checked with the completion device (D2) or completion status display flag ((D2) + 1) designated in the set data.

(a) Completion device (D2)
Turns on at the END processing of the scan where the MRECV instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D2) + 1)
Turns on and off depending on the completion status of the MRECV instruction.
Normal completion : Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the MRECV instruction is completed, and turns off at the next END processing.

[Operation when the MRECV instruction is being executed]



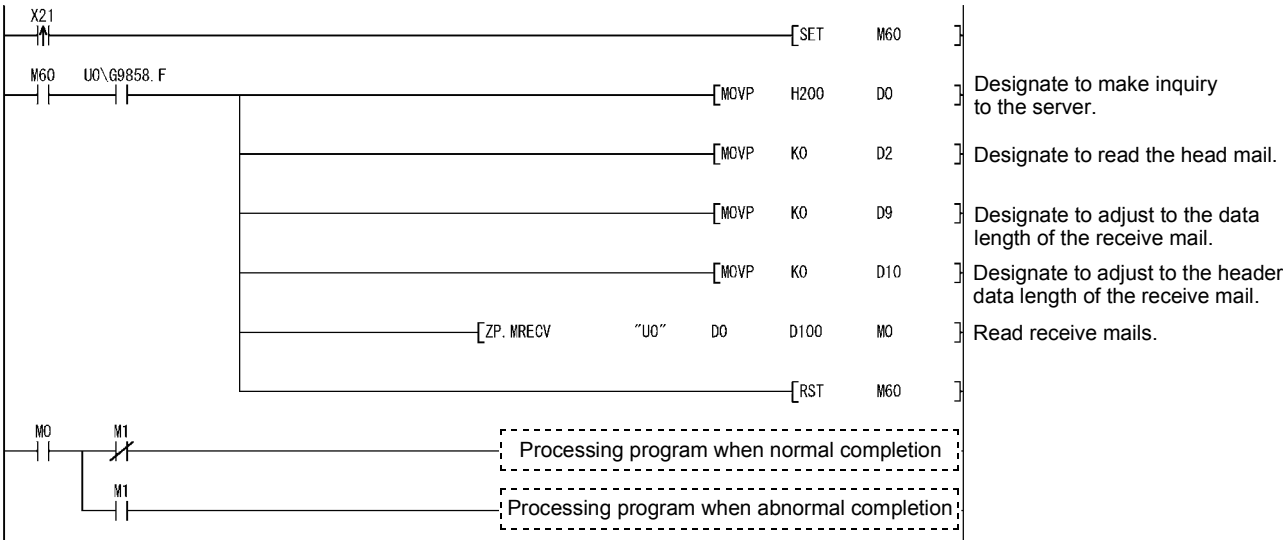
Errors

(1) When a dedicated instruction completes abnormally, the abnormal completion signal (D2)+1 turns on and the error code is stored in the completion status (S)+1. See the following manuals regarding the error code, check the errors and take corrective actions.
<Error codes>
4FFFH or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)
C000H or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

The following example shows a program that receives e-mails.
This program performs e-mail reception processing using the receive command (X21).

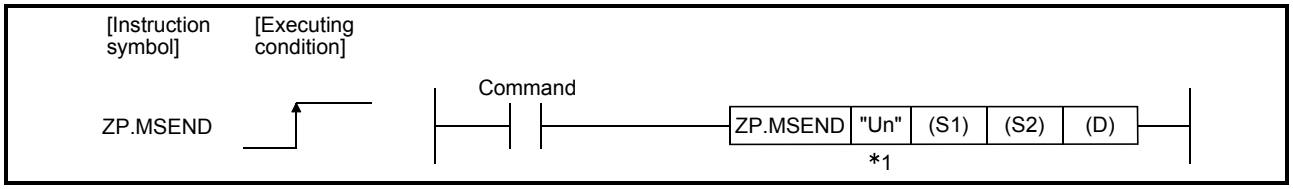
When I/O signals of the Ethernet module are X/Y00 to X/Y1F



6.3 ZP.MSEND

This instruction sends e-mails.

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—				—	—
(S2)	—	○		—				—	—
(D)	○	○		—				—	—



*1 If the originating station is a Basic model QCPU (function version B or later) or Universal model QCPU, " " (double quotation) of the first argument can be omitted.

Set data

Set data	Description	Set by	Data type
"Un"/Un	Start I/O signal of the local station's Ethernet module. (00 to FE$_H$: The higher 2 digits of the 3-digit I/O signal.)	User	String/Binary 16 bits
(S1)	Head device of the local station that stores the control data.	User, system	Device name
(S2)	Head device of the local station that stores the contents of the e-mail to be sent ((Subject + attached file) or (Subject + main text)).	User	
(D)	Local station device that is turned on for one scan by the completion of the instruction. (D) + 1 is turned on if the instruction execution completes abnormally.	System	Bit

The local devices and the file register for each program cannot be used as devices used in setting data.

POINT

The MSEND instruction can be executed only when the local station is QCPU.

REMARKS

The number of steps for the MSEND instruction is 10.

6 - 8

Control data

<table>
<tr><th>Device</th><th>Item</th><th>Set data</th><th>Setting range</th><th>Set by (*1)</th></tr>
<tr><td>(S1) + 0</td><td>Execution/complete type
Send data format</td><td>
<table>
<tr><td>b15 to b12</td><td>to b8</td><td>b7</td><td>to b0</td></tr>
<tr><td>0</td><td>2)</td><td>1)</td><td>0</td></tr>
</table>
1) Complete type (bit 7)
Designate whether or not the setting of the clock data is required at abnormal completion.
0: Clock data setting is not required.
The clock data at error occurrence is not set in (S1) + 11 to (S1) + 15.
1: Clock data setting is required.
The clock data at error occurrence is set in (S1) + 11 to (S1) + 15.
2) Send data format (bit 12 to bit 8)
Designate the format of data to be sent.
(When sending data as an attached file)
<table>
<tr><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>Data format</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Binary data</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>ASCII data (converted from binary to ASCII)</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>CSV data (converted from binary to CSV)</td></tr>
</table>
(When sending data as the main text)
<table>
<tr><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>Data format</th></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Binary data</td></tr>
</table>
[Precautions when designating the main text of e-mail]
• The setting of (bit 11 to bit 8) is invalid when the main text is designated.
• Designate the main text using ASCII characters in a sequence program (the Ethernet module does not convert it to ASCII).
• The following binary code data is treated as control codes.
0D0A$_H$: Line feed code, CR + LF
00$_H$: End of the main text
• It is recommended to limit the data written in one line of the main text to 78 characters or less.
(Be sure to add a line feed code, CR + LF (0D0A$_H$), at the end of lines of the main text.)
</td><td>(As described in the left)</td><td>User</td></tr>
<tr><td>(S1) + 1</td><td>Completion status</td><td>Store the status at completion of the instruction.
0: Normal
Other than 0: Abnormal (error code) (*2)</td><td>—</td><td>System</td></tr>
<tr><td>(S1) + 2</td><td>Send destination number</td><td>Designate the opposite device to which the e-mail is sent by the setting number of the "Ethernet send mail address setting" with GX Developer.
1 to 16: The setting number of the destination external device</td><td>1 to 16</td><td>User</td></tr>
<tr><td>(S1) + 3 to (S1) + 8</td><td>System area</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td>(S1) + 9</td><td>Send data length</td><td>Designate the data length ((Subject + attached file) or (Subject + main text)) of the e-mail stored in (S2) + 0 to (S2) + n.
1) When sending data as an attached file (Subject: 0 to 373, attached file: 1 to 6144)
1 to 6517: The data length of e-mail (words)
2) When sending data as the main text
(Subject: 0 to 373, Main text: 1 to 960)
1 to 1333: The data length of e-mail (words)</td><td>1 to 6517
or
1 to 1333</td><td>User</td></tr>
<tr><td>(S1) + 10</td><td>Subject length</td><td>Designate the data length of the Subject of the e-mail stored in (S2) + 0 to (S2) + n.
0 to 373: The data length of the Subject (words)</td><td>0 to 373</td><td>User</td></tr>
<tr><td>(S1) + 11</td><td>Clock set flag</td><td>This stores the valid/invalid status of the clock data in ((S1) + 12 to (S1) + 15).
0: Invalid
1: Valid</td><td>—</td><td>System</td></tr>
<tr><td>(S1) + 12</td><td rowspan="4">Clock data
(set only when abnormal)</td><td>Higher 8 bits: month (01$_H$ to 12$_H$),
lower 8 bits: last 2 digits of year (00$_H$ to 99$_H$)</td><td rowspan="4">—</td><td rowspan="4">System</td></tr>
<tr><td>(S1) + 13</td><td>Higher 8 bits: hour (00$_H$ to 23$_H$),
lower 8 bits: date (01$_H$ to 31$_H$)</td></tr>
<tr><td>(S1) + 14</td><td>Higher 8 bits: second (00$_H$ to 59$_H$),
lower 8 bits: minute (00$_H$ to 59$_H$)</td></tr>
<tr><td>(S1) + 15</td><td>Higher 8 bits: first 2 digits of year (00$_H$ to 99$_H$),
lower 8 bits: day of the week (00$_H$ (Sunday) to 06$_H$ (Saturday))</td></tr>
</table>

Send data

Device	Item	Set data	Setting range	Set by (＊1)
(S2) + 0 to (S2) + n	Send data	Designate the contents of e-mail ((Subject + attached file) or (Subject + main text)) to be sent.	(Refer to the left)	User

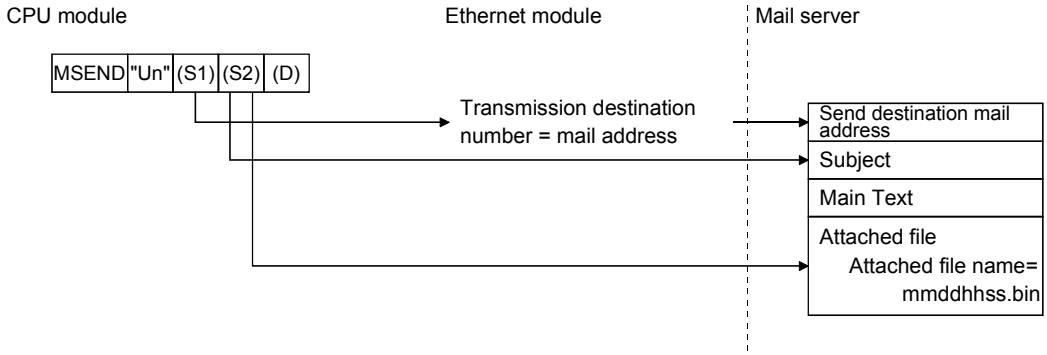
＊1 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

＊2 For a list of error codes, see Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

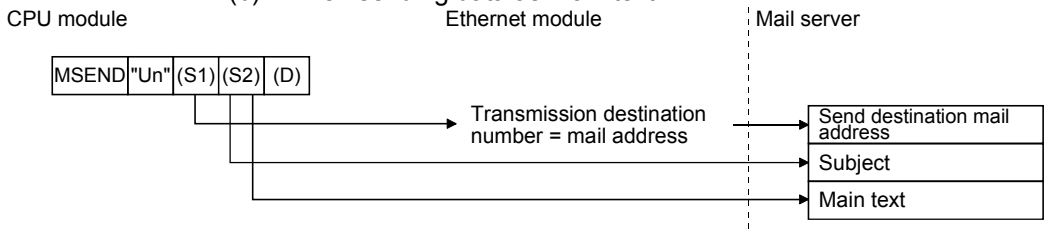
Functions

(1) This instruction sends mails to the designated external device.

(a) When sending data as an attached file



(b) When sending data as main text

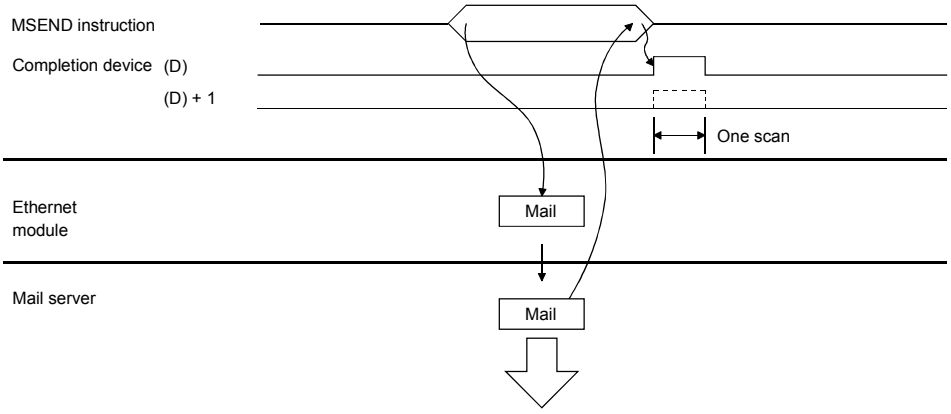


(2) Whether the MSEND instruction is being executed or has been completed normally or abnormally can be checked with the completion device (D) or completion status display flag ((D) + 1) designated in the set data.

(a) Completion device (D)
Turns on at the END processing of the scan where the MSEND instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D) + 1)
Turns on and off depending on the completion status of the MSEND instruction.
Normal completion: Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the MSEND instruction is completed, and turns off at the next END processing.

[Operation when the MSEND instruction is being executed]



Errors

(1) When a dedicated instruction completes abnormally, the abnormal completion signal (D) + 1 turns on and the error code is stored in the completion status (S1)+1. See the following manuals regarding the error codes, check the errors and take corrective actions.

<Error codes>

4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)

C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's manual (Basic)

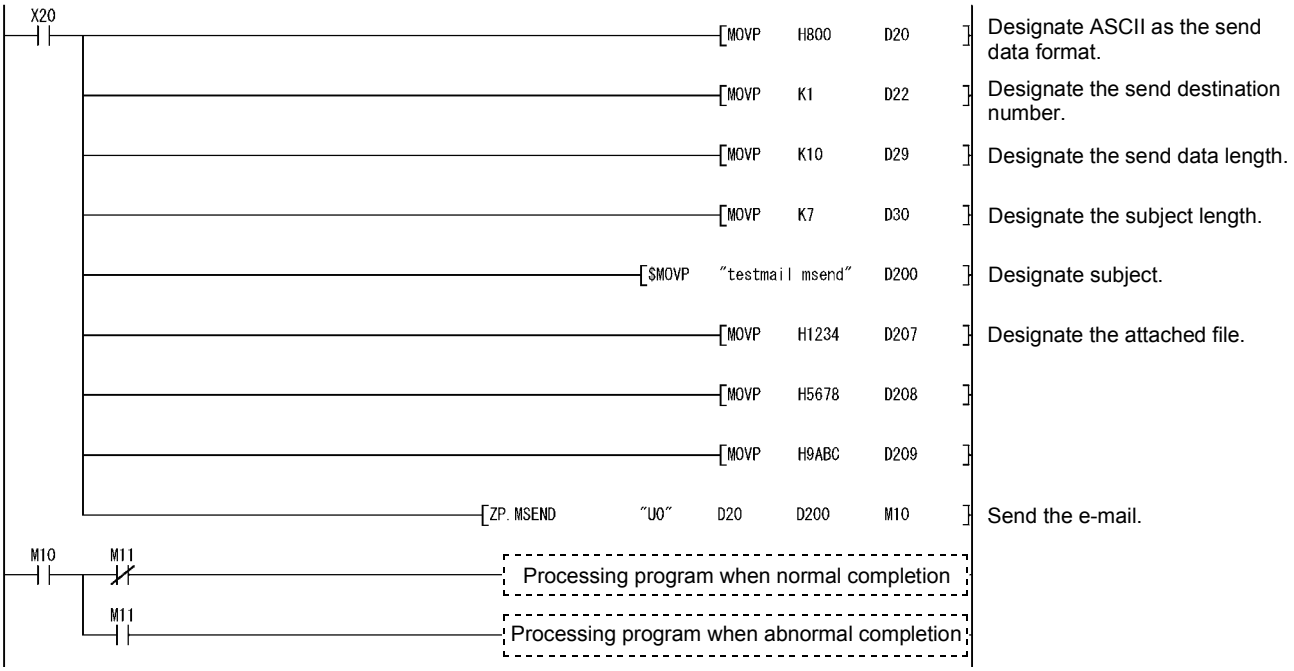
Program example

The following example shows a program that sends e-mails.

(1) When sending e-mail as an attached file

This program performs e-mail transmission processing using the send command (X20).

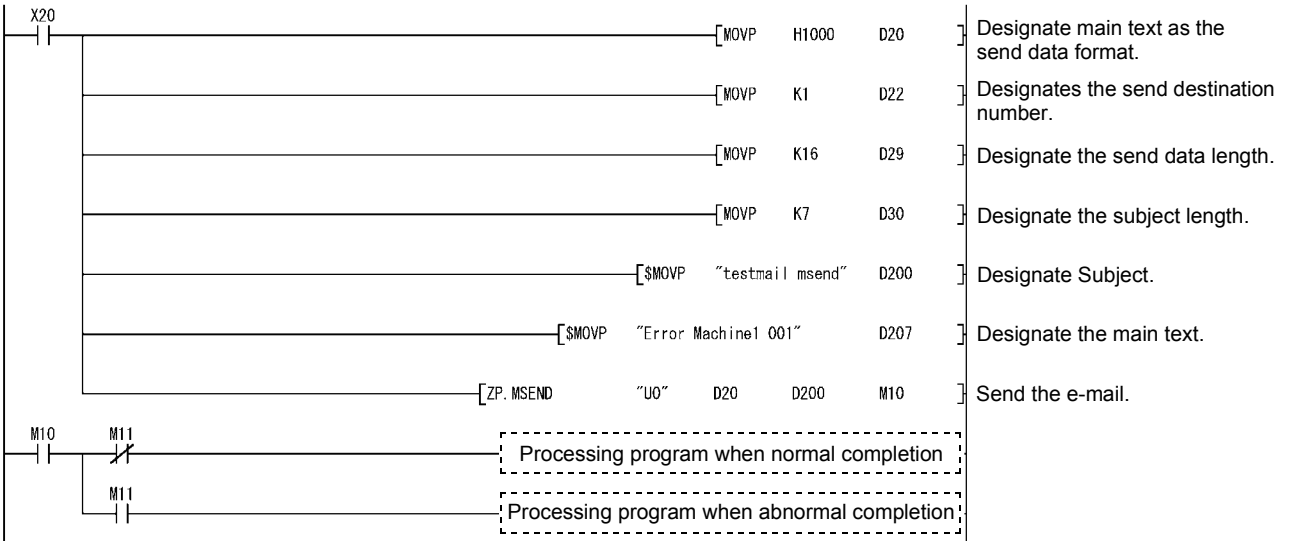
When I/O signals of the Ethernet module are X/Y00 to X/Y1F



(2) When sending e-mail as main text

This program performs e-mail transmission processing using the send command (X20).

When the I/O signals of the Ethernet module are X/Y00 to X/Y1F

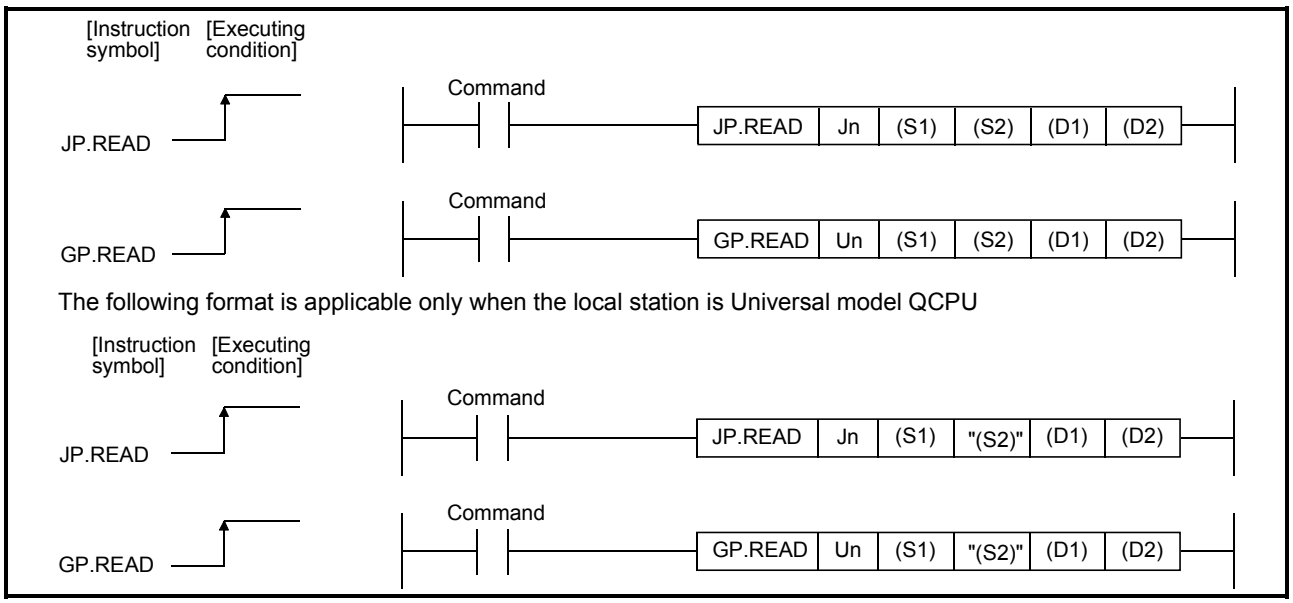


6.4 JP/GP.READ

This instruction reads data from word devices of other stations.

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H, $	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(S2)	—	○ *1		—					
(D1)	—	○		—					
(D2)	○			—					

*1 T, C, D, W, ST, SD, or SW can be used.



Set data

Set data	Description	Set by	Data type
Jn	Network number of the local station (1 to 239, 254) 254: The network designated by the valid module during other station access.	User	Binary 16 bits
Un	Start I/O signal of the local station's Ethernet module. (00 to FE$_H$: The higher 2 digits of a 3-digit I/O signal.)		
(S1)	Head device of the local station that stores control data.	User, system	Device name
(S2)	Head device of the target station from which data is read.	User	
(D1)	Head device of the local station that stores data read.		
(D2)	Local station device that is turned on for one scan by completion of the instruction. (D2) + 1 turns on if the instruction execution completes abnormally.	System	Bit

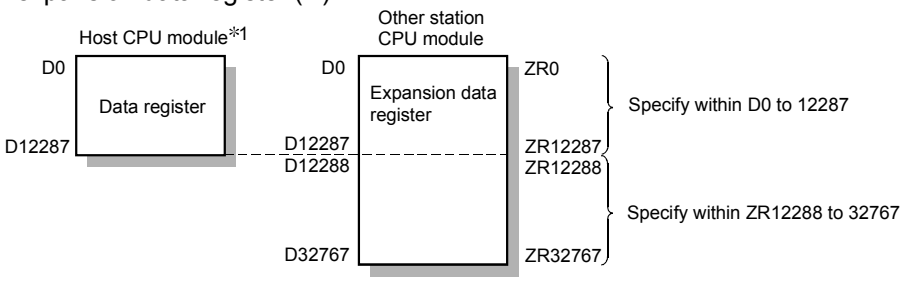
The local devices and the file register for each program cannot be used as devices used in setting data.

POINT

(1) The READ instruction can be executed only when the target station is the Q/QnACPU.
(The READ instruction cannot be executed for an ACPU connected to the MELSECNET/10 or Ethernet.)
Thus, the target station numbers should be limited to Q/QnACPU station numbers.

(2) When reading data from the other station CPU module device with the READ instruction, specify the device within the range applicable to the host station CPU module.
(Head device number to be read in other station CPU module (S2)) + (number of read points -1)
≤ (last device number of host station CPU module ∗)
∗: Last device number in host station CPU module having the same device name as (S2).

(3) Use the file register (ZR) when specifying the expansion data register (D) or the expansion link register (W) that are out of area of the data register (D) or the link register (W) on the host CPU module respectively. (excluding the Universal model QCPU)
For calculating a area for the file regisger (ZR), refer to QCPU User's Manual (Function Explanation, Program Fundamentals.)
(Example) When not assigning the data register (D) of the other station CPU module, or assigning all of the 32K points of the file register (ZR) to the expansion data register (D).



∗1 File register with 32K points or more is required for the host CPU.

REMARKS

The number of steps for the READ instruction is 9.

6 - 14

Control data

Device	Item	Set data	Setting range	Set by (*1)
(S1) + 0	Abnormal complete type	b15 to b7 to b0 0 | 1) | 0 | 1 1) Abnormal complete type (bit 7) Set whether or not the clock data setting is required at abnormal completion. 0: Clock data setting is not required ·····Clock data is not stored in (S1) + 11 to (S1) + 17 when errors occur. 1: Clock data setting is required ·····Clock data is stored in (S1) + 11 to (S1) + 17 when errors occur.	0001H 0081H	User
(S1) + 1	Completion status	Store the status at completion of an instruction. 0: Normal Other than 0: Abnormal (error code) (*2)	—	System
(S1) + 2	Channel used by the local station	Designate the channel used by the local station. 1 to 8 (Channel)	1 to 8	User
(S1) + 3	Target station's CPU type (*3)	Specify the CPU type on the target station. Setting value: 0000H — Single CPU or CPU in the system directly connected to the local station (Same as "03FFH") 03D0H — Control system CPU (*5) 03D1H — Standby system CPU (*5) 03D2H — System A CPU 03D3H — System B CPU 03FFH — Single CPU or CPU in the system directly connected to the local station	0000H 03D0H to 03D3H 03FFH	User
(S1) + 4	Target station network No.	Designate the network No. of the target station. 1 to 239: Network No. 254: When 254 is designated in Jn (The network designated by the valid module during other station access)	1 to 239, 254	User
(S1) + 5	Target station number	Designate the target station. When local station is Universal model QCPU: 1 to 120 When local station is other than Universal model QCPUs: 1 to 64	1 to 120	User
(S1) + 6	—	(Fixed value)	0	User
(S1) + 7	Number of resend	1) At instruction execution Set the number of resends when the instruction is not completed 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)	0 to 15	User System
(S1) + 8	Arrival monitoring time	Set the monitoring time until the instruction completion so that it is greater than or equal to the TCP resend timer value. When the instruction fails to complete within the monitoring time, it is resent for the number of resends designated in (S1) + 7. 0 to TCP resend timer value: The monitoring time is reset to the TCP resend timer value. (TCP resend timer value + 1) to 16383: Monitoring time (unit: s)	0 to 16383	User
(S1) + 9	Read data length	Designate the number of data to be read. When reading from QCPU: 1 to 960 (Word) When reading from QnACPU: 1 to 480 (Word) (*6)	1 to 960	User
(S1) + 10	(Not used)	—	—	—
(S1) + 11	Clock set flag	Store the valid/invalid status of the data in ((S1) + 12 to (S1) + 17). 0: Invalid 1: Valid	—	System
(S1) + 12	Clock data (set only when errors occur)	Higher 8 bits: month (01H to 12H), lower 8 bits: last 2 digits of year (00H to 99H)	—	System
(S1) + 13		Higher 8 bits: hour (00H to 23H), lower 8 bits: date (01H to 31H)		
(S1) + 14		Higher 8 bits: second (00H to 59H), lower 8 bits: minute (00H to 59H)		
(S1) + 15		Higher 8 bits: first 2 digits of year (00H to 99H), lower 8 bits: day of the week (00H (Sunday) to 06H (Saturday))		
(S1) + 16	Abnormal detection network No.	Stores the network number of the station that detected an abnormality. (*4) 1 to 239 (Network No.)	—	System
(S1) + 17	Abnormal detection station number	Stores the station number of the station that detected an abnormality. (*4) 1 to 120 (Station number)	—	

POINT

The data read storage device (D1) requires a contiguous free area equal to or greater than the length of the data read ((S) + 9) (maximum of 960 words).

∗1 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

∗2 For a list of error codes, see Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

∗3 It can be specified when the local station has an Ethernet module of function version D or later. (Not available in any other case. Access to the target CPU is required.)

∗4 Nothing is stored if the execution source detects an error when receiving an instruction.

∗5 When the READ instruction is executed to the redundant system with a control system or standby system CPU specified, the instruction may be unsuccessfully completed due to system switching occurred on the target station (error code: 4244H, 4248H).
If this has occurred, execute the READ instruction again.

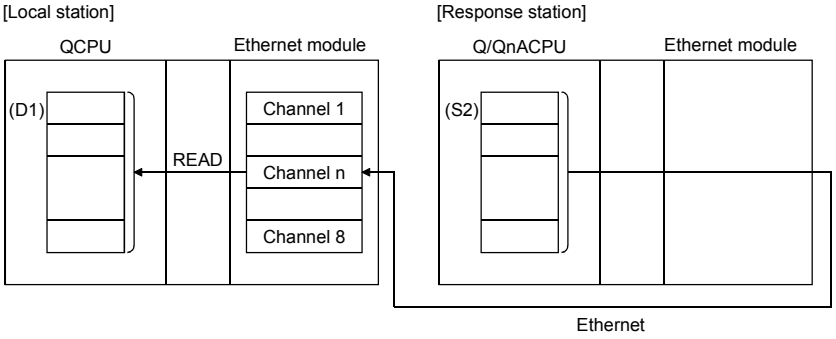
∗6 When data of more than 480 words is specified, a C084H error occurs on the local station.
Check the read data length (1 to 480 words) and execute the READ instruction.

REMARKS

The allowable read data length ((S1)+9) of the READ instruction varies depending on the version. (See the User's Manual (Basic), Section 2.7.)
Specifying a length value outside the setting range will cause a 4101 error (OPERATION ERROR) on the local station.

Functions

(1) This instruction designates the target network number and target station number of a station connected to a CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet network system in the control data and reads the data of designated word devices of that station.
When reading the device data is completed, the completion device designated by (D2) turns on.



(2) Device data can be read from stations connected to either the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet networks having the designated numbers, in addition to stations connected to the local station's network.

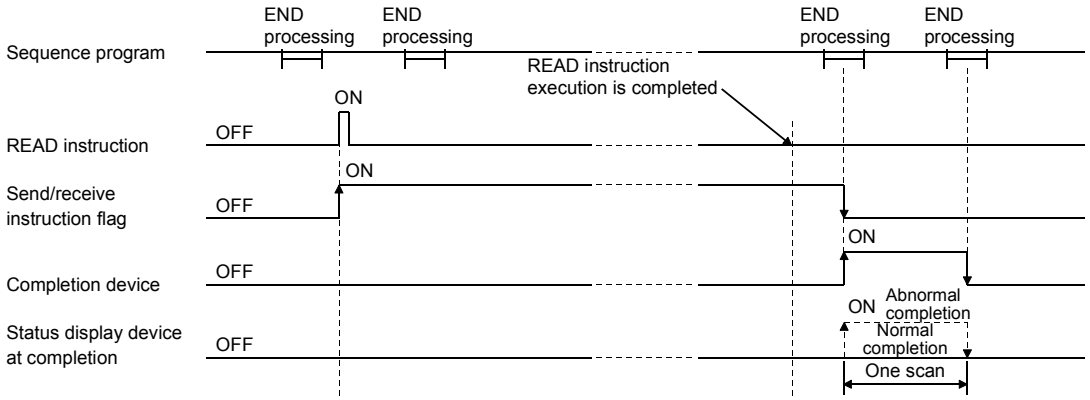
(3) The data link instruction and instructions for the Ethernet network system cannot be executed at two or more locations for the same channel.
If the execution conditions are met at two or more locations at the same time, instructions to be executed later have to wait until the channel becomes available because handshaking is automatically performed at the execution of the first instruction.

(4) Whether the READ instruction is being executed or has been completed normally or abnormally can be checked with the completion device (D2) or completion status display flag ((D2) + 1) designated in the set data.

(a) Completion device (D2)
Turns on at the END processing of the scan where the READ instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D2) + 1)
Turns on and off depending on the completion status of the READ instruction.
Normal completion: Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the READ instruction is completed, and turns off at the next END processing.

[Operation of the local station when the READ instruction is being executed]



(5) When executing the instruction using JP.READ/GP.READ, the read processing is executed only once when the read instruction flag switches from off to on (at rise).

Errors

(1) When a dedicated instruction ends with an error, the abnormal completion signal (D2)+1 turns on and the error code is stored in the completion status (S1) + 1. See the following manuals regarding the error code, check the errors and take corrective actions.

<Error codes>

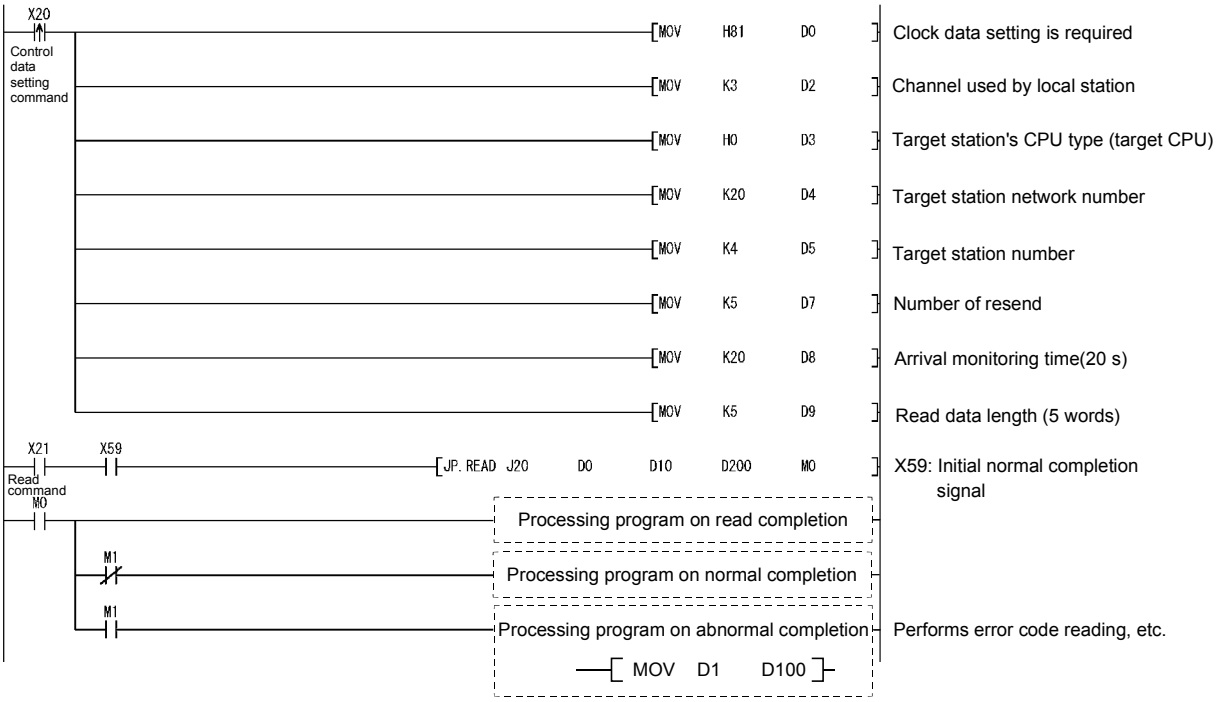
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)

C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

The following example shows a program that reads data from D10 to 14 of station number 4 to D200 to 204 of station number 1.

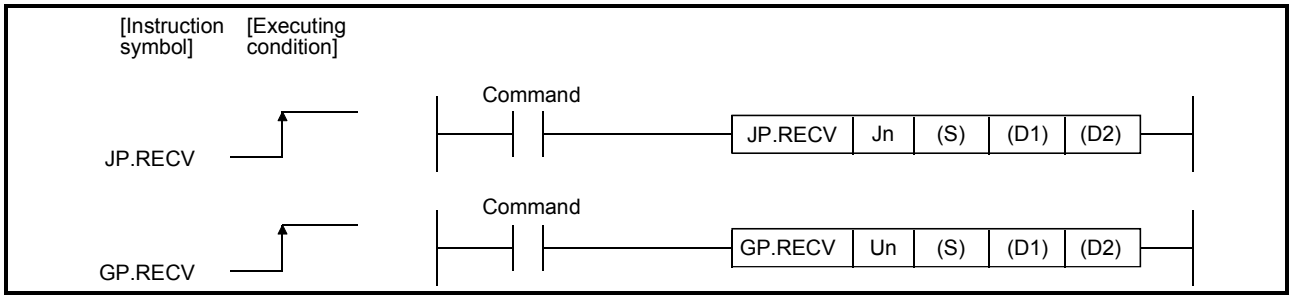
When I/O signals of the Ethernet module are X/Y40 to X/Y5F



6.5 JP/GP.RECV (for the Main Program)

This instruction reads received data.

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H	Others
	Bit	Word		Bit	Word				
(S)	—	○		—					
(D1)	—	○		—					
(D2)	○			—					



Set data

Set data	Description	Set by	Data type
Jn	Network No. of the local station (1 to 239, 254) 254: The network designated by the valid module during other station access.	User	Binary 16 bits
Un	Start I/O signal of the local station's Ethernet module. (00 to FE_H: The higher 2 digits of the 3-digit I/O signal.)		Character string
(S)	Head device of the local station that stores the control data.	User, system	Device name
(D1)	Head device of the local station that stores the reception.	System	
(D2)	Local station device that is turned on for one scan by the completion of the instruction. (D2) + 1 is turned on if the instruction execution completes abnormally.		Bit

The local devices and the file register for each program cannot be used as devices used in setting data.

POINT

The RECV instruction can be executed only when the local station is a Q/QnACPU.

REMARKS

The number of steps for the RECV instruction is 8.

Control data

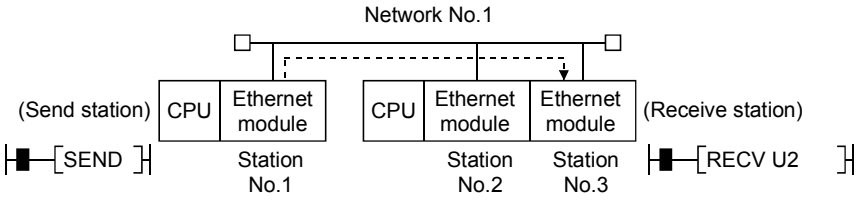
Device	Item	Set data	Setting range	Set by (*1)
(S) + 0	Abnormal complete type	b15 to b8 b7 b6 to b0 0 to 0 1) 0 to 0 1) Abnormal complete type (bit 7) Set whether or not the clock data setting is required at abnormal completion. 0: Clock data setting is not required ·····Clock data is not stored in (S) + 11 to (S) + 17 when errors occur. 1: Clock data setting is required ·····Clock data is stored in (S) + 11 to (S) + 17 when errors occur.	0000_H 0080_H	User
(S) + 1	Completion status	Store the status at completion of an instruction. 0: Normal Other than 0: Abnormal (error code) (*2)	—	System
(S) + 2	Local station storage channel	Specify the channel of the own station, where receive data are stored. 1 to 8 (Channel)	1 to 8	User
(S) + 3	Channel used by the transmission station	Store the channel number used by the transmission station. 1 to 8 (Channel)	—	System
(S) + 4	Transmission station network number	Store the network number of the transmission station. 1 to 239: Network No.	—	System
(S) + 5	Transmission station number	Stores the station number of the transmission station. 1 to 120: Station number (reception from the station with the corresponding station number)	—	System
(S) + 6	(Not used)	—	—	—
(S) + 7	(Not used)	—	—	—
(S) + 8	Arrival monitoring time	Set the monitoring time until the instruction completion so that it is greater than or equal to the TCP resend timer value. When the instruction fails to complete within the monitoring time, abnormal completion occurs. 0 to TCP resend timer value: The monitoring time is reset to the TCP resend timer value. (TCP resend timer value + 1) to 16383: Monitoring time (unit: s)	0 to 16383	User
(S) + 9	Reception data length	Stores the word count of the receive data stored in (D1) + 0 to (D1) + n. 0: No receive data 1 to 960 : Word count of receive data	—	System
(S) + 10	(Not used)	—	—	—
(S) + 11	Clock set flag	Store the valid/invalid status of the data in ((S) + 12 to (S) + 17). 0: Invalid 1: Valid	—	System
(S) + 12	Clock data (set only when errors occur)	Higher 8 bits: month (01_H to 12_H), lower 8 bits: last 2 digits of year (00_H to 99_H)	—	System
(S) + 13		Higher 8 bits: hour (00_H to 23_H), lower 8 bits: date (01_H to 31_H)		
(S) + 14		Higher 8 bits: second (00_H to 59_H), lower 8 bits: minute (00_H to 59_H)		
(S) + 15		Higher 8 bits: first 2 digits of year (00_H to 99_H), lower 8 bits: day of the week (00_H (Sunday) to 06_H (Saturday))		
(S) + 16	Abnormal detection network number	Stores the network No. of the station that detected an abnormality. (*3) 1 to 239 (Network No.)	—	System
(S) + 17	Abnormal detection station number	Stores the station number of the station that detected an abnormality. (*3) 1 to 120 (Station number)	—	

POINT

(1) The receive data storage device (D1) requires a contiguous free area equal to or greater than the receive data length ((S) + 9) (maximum of 960 words).

(2) Execute the RECV instruction every time the corresponding channel's bit in the RECV instruction execution request area (address: 205) of the buffer memory turns on (there is receive data).

(3) When the Ethernet modules on the same network are installed at the receive station, execute RECV instruction by specifying Un of the Ethernet module which stores the data sent by SEND instruction.
Specifying Jn does not execute RECV instruction.
(Example) Specify "U2" when executing the RECV instruction at station No. 3 in response to the SEND instruction from station No. 1.



∗1 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

∗2 For a list of error codes, see Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

∗3 Nothing is stored if the execution source detects an error when receiving an instruction.

REMARKS

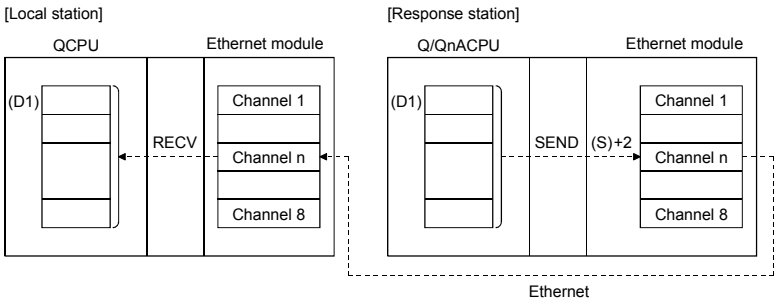
The allowable receive data length ((S)+9) of the RECV instruction varies depending on the version. (See the User's Manual (Basic), Section 2.7.)
Specifying a length value outside the setting range will cause a 4101 error (OPERATION ERROR) on the local station.

Functions

(1) This instruction reads, via the Ethernet module of the local station, the data sent from a station connected to a CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet network system, which is designated with the network number and station number in the control data.

∗ The data is sent using the SEND instruction.
When data is received from the send station, the receive data is stored in the channel of the local station designated with the send station, and the corresponding bit in the RECV instruction execution request area (address: 205) of the Ethernet module buffer memory turns on. The received data is read from the receive data storage channel using the ON status of the corresponding bit of the RECV instruction execution request area to time the reading operations.

When reading the receive data from the Ethernet module is completed, the completion device designated by (D2) turns on.



(2) The instructions for Ethernet module cannot be executed to two or more locations for the same channel.
If the execution conditions are met at two or more locations at the same time, instructions to be executed later have to wait until the channel becomes available because handshaking is automatically performed at the execution of the first instruction.

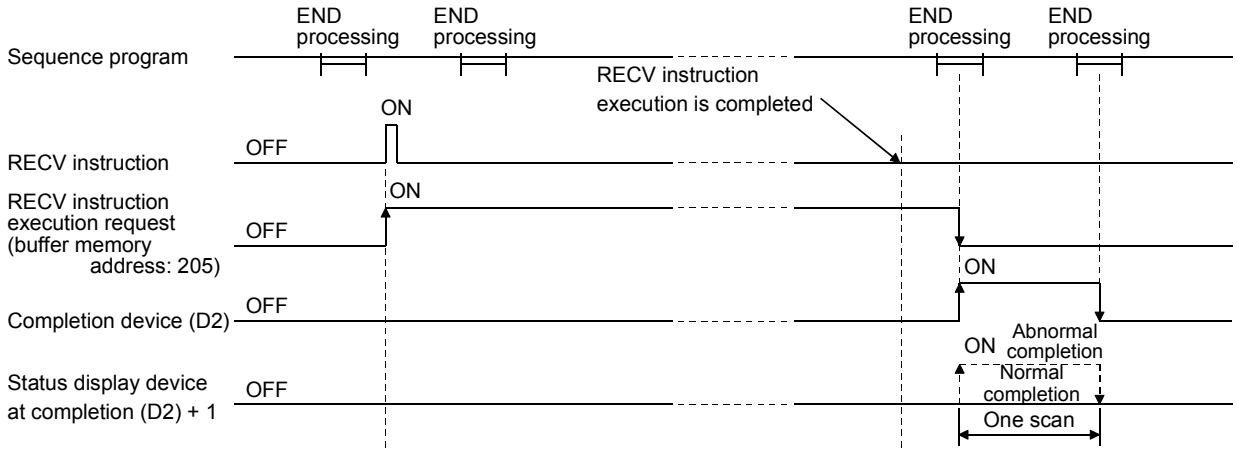
(3) RECVS instruction (for interrupt program) cannot be used with the instruction for data link in cases where the same channel is used to read receive data using the instruction for data link.

(4) Whether the RECV instruction is being executed or has been completed normally or abnormally can be checked with the completion device (D2) or completion status display flag ((D2) + 1) designated in the set data.

(a) Completion device (D2)
Turns on at the END processing of the scan where the RECV instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D2) + 1)
Turns on and off depending on the completion status of the RECV instruction.
Normal completion: Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the RECV instruction is completed, and turns off at the next END processing.

[Operation of the local station when the RECV instruction is being executed]



(5) When executing the instruction using JP.RECV/GP.RECV, the read processing is executed only once when the read instruction flag goes from off to on (at rise).

Errors

(1) When a dedicated instruction completes abnormally, the abnormal completion signal (D2) + 1 turns on and the error code is stored in the completion status (S)+1. See the following manuals regarding the error code, check the errors and take corrective actions.

<Error codes>

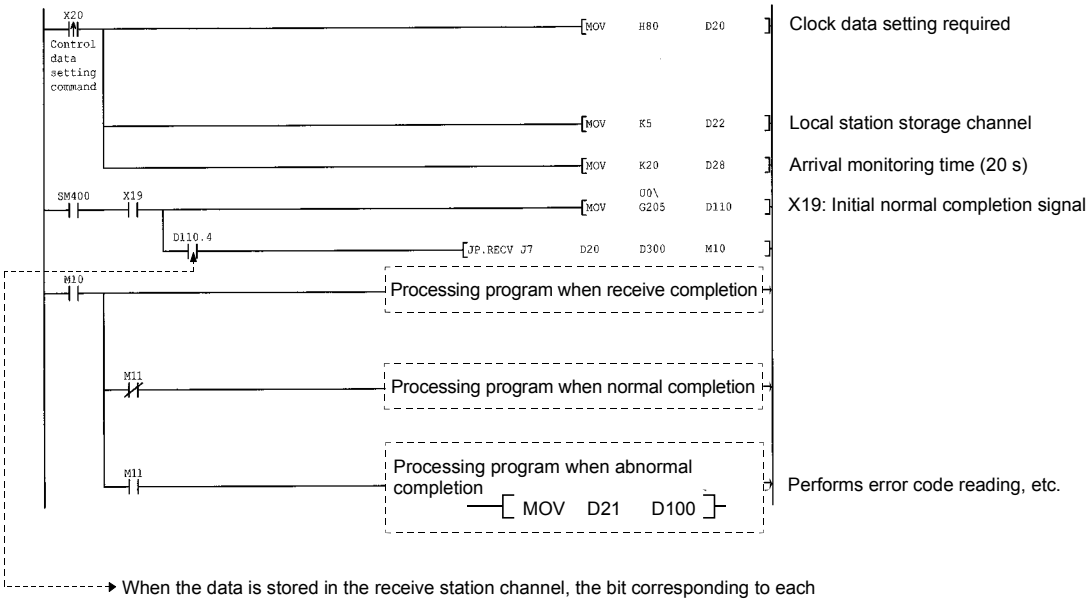
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)

C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's manual (Basic)

Program example

The following example shows a program that reads receive data from channel 5.

When I/O signals of the Ethernet module are X/Y00 to X/Y1F

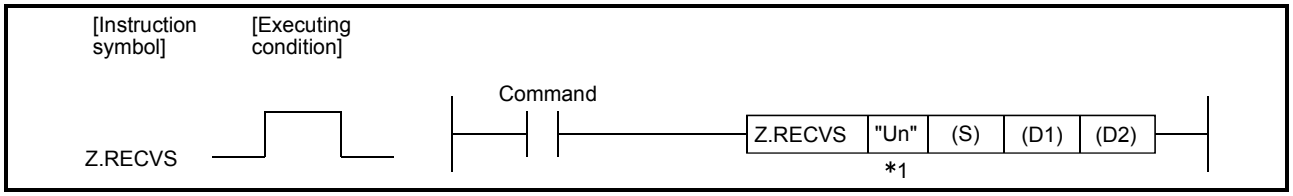


When the data is stored in the receive station channel, the bit corresponding to each channel of buffer memory RECV instruction execution request area turns on. Data can be read automatically bu using this signal for the receive command. The signal turns off shen the RECV instruction is completed.

6.6 Z.RECVS (for Interrupt Programs)

This instruction reads received data.

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H	Others
	Bit	Word		Bit	Word				
(S)	—	○		—					
(D1)	—	○		—					
(D2)	○			—					



*1 If the originating station is a Basic model QCPU (function version B or later) or Universal model QCPU, " " (double quotation) of the first argument can be omitted.

Set data

Set data	Description	Set by	Data type
"Un"/Un	Start I/O signal of the local station's Ethernet module. (00 to FE$_H$: The higher 2 digits of the 3-digit I/O signal.)	User	String/Binary 16 bits
(S)	Head device of the local station that stores the control data.	User, system	Device name
(D1)	Head device of the local station that stores the receive data.	System	
(D2)	(Designate as dummy.)		Bit

The local devices and the file register for each program cannot be used as devices used in setting data.

POINT

The RECV instruction can be executed only when the local station is a QCPU.

REMARKS

The number of steps for the RECV instruction is 10.

Control data

Device	Item	Set data	Setting range	Set by (＊1)
(S) + 0	Complete type	Designate 0.	0	User
(S) + 1	Completion status	Stores the status at completion of the instruction. 0: Normal Other than 0: Abnormal (error code) (＊2)	—	System
(S) + 2	Local station storage channel	Designate the channel number that stores data to be read. 1 to 8: Channel number	1 to 8	User
(S) + 3	Channel used by send station	Stores the channel number used by the send station. 1 to 8: Channel number	—	System
(S) + 4	Network number used by send station	Stores the network number of the send station. 1 to 239: Network number	—	System
(S) + 5	Send station number	Stores the station number of the send station. 1 to 120: Station number (receive from the station with the indicated station number)	—	System
(S) + 6 to (S) + 8	System area	—	—	—
(S) + 9	Receive data length	Stores the word count of the receive data stored in (D1) + 0 to (D1) + n. 0: No receive data 1 to 960: Word count of receive data	—	System
(S) + 10	System area	—	—	—

Receive data

Device	Item	Set data	Setting range	Set by (＊1)
(D1) + 0 to (D1) + n	Receive data	Store the receive data.	—	System

POINT

The receive data storage device (D1) requires a contiguous free area equal to or greater than the receive data length ((S) + 9) (maximum of 960 words).

＊1 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

＊2 For a list of error codes, see Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

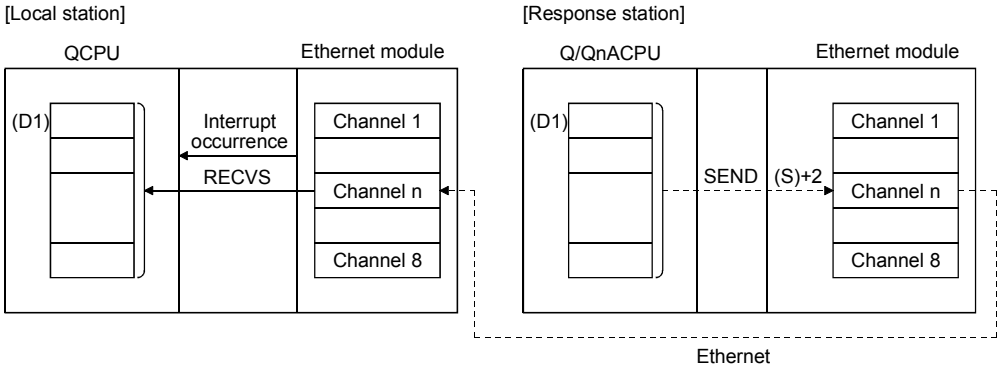
REMARKS

The allowable receive data length ((S)+9) of the RECVS instruction varies depending on the version. (See the User's Manual (Basic), Section 2.7.) Specifying a length value outside the setting range will cause a 4101 error (OPERATION ERROR) on the local station.

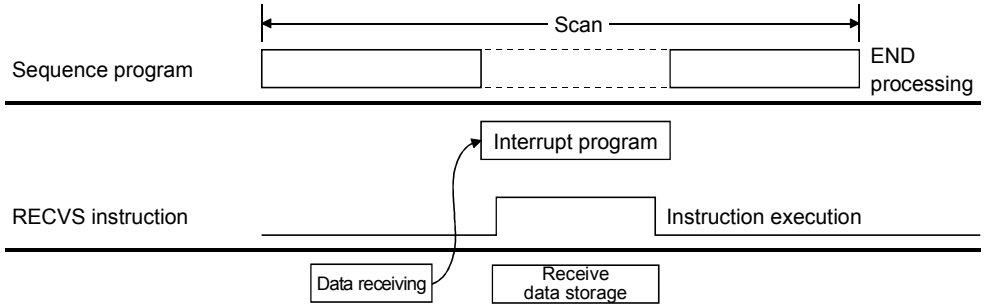
Functions

(1) This instruction reads the data received from other station (a station connected to CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet network system) at the local station storage channel ((S) + 2) designated in the control data.

＊ Data is sent using the SEND instruction.
When data is received from the transmission station, the receive data is stored in the channel of the local station designated with the transmission station, and the interrupt program with the interrupt number (Ixx) set with GX Developer is started.
The receive data is read using the RECVS instruction in this interrupt program.



[Operation when the RECVS instruction is being executed]



(2) The Z.RECVS instruction is used in the interrupt program and its processing is completed within one scan.

(3) RECVS instruction (interrupt program-use) can not be used with the instruction for data link in cases where the same channel is used to read received data using the instruction for data link.

Errors

(1) When a dedicated instruction completes abnormally, the abnormal completion signal (D2)+1 turns on and the error code is stored in the completion status (S)+1. See the following manuals regarding the error code, check the errors and take corrective actions.

<Error codes>

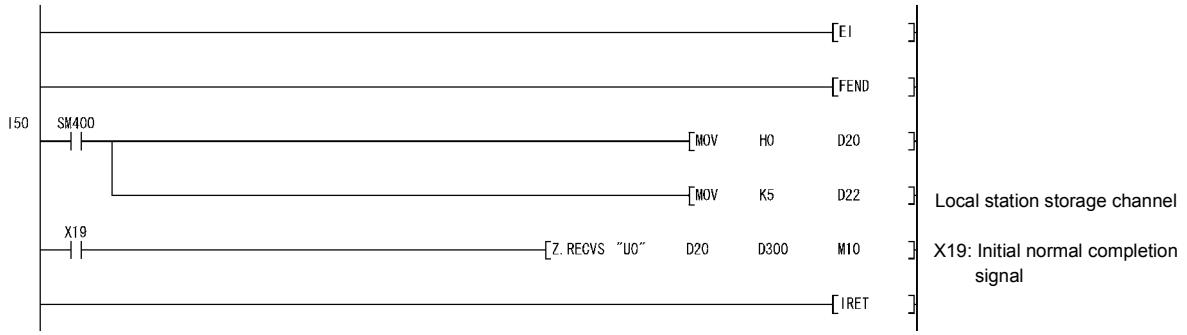
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)

C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

The following example shows an interrupt program that reads the receive data from channel 5.

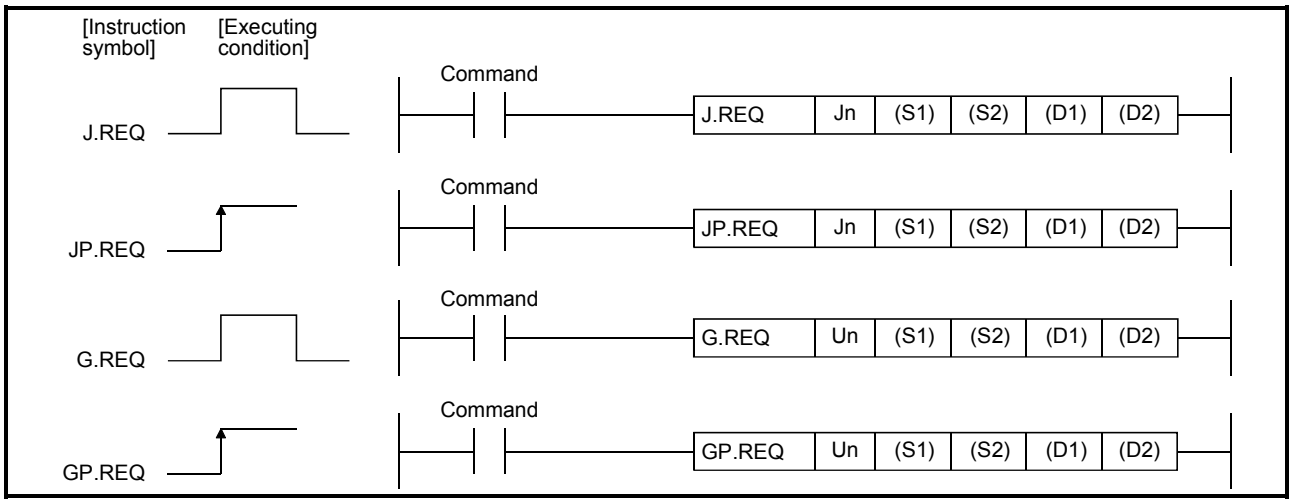
When I/O signals of the Ethernet module are X/Y00 to X/Y1F



6.7 J(P)/G(P).REQ (Remote RUN/STOP)

This instruction issues remote RUN/STOP requests to programmable controller CPUs of other stations.

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(S2)	—	○		—					
(D1)	—	○		—					
(D2)	○			—					



Set data

Set data	Description	Set by	Data type
Jn	Network number of the local station (1 to 239, 254) 254: The network designated by the valid module during other station access.	User	Binary 16 bits
Un	Start I/O signal of the local station's Ethernet module. (00 to FE$_H$: The higher 2 digits of the 3-digit I/O signal.)		Character string
(S1)	Head device of the local station that stores the control data.	User, system	Device name
(S2)	Head device of the local station that stores the request data.	User	
(D1)	Head device of the local station that stores the response data.	System	
(D2)	Local station device that is turned on for one scan by the completion of the instruction. (D2) + 1 is turned on if the instruction execution completes abnormally.		Bit

The local devices and the file register for each program cannot be used as devices used in setting data.

POINT

The REQ instruction can be executed only when the target station is a Q/QnACPU. (The REQ instruction cannot be executed to an ACPU connected to an MELSECNET/10 or Ethernet network system.)

REMARKS

The number of basic steps for the REQ instruction is 9.

Control data

Device	Item	Set data	Setting range	Set by (*1)
(S1) + 0	Abnormal complete type	b15 to b7 to b4 to b0 0 | 1) | 0 | 1 | 0 | 1 1) Abnormal complete type (bit 7) Set whether or not the clock data setting is required at abnormal completion. 0: Clock data setting is not required ·····Clock data is not stored in (S1) + 11 to (S1) + 17 when errors occur. 1: Clock data setting is required ·····Clock data is stored in (S1) + 11 to (S1) + 17 when errors occur.	0011H 0091H	User
(S1) + 1	Completion status	Store the status at completion of an instruction. 0: Normal Other than 0: Abnormal (error code) (*2)	—	System
(S1) + 2	Channel used by the local station	Designate the channel used by the local station. 1 to 8 (channel)	1 to 8	User
(S1) + 3	Target station's CPU type (*3)	Specify the CPU type on the target station. Setting value: 0000H — Single CPU or CPU in the system directly connected to the local station (Same as "03FFH") 03D0H — Control system CPU (*5) 03D1H — Standby system CPU (*5) 03D2H — System A CPU 03D3H — System B CPU 03FFH — Single CPU or CPU in the system directly connected to the local station	0000H 03D0H to 03D3H 03FFH	User
(S1) + 4	Target station network number	Designate the network number of the target station. 1 to 239: Network number 254: When 254 is designated in Jn (The network designated by the valid module during other station access)	1 to 239, 254	User
(S1) + 5	Target station number	Designate the target station. 1) Station number specification When local station is Universal model QCPU: 1 to 120 When local station is other than Universal model QCPUs : 1 to 64 2) Specific group 81H to A0H: All stations with the indicated group number (only clock data write and remote RUN/STOP are allowed) 3) All stations FFH: All stations of the target network number (simultaneous broadcast) excluding the local station (only clock data write and remote RUN/STOP are allowed)	1 to 120 81H to A0H FFH	User
(S1) + 6	—	(Fixed value)	0	User
(S1) + 7	Number of resends	1) At instruction execution Set the number of resends when the execution of an instruction did not 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)	0 to 15	User System
(S1) + 8	Arrival monitoring time	Set the monitoring time until the instruction completion so that it is greater than or equal to the TCP resend timer value. When the instruction fails to complete within the monitoring time, it is resent for the number of resends designated in (S1) + 7. 0 to TCP resend timer value: The monitoring time is reset to the TCP resend timer value. (TCP resend timer value + 1) to 16383: The monitoring time is the designated value (unit: s)	0 to 16383	User
(S1) + 9	Request data length	Designate the number of request data (word). (Word count of data stored in the request data storage device (S2)) 4: Remote RUN 3: Remote STOP 2: Clock data read 6: Clock data write	2 to 4, 6	User
(S1) + 10	Response data length	Store the number of response data (word) (Word count of data stored in the response data storage device (D1)). 4: Remote RUN 6: Clock data read 2: Clock data write	—	System
(S1) + 11	Clock set flag	Store the valid/invalid status of the data in ((S1) + 12 to (S1) + 17). 0: Invalid 1: Valid	—	System

(Continued to the next page)

Device	Item	Set data	Setting range	Set by (*1)
(S1) + 12	Clock data (set only when errors occur) (*2)	Higher 8 bits: month (01H to 12H), lower 8 bits: last 2 digits of year (00H to 99H)	—	System
(S1) + 13		Higher 8 bits: hour (00H to 23H), lower 8 bits: date (01H to 31H)		
(S1) + 14		Higher 8 bits: second (00H to 59H), lower 8 bits: minute (00H to 59H)		
(S1) + 15		Higher 8 bits: first 2 digits of year (00H to 99H), lower 8 bits: day of the week (00H (Sunday) to 06H (Saturday))		
(S1) + 16	Abnormal detection network number	Stores the network number of the station that detected an abnormality. (*4) 1 to 239 (Network number)	—	System
(S1) + 17	Abnormal detection station number	Stores the station number of the station that detected an abnormality. (*4) 1 to 120 (Station number)	—	

*1 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

*2 For a list of error codes, see Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

*3 It can be specified when the local station has an Ethernet module of function version D or later. (Fixed to "03FFH" for other than the above. Access to the target CPU is made.)

*4 Nothing is stored if the execution source detects an error when receiving an instruction.

*5 When the REQ instruction is executed to the redundant system with a control system or standby system CPU specified, the instruction may be unsuccessfully completed due to system switching occurred on the target station (error code: 4244H, 4248H).
If this has occurred, execute the REQ instruction again.

Request data (All values are set by the user)

Device	Item	Description	Remote RUN	Remote STOP
(S2) + 0	Request type	0010H: When station No. is specified in (S1)+5 0030H: When all stations or a group is specified in (S1)+5	○	○
(S2) + 1	Sub-request type	0001H: Remote RUN 0002H: Remote STOP	○	○
(S2) + 2	Mode	Designate whether or not to forcefully execute remote RUN/STOP operations. 0001H: Do 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	Designate the status of the CPU's device memory only when executing remote RUN. 0000H: Do not clear (however, the local device will be cleared) 0001H: Clear (excluding setting and latch range at remote RUN) 0002H: Clear (including setting and latch range at remote RUN)	○	—

Response data (All values are set by the system)
When "all stations or a group (FFH or 81H to A0H)" is specified in Target station No. ((S1)+5), no response data will be stored.

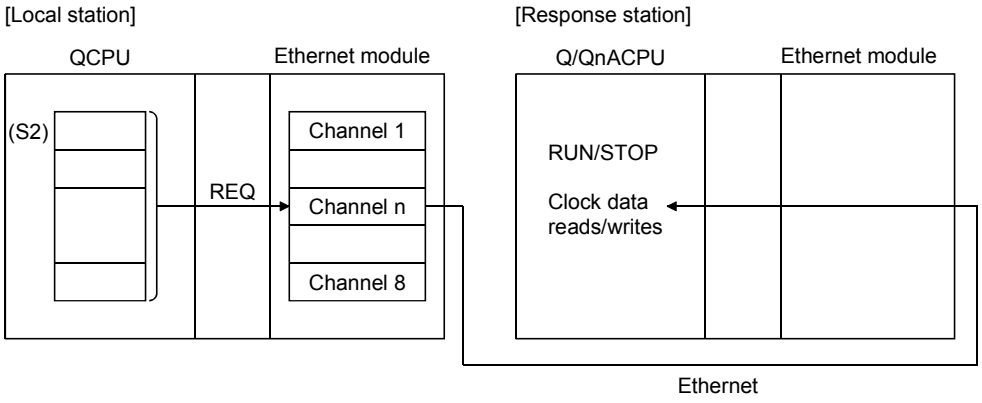
Device	Item	Description	Remote RUN	Remote STOP
(D1)	Request type	0090H: When station No. is specified in (S1)+5	○	○
(D1) + 1	Sub-request type	0001H: Remote RUN 0002H: Remote STOP	○	○

POINT

(1) Remote RUN/STOP becomes valid when the RUN/STOP key switch of the target station's Q/QnACPU is "RUN."
(2) Remote RUN/STOP cannot be executed when the system protection is activated on the target station's Q/QnACPU.
(3) When other station has executed a remote STOP/PAUSE operation on the target station, the RUN request cannot be executed if the mode of (S2) + 2 is "Do not force execution (0001_H)."
(4) If the Q/QnACPU of the target station for which a remote STOP operation has been executed is reset, the information of the remote STOP is erased.
(5) The clear mode ((S2) + 3) designates how the clear (initialization) processing of the Q/QnACPU device memory should be performed when the Q/QnACPU starts performing calculations after a remote RUN request has been issued to it.
The Q/QnACPU executes the designated clear and then goes into the RUN status according to the parameter settings (PLC file → Initial Device value).

Functions

(1) This instruction sends the request data designated by (S2) of the local station to the station connected to a CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet network system, which is designated with the network number and station number in the control data, and makes a service request.
When the request to the target station is completed, the completion device designated with (D2) turns on.



(2) Device data can be sent from stations connected to either the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet networks having the designated numbers, in addition to stations connected to the local station's network.

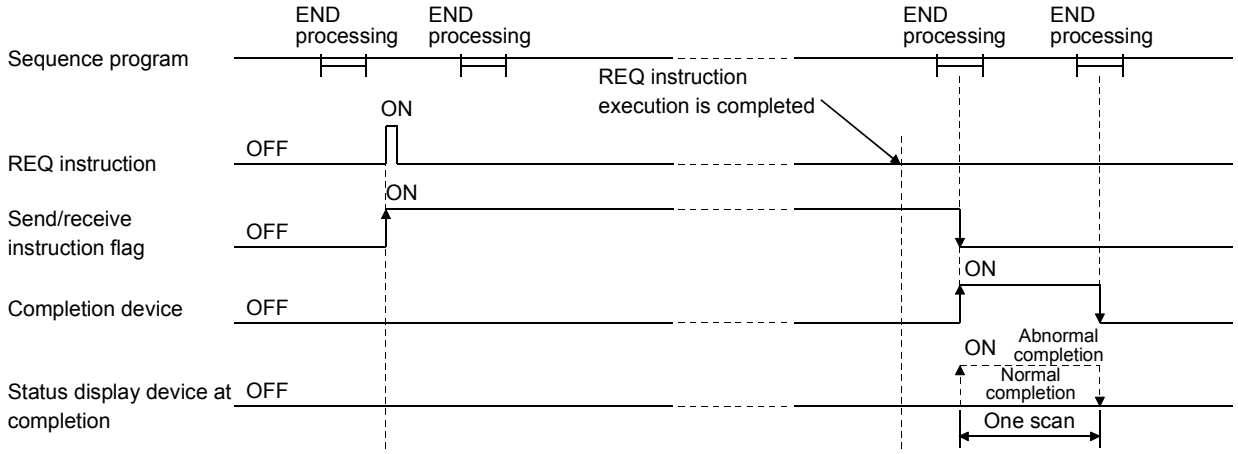
(3) The data link instruction and instructions for the Ethernet network system cannot be executed at two or more locations for the same channel.
If the execution conditions are met at two or more locations at the same time, instructions to be executed later have to wait until the channel becomes available because handshaking is automatically performed at the execution of the first instruction.

(4) Whether the REQ instruction is being executed or has been completed normally or abnormally can be checked with the complete device (D2) or completion status display flag ((D2) + 1) designated in the set data.

(a) Completion device (D2)
Turns on at the END processing of the scan where the REQ instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D2) + 1)
Turns on and off depending on the completion status of the REQ instruction.
Normal completion: Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the REQ instruction is completed, and turns off at the next END processing.

[Operation of the local station when the REQ instruction is being executed]



(5) When the instruction is executed using J.REQ/G.REQ, the next write processing is executed in succession after one processing is completed while the send/receive instruction flag is on.
When the instruction is executed using JP.REQ/GP.REQ, the processing is executed only once when the send/receive instruction flag switches from off to on (at rise).

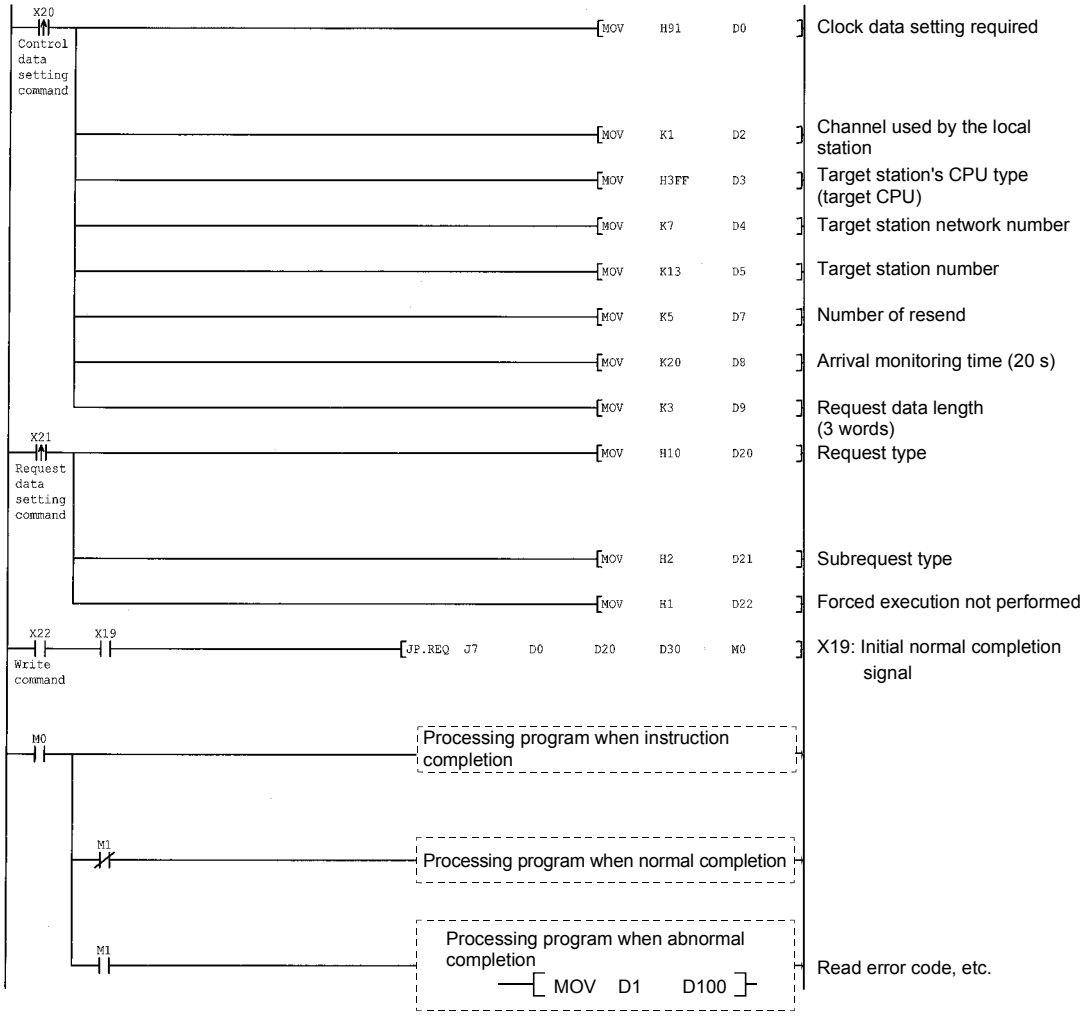
Errors

(1) When a dedicated instruction completes abnormally, the abnormal completion signal (D2) + 1 turns on and the error code is stored in the completion status (S1) + 1.
See the following manuals regarding the error code, check the errors and take corrective actions.
<Error codes>
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)
C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

The following example shows a program that executes remote STOP on the Q/QnACPU of station number 13 in network number 7.

When I/O signals of the Ethernet module are X/Y00 to X/Y1F



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6.8 J(P)/G(P).REQ (Clock Data Read/Write)

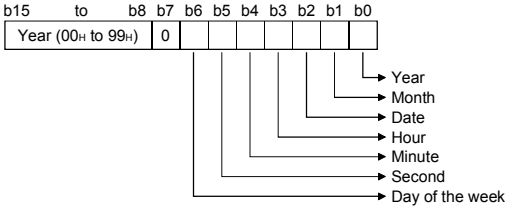
This instruction reads/writes clock data from/to other stations.

POINT

See Section 6.7 for the following information on the REQ instruction for reading/writing clock data from/to other stations.
Since the same explanation as when executing remote RUN/STOP operations using the REQ instruction applies in this case, the explanation of these items is omitted in this section.

1) Instruction format
2) Devices that can be used with the instruction
3) Control data in the setting data
4) Functions
5) Error

Request data (All items marked with ○ are set by the user)

Device	Item	Set data	Clock data read	Clock data write
(S2)	Request type	0001H: Clock data read 0011H: Clock data write (When station No. is specified in (S1)+5) 0031H: Clock data write (When all stations or a group is specified in (S1)+5)	○	○
(S2) + 1	Sub-request type	0002H: Clock data read 0001H: Clock data write	○	○
(S2) + 2	Change pattern Year to be changed	1) Change pattern (bits 0 to 7) Specify which items are to be written to the fields of (high byte of (S2)+2) to ((S2)+5). 0: Do not change 1: Change 2) Year to be changed (bits 8 to 15) Store year (last two digits of the year in the Gregorian calendar) as BCD code. 	—	○
(S2) + 3	Clock data to be changed (continued)	Higher 8 bits: date (01H to 31H), lower 8 bits : month (01H to 12H)	—	○
(S2) + 4		Higher 8 bits: minute (00H to 59H), lower 8 bits : hour (00H to 23H)	—	○
(S2) + 5		Higher 8 bits: day of the week (00H (Sunday) to 06H (Saturday)), lower 8 bits : second (00H to 59H)	—	○

* In this function, the higher two digits of the year data cannot be changed. When it is necessary to change the higher two digits of the year data, use other function (such as GX Developer) to set the clock data.

Request data (All items marked with ○ are set by the user)
When "all stations or a group (FF$_H$ or 81$_H$ to A0$_H$)" is specified in Target station No. ((S1)+5), no response data will be stored.

Device	Item	Set data	Clock data read	Clock data write
(D1) + 0	Request type	0081$_H$: Clock data read 0091$_H$: Clock data write (When station No. is specified in (S1)+5)	○	○
(D1) + 1	Sub-request type	0002$_H$: Clock data read 0001$_H$: Clock data write	○	○
(D1) + 2	Clock data read	Higher 8 bits: month (01$_H$ to 12$_H$), lower 8 bits : year (00$_H$ to 99$_H$) ＊ Year: Lower two digits	○	—
(D1) + 3		Higher 8 bits: hour (00$_H$ to 23$_H$), lower 8 bits : date (01$_H$ to 31$_H$)	○	—
(D1) + 4		Higher 8 bits: second (00$_H$ to 59$_H$), lower 8 bits : minute (00$_H$ to 59$_H$)	○	—
(D1) + 5		Higher 8 bits: (00$_H$), lower 8 bits : day of the week (00$_H$ (Sunday) to 06$_H$ (Saturday)).	○	—

POINT

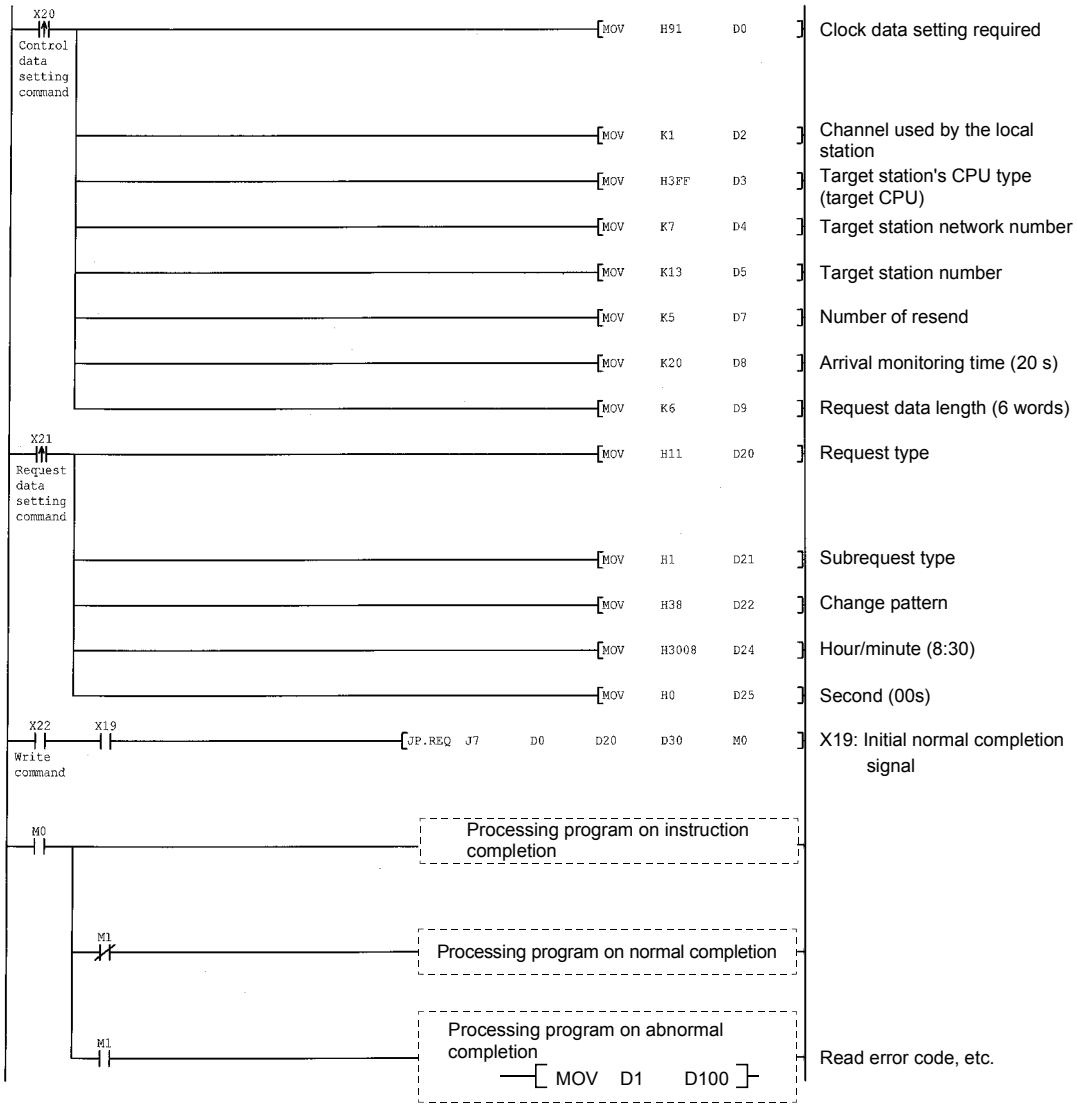
(1) The clock data cannot be written when the system protection is activated on the target station's Q/QnACPU.

(2) When the clock data is read, the response data storage device (D1) requires a contiguous free area of six words.

Program example

The following example shows a program that writes the clock data (8:30:00) to the Q/QnACPU of station number 13 having network number 7.

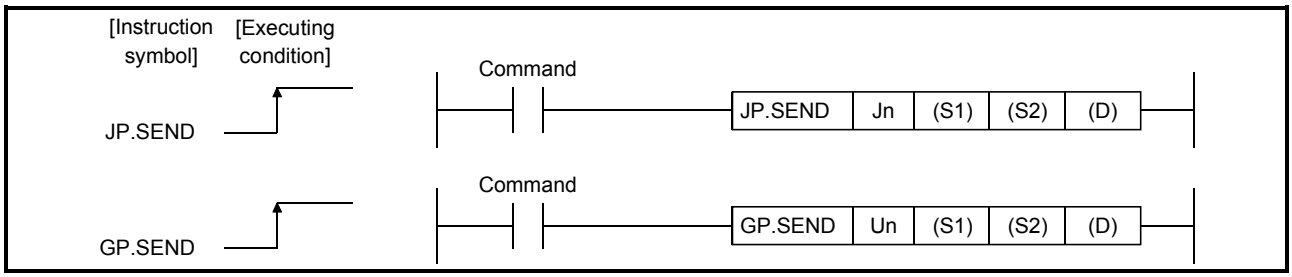
When I/O signals of the Ethernet module are X/Y00 to X/Y1F



6.9 JP/GP.SEND

This instruction sends data to other station's Q/QnACPU.

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(S2)	—	○		—					
(D)	○			—					



Setting data

Set data	Description	Set by (*1)	Data type
Jn	Network number of the local station (1 to 239, 254) 254: The network designated by the valid module during other station access.	User	Binary 16 bits
Un	Start I/O signal of the local station's Ethernet module. (00 to FE$_H$: The higher 2 digits of the 3-digit I/O signal.)		Character string
(S1)	Head device of the local station that stores the control data.	User, system	Device name
(S2)	Head device of the local station that stores the send data.	User	
(D)	Local station device that is turned on for one scan by the completion of the instruction. (D) + 1 is turned on if the instruction execution completes abnormally.	System	Bit

The local devices and the file register for each program cannot be used as devices used in setting data.

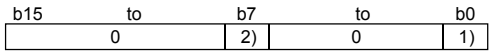
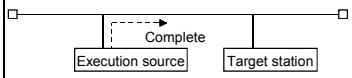
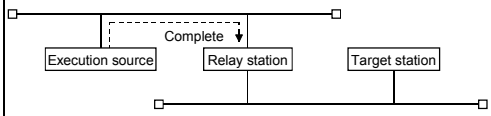
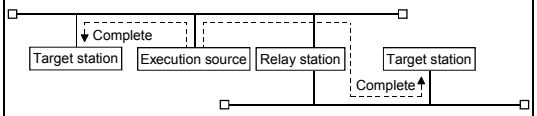
POINT

The SEND instruction can be executed only when the target station is a Q/QnACPU. (The SEND instruction cannot be executed for an ACPU connected to an MELSECNET/10 or Ethernet network system.)

REMARKS

The number of steps for the SEND instruction is 8.

Control data

Device	Item	Set data	Setting range	Set by (*1)
(S1) + 0	Execution/abnormal complete type	 1) Execution type (bit 0) 0: No arrival confirmation When the target station is on the same network: Completed when the data is sent from the local station.  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 complete type (bit 7) Set whether or not the clock data setting is required at abnormal completion. 0: Clock data setting not required: Clock data at error occurrence is not stored in (S1) + 11 to (S1) + 17. 1: Clock data setting required Clock data at error occurrence is stored in (S1) + 11 to (S1) + 17.	0000H 0001H 0080H 0081H	User
(S1) + 1	Completion status	Stores the status at the completion of the instruction. 0 : Normal Other than 0: Abnormal (error code) (*2)	—	System
(S1) + 2	Channel used by the local station	Set the channel used by the local station. 1 to 8 (channel)	1 to 8	User
(S1) + 3	Target station storage channel	Designate the target station's channel that stores data. 1 to 8 (channel)	1 to 8	User
(S1) + 4	Target station network number	Designate the network number of the target station. 1 to 239: Network number 254 : When 254 is designated in Jn (The network designated by the valid module during other station access)	1 to 239, 254	User

(Continued to the next page)

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Device	Item	Set data	Setting range	Set by (*1)
(S1) + 5	Target station number	Designate the target station. 1) Station number specification When local station is Universal model QCPU: 1 to 120 When local station is other than Universal model QCPUs: 1 to 64 2) Specific group 81_H to $A0_H$: All the station having the indicated group number (Can be set when the execution type designated in (S1) is "0: No arrival confirmation.") 3) All stations FF_H : All stations having the target network number (simultaneous broadcasting): Excluding the local station (Can be set when the execution type designated in (S1) is "0: No arrival confirmation.")	1 to 120 81_H to $A0_H$ FF_H	User
(S1) + 6	—	(Fixed value)	0	User
(S1) + 7	Number of resends	Valid when the execution type designated in (S1) is "1: With arrival confirmation." 1) At instruction execution Set the number of resends when the instruction fails to complete within the monitoring time designated by (S1) + 8. 0 to 15 (Time) 2) At instruction completion Store the number of resends executed (result). 0 to 15 (Time)	0 to 15	User System
(S1) + 8	Arrival monitoring time	Valid when the execution type designated in (S1) is "1: With arrival confirmation." Set the monitoring time until the instruction completion equals to or becomes greater than the TCP resend timer value. When the instruction fails to complete within the monitoring time, it is resent for the number of resends designated in (S1) + 7. 0 to TCP resend timer value: The monitoring time is reset to the TCP resend timer value. (TCP resend timer value + 1) to 16383: Monitoring time (unit: s).	0 to 16383 0 to TCP	User
(S1) + 9	Send data length	Designate the number of send data in (S2) to (S2) + n. When sending to QCPU: 1 to 960 (word) When sending to QnACPU: 1 to 480 (word)	1 to 960	User
(S1) + 10	(Not used)	—	—	—
(S1) + 11	Clock set flag	Store the valid/invalid status of the clock data in (S1) + 12 to (S1) + 17. 0: Invalid 1:Valid	—	System

(Continued to the next page)

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Device	Item	Set data	Setting range	Set by (*1)
(S1) + 12	Clock data (set only when errors occur)	Higher 8 bits: month (01_H to 12_H), lower 8 bits : last 2 digits of year (00_H to 99_H)	—	System
(S1) + 13		Higher 8 bits: hour (00_H to 23_H), lower 8 bit : date (01_H to 31_H)		
(S1) + 14		Higher 8 bits: second (00_H to 59_H), lower 8 bits : minute (00_H to 59_H)		
(S1) + 15		Higher 8 bits: first 2 digits of year (00_H to 99_H), lower 8 bits : day of the week (00_H (Sunday) to 06_H (Saturday))		
(S1) + 16	Abnormal detection network number	Stores the network number of the station that detected an abnormality. (*3) 1 to 239 (Network number)	—	System
(S1) + 17	Abnormal detection station number	Stores the station number of the station that detected an abnormality. (*3) 1 to 120 (Station number)	—	

*1 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

*2 For a list of error codes, see Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

*3 Nothing is stored if the execution source detects an error when receiving an instruction.

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REMARKS

The following explains the reception processing on the target station by the send data length of the SEND instruction.
The allowable send data length ((S1)+9) of the SEND instruction varies depending on the version. (See the User's Manual (Basic), Section 2.7.)
Specifying a length value outside the setting range will cause a 4101 error (OPERATION ERROR) on the local station.

<When the target station is an Ethernet module>

Local station (SEND)	Target station (RECV/RECVS)			Target station (RECV)		
	Q series Ethernet module			QnA series Ethernet module		
	Supporting receive data length of 960 words	Not supporting receive data length of 960 words (480 words)		QE71N (480 words)	QE71 (480 words)	
		Function version B, D	Function version A		9707B or later	9706 or earlier
1 to 480 words	○	○	○	○	○	—
481 to 960 words	○	× ＊1	× ＊2	× ＊1	× ＊3	—

○: Performs the processing normally.
×: Terminates abnormally and returns an error code to the request source.

＊1 A C086H error occurs on the local station.
On the target station, the corresponding bit in the RECV instruction execution request area (address: 205) of the buffer memory remains OFF, and no error occurs.

＊2 On the local station, although the initial transmission is completed normally, a C085H error will occur for the second one or later.
The target station behaves as follows:
- Upon the initial reception of the SEND instruction message, the corresponding bit in the RECV instruction execution request area (address: 205) of the buffer memory turns ON.
- Executing the RECV instruction generates a C1A6H error, by which the corresponding bit in the RECV instruction execution request area (address: 205) cannot be turned OFF.
- The RECV instruction generates an interrupt, however, the instruction is not be executed.

＊3 On the local station, the SEND instruction is completed normally.
On the target station, execution of the RECV instruction generates a 4001H error and turns OFF the corresponding bit in the RECV instruction execution request area (address: 205).
Check the send data length (1 to 480 words) and execute the SEND instruction.

<When the target station is a network module>

Local station (SEND)	Target station (RECV/RECVS)			Target station (RECV)
	Q series CC-Link IE controller network module	Q series MELSECNET/H network module		QnA series MELSECNET/10 network module (480 words)
		Function version B, D (960 words)	Function version A (489 words)	
1 to 480 words	○	○	○	○
481 to 960 words	○	○	×	×

○: Performs the processing normally.
×: Terminates abnormally and returns an error code to the request source.

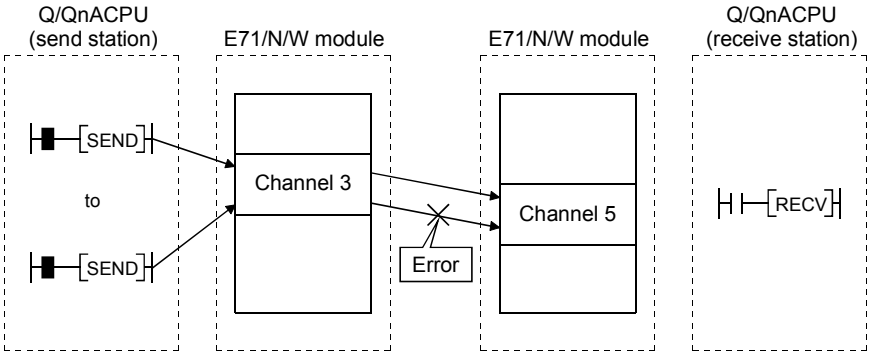
POINT

(1) The send data storage device (S2) requires a continuous free area equal to or greater than the send data length ((S1) + 9) (maximum of 960 words).

(2) In order to increase the reliability of the data, it is recommended to execute the instruction by setting the execution type to "With arrival confirmation" when a number from one to 120 is designated for the target station number.
When 81H to A0H or FFH is designated for the target station number, the instruction should be executed by setting the execution type to "No arrival confirmation."

(3) When sending data to the same channel of the receive station, do so after the receive station reads data using the RECV instruction.
If the communication itself is normally completed when the execution type is set to "No arrival confirmation," the send is considered normally completed on the send station even if the contents of the send data are abnormal.
In addition, even if the contents of the send data are normal, when the instruction is executed to the same station from multiple stations, a timeout error (C083H) will occur on the send station.

(4) When the execution type is set to "With arrival confirmation," if the send station sends data to the same channel of the receive station before the receive station reads data using the RECV instruction, a buffer full-error will occur on the send station side.

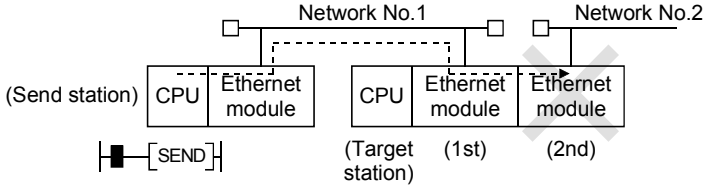


(5) Designate the target station sending data with the network No. and station No. of the network module or Ethernet module receiving the request from the send station.

* In the diagram below, designate the network No. and station No. of the first Ethernet module.

The SEND instruction cannot be executed if a network module or Ethernet module other than the one receiving the request from the send station is designated.

* In the diagram below, the SEND instruction cannot be executed if the network No. and station No. of the second Ethernet module is designated.



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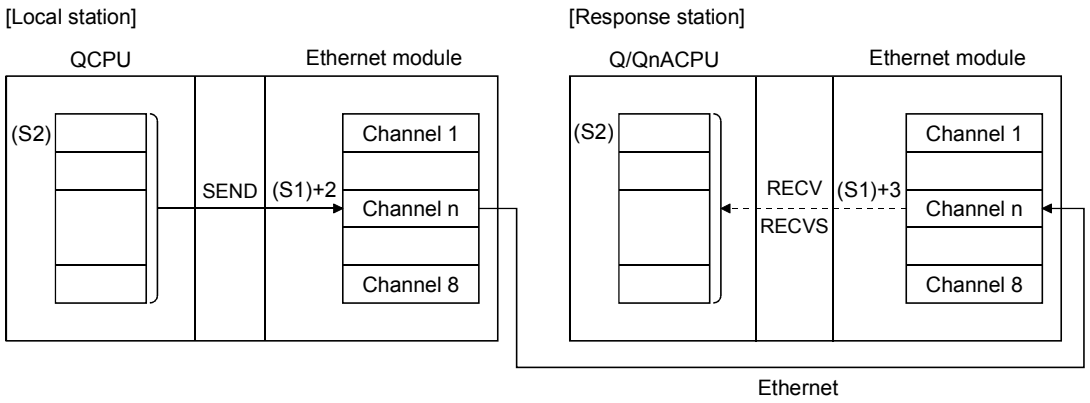
Functions

(1) This instruction sends data stored in the devices designated with the local station's (S2) to the station designated with the target station network number and target station number in the control data. The target station must be connected to a CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet network system.
The sent data is stored in the channel set with the target station's (S2).
Use the RECV/RECVS instruction when reading the data sent on the target station.
When data sending to the target station number is completed, the completion device designated in (D) turns on.



(2) Data can be sent to stations connected to either the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet networks having the designated numbers, in addition to stations connected to the local station's network.

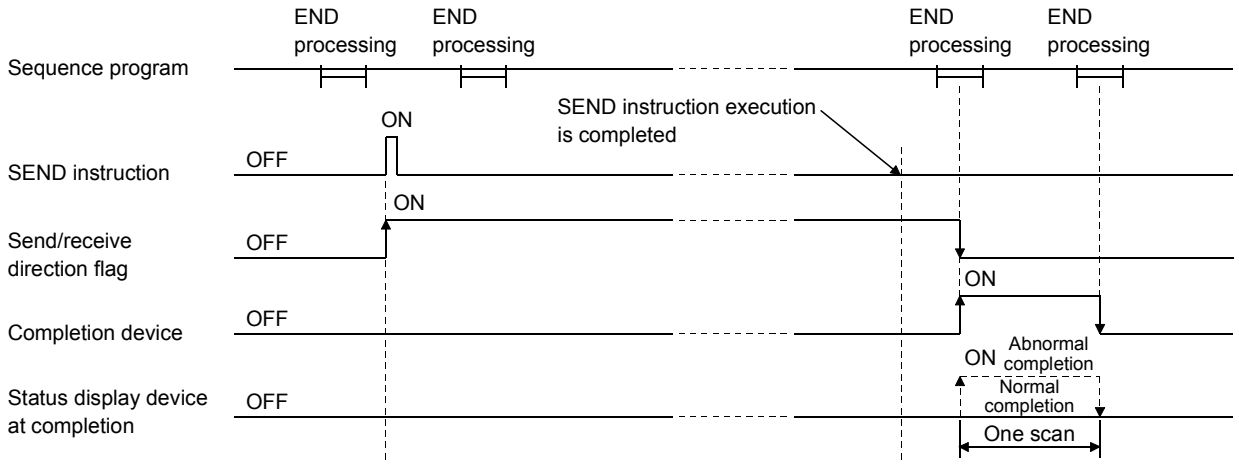
(3) The data link instruction and instructions for the Ethernet network system cannot be executed at two or more locations for the same channel.
If the execution conditions are met at two or more locations at the same time, instructions to be executed later have to wait until the channel becomes available because handshaking is automatically performed at the execution of the first instruction.

(4) Whether the SEND instruction is being executed or has been completed normally or abnormally can be checked with the completion device (D2) or completion status display flag ((D2) + 1) designated in the set data.

(a) Completion device (D2)
Turns on at the END processing of the scan where the SEND instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D2) + 1)
Turns on and off depending on the completion status of the SEND instruction.
Normal completion : Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the SEND instruction is completed, and turns off at the next END processing.

[Operation of the local station when the SEND instruction is being executed]



(5) When the instruction is executed using JP.SEND/GP.SEND, the send processing is executed only once when the send instruction flag switches from off to on (at rise).

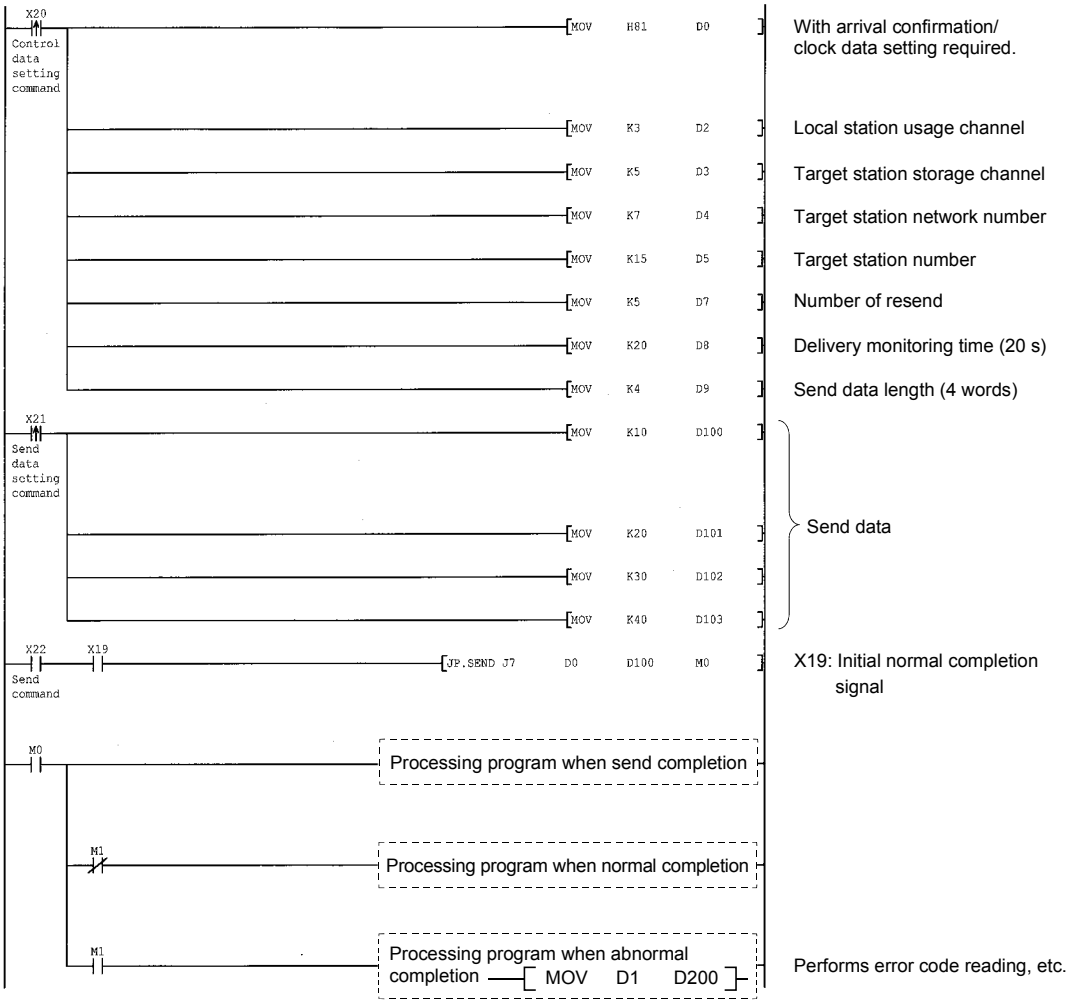
Errors

(1) When a dedicated instruction completes abnormally, the abnormal completion signal (D) + 1 turns on and the error code is stored in the completion status (S1) + 1.
See the following manuals regarding the error code, check the errors and take corrective actions.
<Error codes>
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)
C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

The following example shows a program that sends data to channel 5 of station number 15.

When I/O signals of the Ethernet module are X/Y00 to X/Y1F



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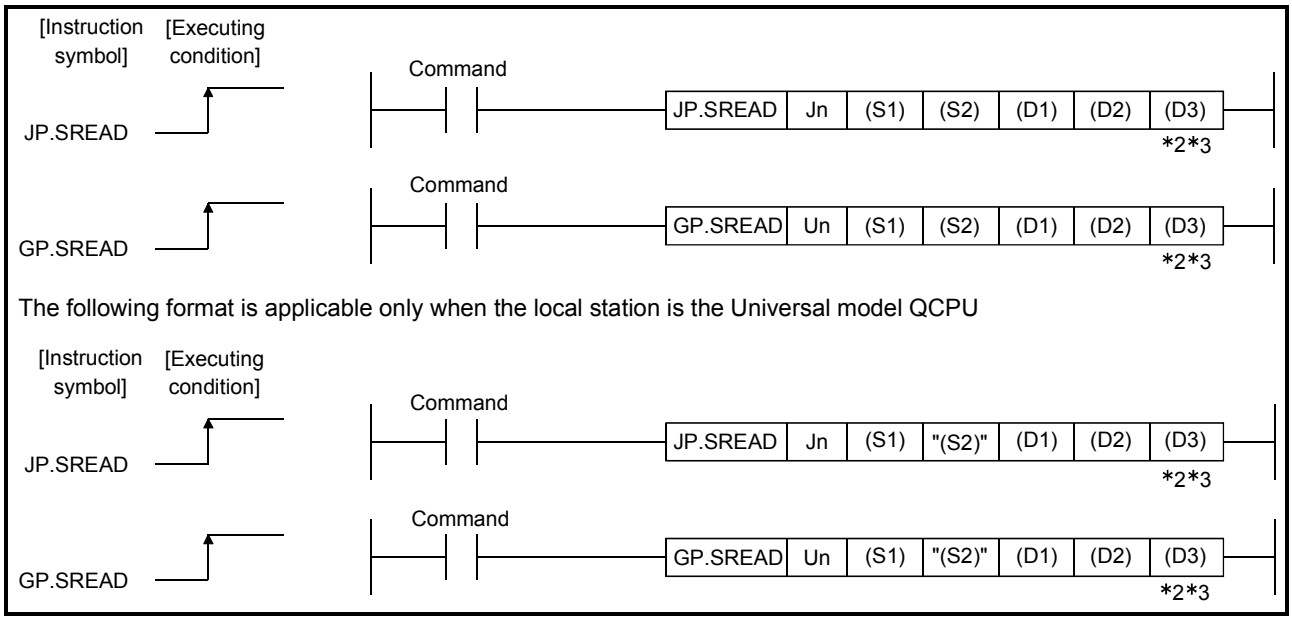
6.10 JP/GP.SREAD

This instruction reads data in word devices of other stations.

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(S2)	—	○ *1		—					
(D1)	—	○		—					
(D2)	○			—					
(D3)	○			—					

*1 T, C, D, W, ST, SD, or SW can be used.



*2 The SREAD instruction can be programmed without argument (D3). However, in such a case, the operation is identical to the READ instruction. With the SREAD instruction, different operations are available depending on whether (D3) is omitted or not.

*3 When the target station is a Basic model QCPU or safety CPU, the read notification device set as argument (D3) for the target station is ignored. (Same operation as with the READ instruction)

Setting data

Set data	Description	Set by	Data type
Jn	Network number of the local station (1 to 239, 254) 254: The network designated by the valid module during other station access.	User	Binary 16 bits
Un	Start I/O signal of the local station's Ethernet module. (00 to FE$_H$: The higher 2 digits of the 3-digit I/O signal.)		
(S1)	Head device of the local station that stores the control data.	User, system	Device name
(S2)	Head device of the target station from which data is read.	User	
(D1)	Head device of the local station that stores data read.	System	
(D2)	Local station device that is turned on for one scan by the completion of the instruction. (D2) + 1 is turned on if the instruction execution completes abnormally.		Bit
(D3)	Device of the target station that is turned on for one scan by completion of the instruction. (Read notification device)		

The local devices and the file register for each program cannot be used as devices used in setting data.

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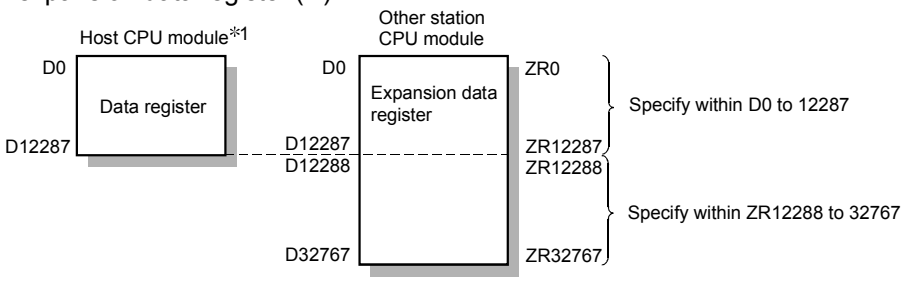
POINT

(1) The SREAD instruction can be executed only when the target station is Q/QnACPU.
(The SREAD instruction cannot be executed for an ACPU connected to the MELSECNET/10 or Ethernet network systems.)
Thus, the target station numbers should be limited to Q/QnACPU station numbers.

(2) When reading data from the other station CPU module device with the SREAD instruction, specify the device within the range applicable to the host station CPU module.
(Head device number to be read in other station CPU module (S2)) + (number of read points -1)
≤ (last device number of host station CPU module ∗)
∗: Last device number in host station CPU module having the same device name as (S2).

(3) Use the file register (ZR) when specifying the expansion data register (D) or the expansion link register (W) that are out of area of the data register (D) or the link register (W) on the host CPU module respectively. (excluding the Universal model QCPU)
For calculating a area for the file regisger (ZR), refer to QCPU User's Manual (Function Explanation, Program Fundamentals).
(Example) When not assigning the data register (D) of the other station CPU module, or assigning all of the 32K points of the file register (ZR) to the expansion data register (D).



∗1 File register with 32K points or more is required for the host CPU.

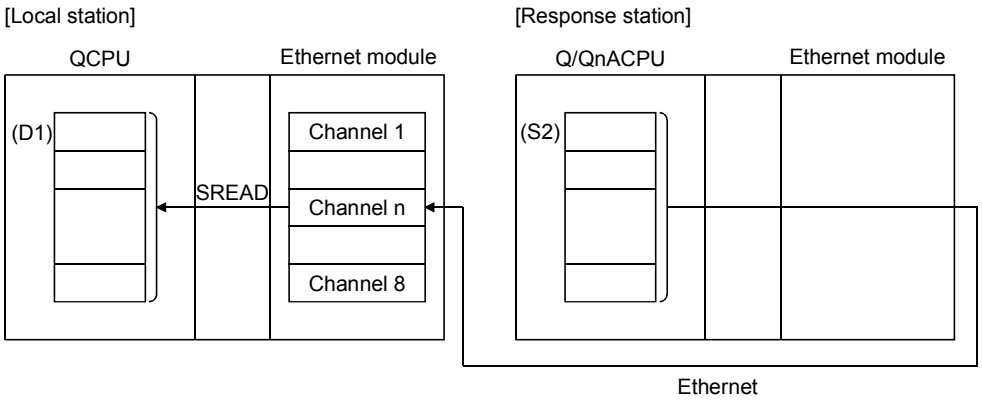
Control data

See Section 6.4 for information about how to handle the control data of the SREAD instruction when reading from the word device memory of other station. The control data should be handled in the same way as when reading the word device memory using the READ instruction. Thus, this section omits its explanation.

∗ The number of steps for the SREAD instruction is 10.

Functions

(1) This instruction reads the designated word device data of the station designated with the target station network number and target station number in the control data. The station must be connected to a CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet network system.
When reading the device data from other station is completed, the completion device designated in (D2) turns on.
Also, when sending the device data designated in (S2) is completed, the device on other station designated in (D3) turns on.



(2) Device data can be read from stations connected to either the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet networks having the designated numbers, in addition to stations connected to the local station's network.

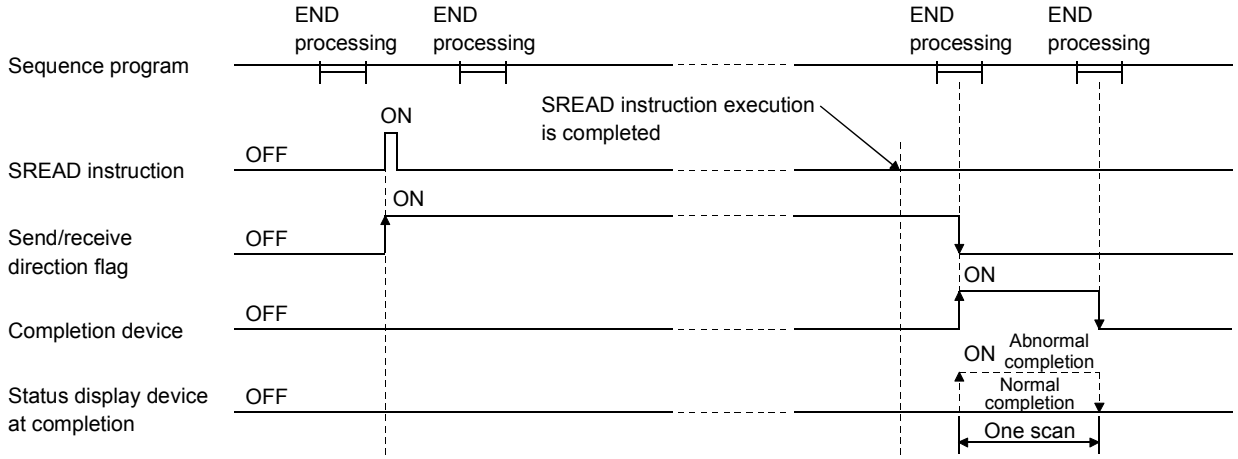
(3) The data link instruction and instructions for the Ethernet network system cannot be executed at two or more locations for the same channel.
If the execution conditions are met at two or more locations at the same time, instructions to be executed later have to wait until the channel becomes available because handshaking is automatically performed at the execution of the first instruction.

(4) Whether the SREAD instruction is being executed or has been completed normally or abnormally can be checked with the send/receive instruction flag corresponding to the channel used, completion device (D2), or completion status display flag ((D2) + 1) designated in the set data.

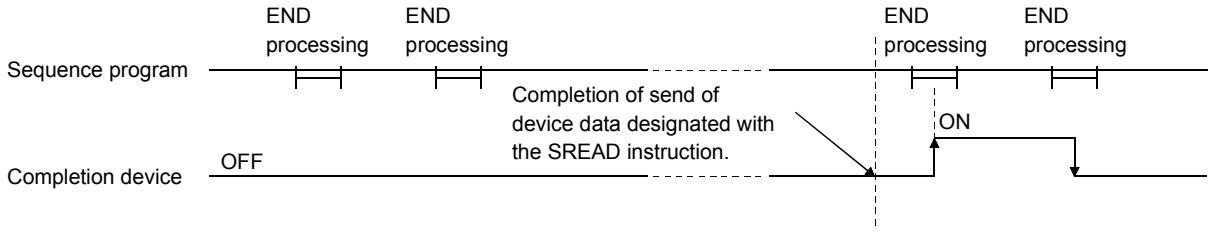
(a) Completion device (D2)
Turns on at the END processing of the scan where the SREAD instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D2) + 1)
Turns on and off depending on the completion status of the SREAD instruction.
Normal completion : Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the SREAD instruction is completed, and turns off at the next END processing.

[Operation of the local station when the SREAD instruction is being executed]



[Operation of the other station when the SREAD instruction is being executed]



(5) When the instruction is executed using J.SREAD/G.SREAD, the next read processing is executed in succession after one read processing is completed while the read command is on.
When the instruction is executed using JP.SREAD/GP.SREAD, the read processing is executed only once when the read command switches from off to on (at rise).

Errors

(1) When a dedicated instruction ends with an error, the abnormal completion signal (D2) + 1 turns on and the error code is stored in the completion status (S1) + 1. See the following manuals regarding the error code, check the errors and take corrective actions.
<Error codes>
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)
C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

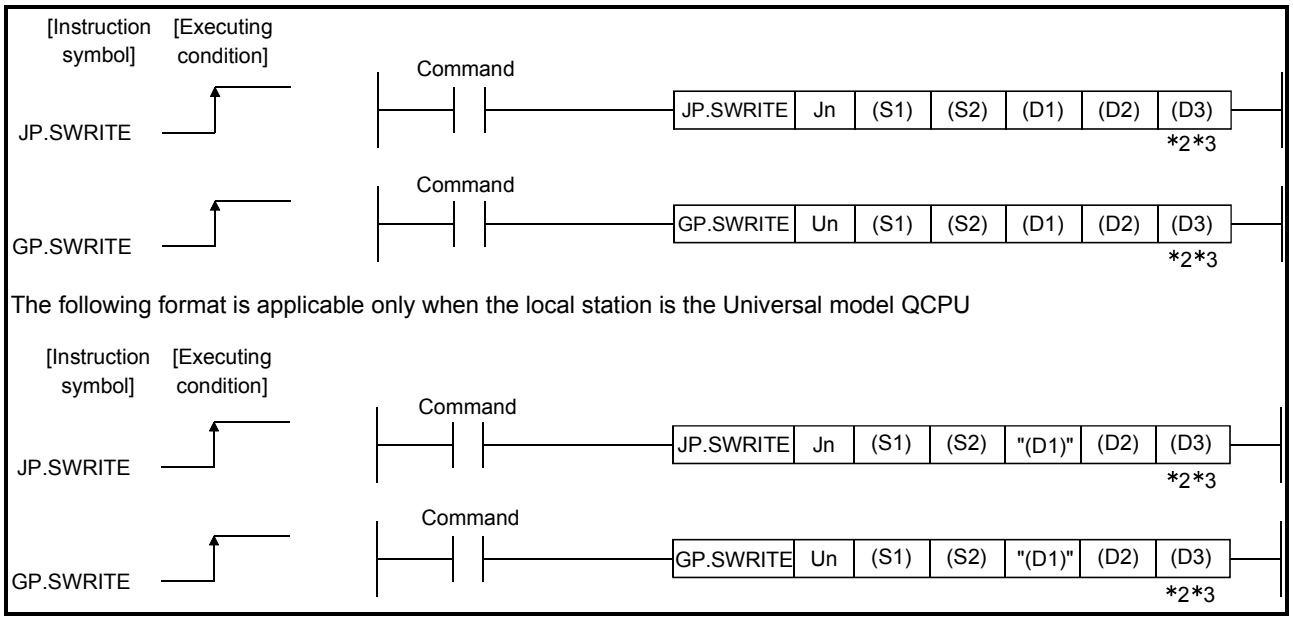
See the program example of the READ instruction described in Section 6.4. The SREAD instruction only differs from the READ instruction on one point, namely that the read notification device (D3) is designated at the end of arguments.

6.11 JP/GP.SWRITE

This instruction writes data to word devices of other stations.

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(S2)	—	○		—					
(D1)	—	○ *1		—					
(D2)	○			—					
(D3)	○			—					

*1 T, C, D, W, ST, SD or SW can be used.
For SD/SW, data can be written within the setting range allowed for the user.
For details on SD/SW, refer to the manual for the programmable controller CPU or network module of the target station.



*2 The SWRITE instruction can be programmed without argument (D3).
However, in such a case, the operation is identical to the WRITE instruction.
With the SWRITE instruction, different operations are available depending on whether (D3) is omitted or not.

*3 When the target station is a Basic model QCPU or safety CPU, the write notification device set as argument (D3) for the target station is ignored. (Same operation as with the WRITE instruction)

Setting data

Set data	Description	Set by	Data type
Jn	Network number of the local station (1 to 239, 254) 254: The network designated by the valid module during other station access.	User	Binary 16 bits
Un	Start I/O signal of the local station's Ethernet net module. (00 to FE: The higher 2 digits of the 3-digit I/O signal.)		
(S1)	Head device of the local station that stores the control data.	User, system	Device name
(S2)	Head device of the local station that stores data to be written.	User	
(D1)	Head device of the target station to which data is written.		
(D2)	Local station device that is turned on for one scan by the completion of the instruction. (D2) + 1 is turned on if the instruction execution completes abnormally.	System	Bit
(D3)	Device of the target station that is turned on for one scan by the completion of the instruction. (Write notification device)		

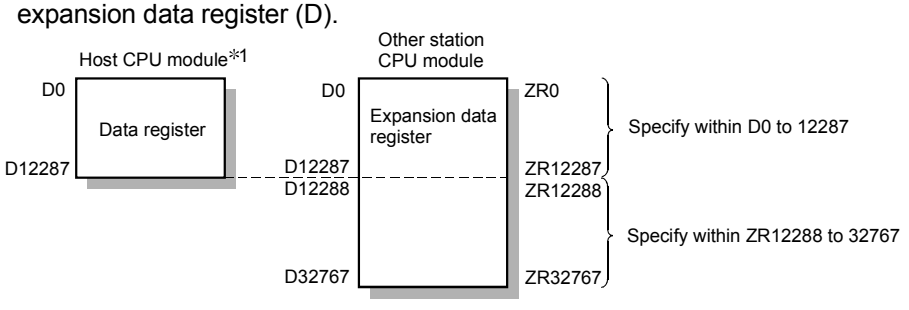
The local devices and the file register for each program cannot be used as devices used in setting data.

POINT

(1) The SWRITE instruction can be executed only when the target station is a Q/QnACPU.
(The SWRITE instruction cannot be executed for an ACPU connected to the MELSECNET/10 or Ethernet network system.) Thus, the target station number should be limited to the Q/QnACPU station numbers.

(2) When writing data from the other station CPU module device with the SWRITE instruction, specify the device within the range applicable to the host station CPU module.
(Head device number to be write in other station CPU module (D1)) + (number of write points -1)
≤ (last device number of host station CPU module ∗)
∗: Last device number in host station CPU module having the same device name as (D1).

(3) Use the file register (ZR) when specifying the expansion data register (D) or the expansion link register (W) that are out of area of the data register (D) or the link register (W) on the host CPU module respectively. (excluding the Universal model QCPU)
For calculating a area for the file regisger (ZR), refer to QCPU User's Manual (Function Explanation, Program Fundamentals).
(Example) When not assigning the data register (D) of the other station CPU module, or assigning all of the 32K points of the file register (ZR) to the expansion data register (D).



∗1 File register with 32K points or more is required for the host CPU.

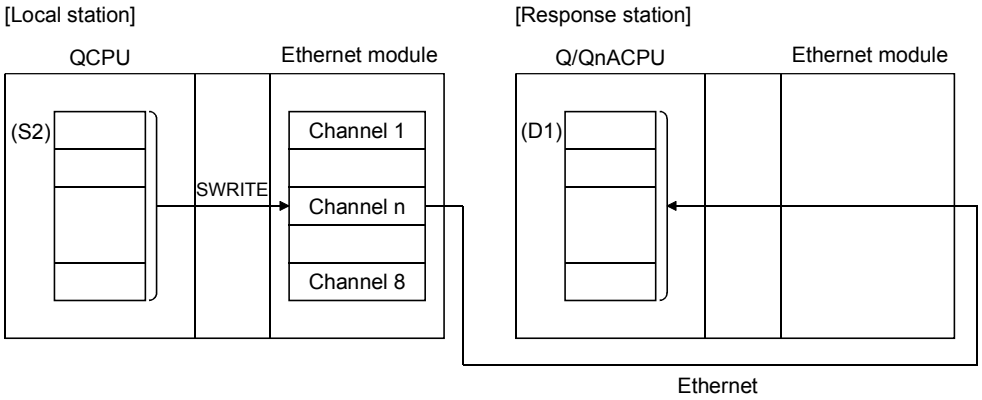
Control data

See Section 6.12 for information about how to handle the control data of the SWRITE instruction when writing to the word device memory of other station. The control data should be handled is the same as when writing to the word device memory using the WRITE instruction. Thus, this section omits its explanation.

* The number of steps for the SWRITE instruction is 11.

Functions

(1) This instruction writes data in the device designated in (S2) and succeeding devices of the local station to the word devices of the station, which is connected to either the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet, that is designated with the target station network number and target station number in the control data.
When writing device data from other station number is completed, the completion device designated in (D2) turns on.
Also , when writing the device data designated in (S2) is completed, the device on the other station designated in (D3) turns on.



(2) Device data can be written to stations connected to either the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet networks having the designated numbers, in addition to stations connected to the local station's network.

(3) The data link instruction and instructions for the Ethernet network system cannot be executed at two or more locations for the same channel.
If the execution conditions are met at two or more locations at the same time, instructions to be executed later have to wait until the channel becomes available because handshaking is automatically performed at the execution of the first instruction.

(4) Whether the SWRITE instruction is being executed or has been completed normally or abnormally can be checked with the send/receive instruction flag corresponds to the channel used, completion device (D2), or completion status display flag ((D2) + 1) designated in the set data.

(a) Completion device (D2)
Turns on at the END processing of the scan where the SWRITE instruction is completed, and turns off at the next END processing.

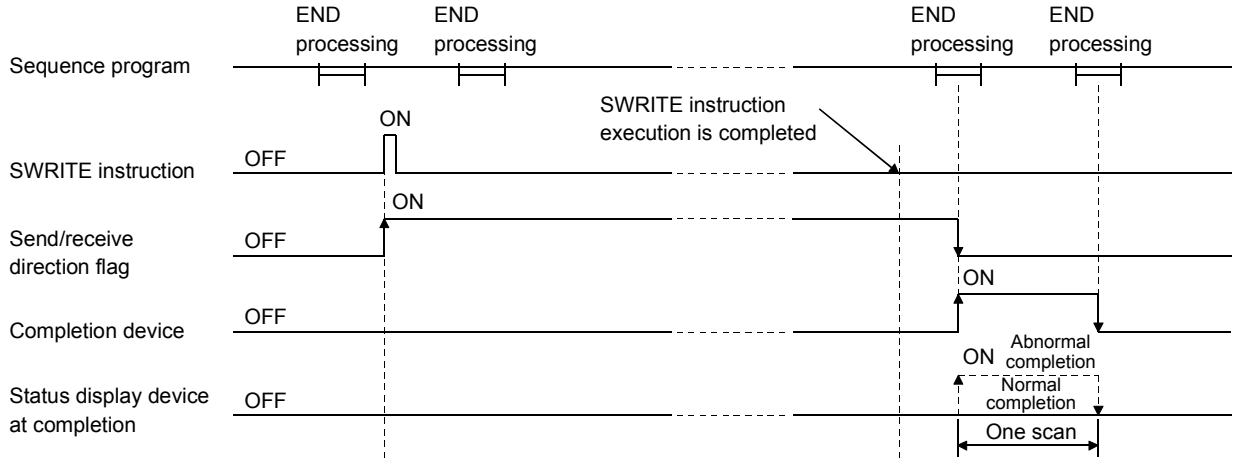
(b) Status display device at completion ((D2) + 1)

Turns on and off depending on the completion status of the SWRITE instruction.

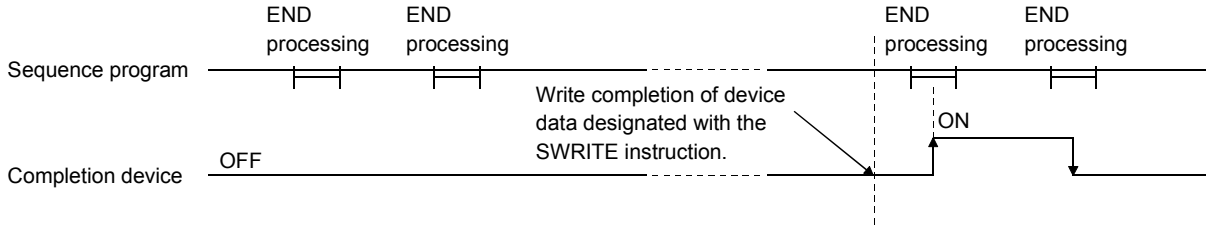
Normal completion : Stays off and does not change.

Abnormal completion: Turns on at the END processing of the scan where the SWRITE instruction is completed, and turns off at the next END processing.

[Operation of the local station when the SWRITE instruction is being executed]



[Operation of the other station when the SWRITE instruction is being executed]



(5) When the instruction is executed using J.SWRITE/G.SWRITE, the next read processing is executed in succession after one read processing is completed while the read command is on.

When the instruction is executed using JP.SWRITE /GP.SWRITE, the read processing is executed only once when the read command switches from off to on (at rise).

Errors

(1) When a dedicated instruction ends with an error, the abnormal completion signal (D2) + 1 turns on and the error code is stored in the completion status (S1) + 1. See the following manuals regarding the error code, check the errors and take corrective actions.

<Error codes>

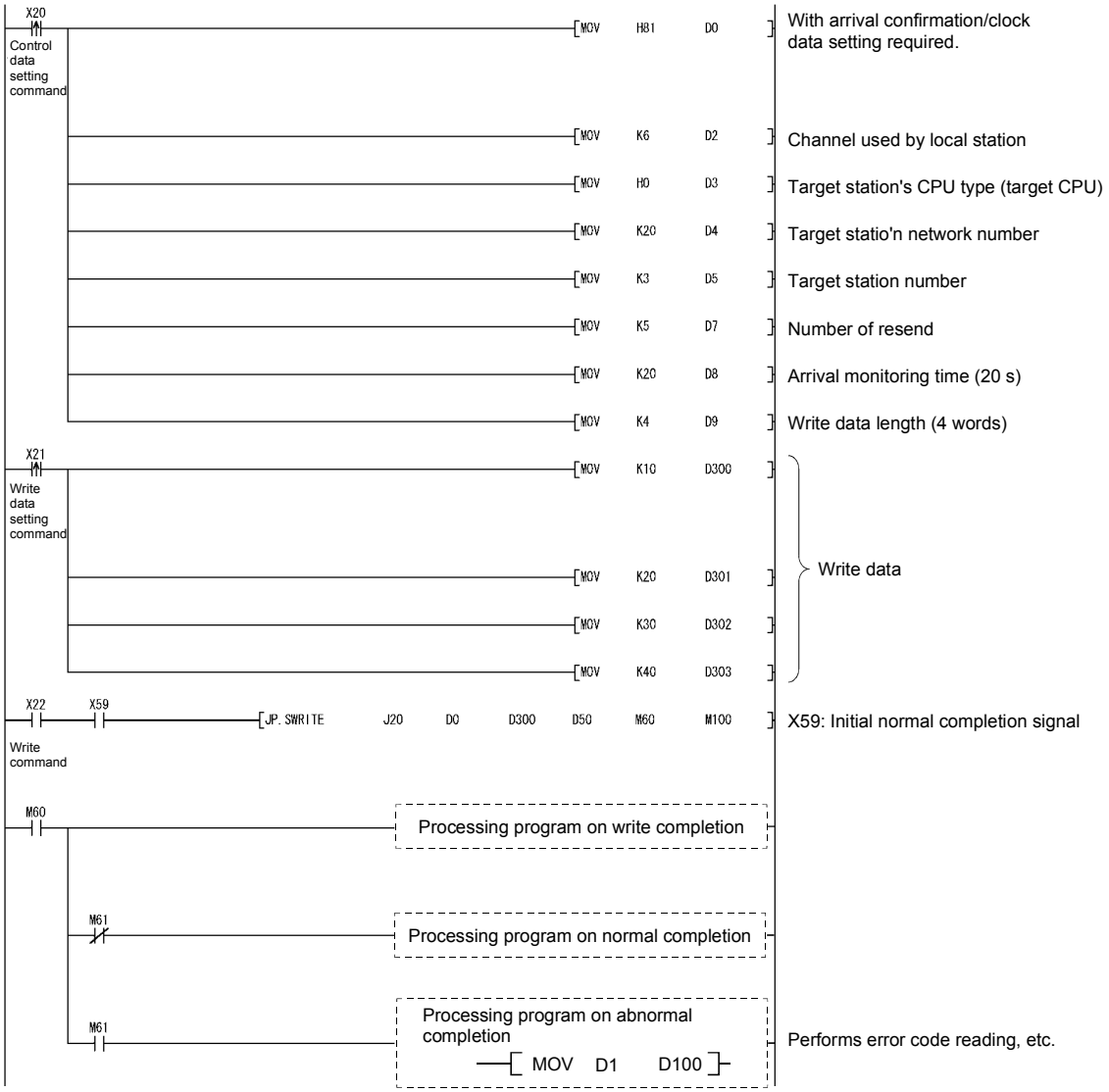
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)

C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

The following example shows a program that writes the data stored in D300 to 303 to D50 to 53 of station number 3

When I/O signals of the Ethernet module are X/Y40 to X/Y5F

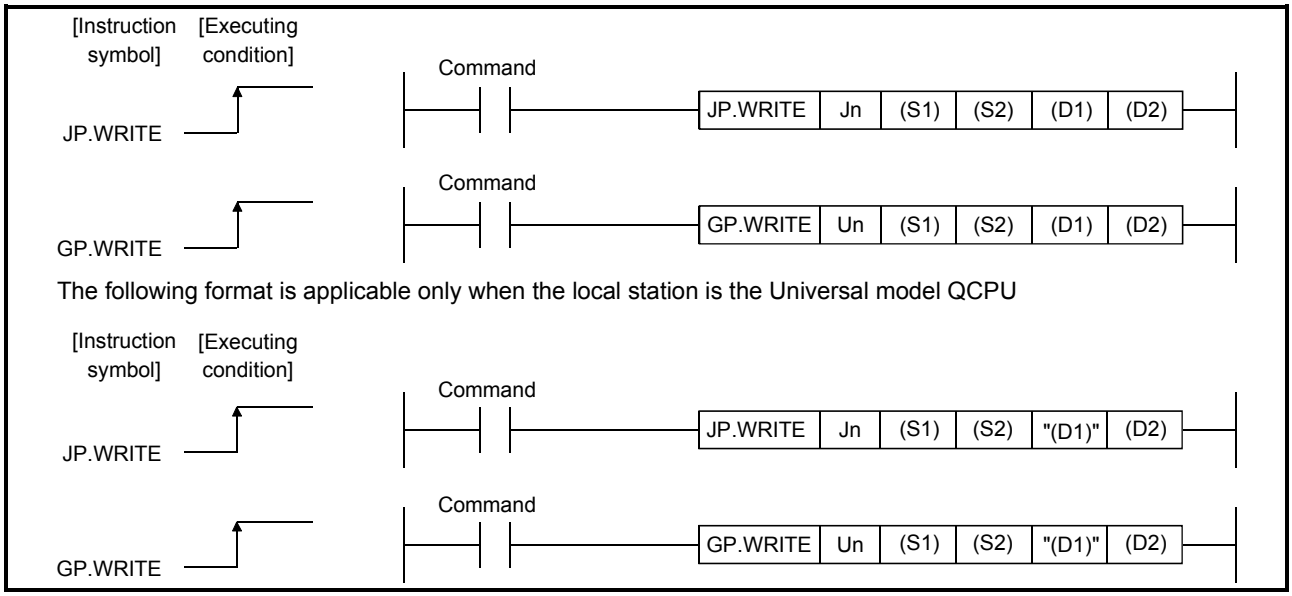


6.12 JP/GP.WRITE

This instruction writes data to word devices of other stations.

Set data	Applicable device									
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H	Others
	Bit	Word		Bit	Word				
(S1)	—	○		—					
(S2)	—	○		—					
(D1)	—	○ *1		—					
(D2)	○			—					

*1 T, C, D, W, ST, SD or SW can be used.
For SD/SW, data can be written within the setting range allowed for the user.
For details on SD/SW, refer to the manual for the programmable controller CPU or network module of the target station.



Setting data

Set data	Description	Set by (*1)	Data type
Jn	Network number of the local station (1 to 239, 254) 254: The network designated by the valid module during other station access.	User	Binary 16 bits
Un	Start I/O signal of the local station's Ethernet module. (00 to FE$_H$: The higher 2 digits of the 3-digit I/O signal)		
(S1)	Head device of the local station that stores the control data.	User, system	Device name
(S2)	Head device of the local station that stores data to be written.	User	
(D1)	Head device of the target station to which data is written.		
(D2)	Local station device that is turned on for one scan by the completion of the instruction. (D2) + 1 is turned on if the instruction execution completes abnormally.	System	Bit

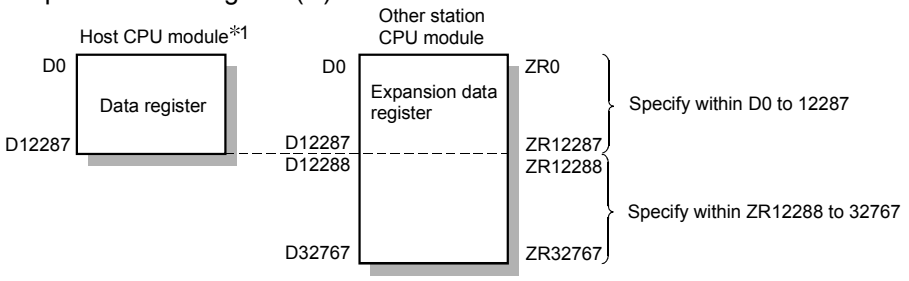
The local devices and the file register for each program cannot be used as devices used in setting data.

POINT

(1) The WRITE instruction can be executed only when the target station is the Q/QnACPU.
(The WRITE instruction cannot be executed for an ACPU connected to the MELSECNET/10 or Ethernet network systems.)
Thus, the target station numbers should be limited to Q/QnACPU station numbers.

(2) When writing data from the other station CPU module device with the WRITE instruction, specify the device within the range applicable to the host station CPU module.
(Head device number to be write in other station CPU module (D1)) + (number of write points -1)
≤ (last device number of host station CPU module ＊)
＊ : Last device number in host station CPU module having the same device name as (D1).

(3) Use the file register (ZR) when specifying the expansion data register (D) or the expansion link register (W) that are out of area of the data register (D) or the link register (W) on the host CPU module respectively. (excluding the Universal model QCPU)
For calculating a area for the file regisger (ZR), refer to QCPU User's Manual (Function Explanation, Program Fundamentals).
(Example) When not assigning the data register (D) of the other station CPU module, or assigning all of the 32K points of the file register (ZR) to the expansion data register (D).



＊1 File register with 32K points or more is required for the host CPU.

REMARKS

The number of steps for the WRITE instruction is 10.

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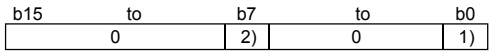
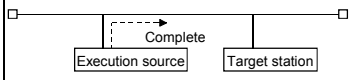
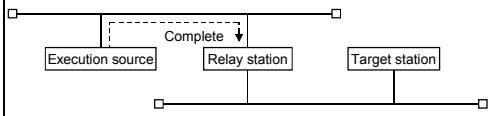
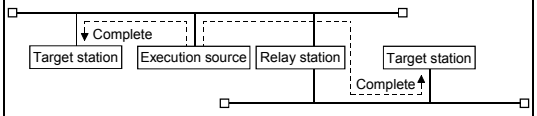
Control data

<table>
<tr><th>Device</th><th>Item</th><th>Set data</th><th>Setting range</th><th>Set by (＊1)</th></tr>
<tr><td>(S1) + 0</td><td>Execution/abnormal complete type</td><td>


1) Execution type (bit 0)
0: No arrival confirmation
When the target station is on the same network:
Completed when the data is sent from the local station.


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 data is written to the target station.


2) Abnormal complete type (bit 7)
Designate whether the clock data setting is required or not at abnormal completion.
0: Clock data setting not required:
Clock data at error occurrence is not stored in (S1) + 11 to (S1) + 17.
1: Clock data setting required
Clock data at error occurrence is stored in (S1) + 11 to (S1) + 17.</td><td>0001_H
0081_H</td><td>User</td></tr>
<tr><td>(S1) + 1</td><td>Completion status</td><td>Stores the status at the completion of the instruction.
0 : Normal
Other than 0: Abnormal (error code) (＊2)</td><td>—</td><td>System</td></tr>
<tr><td>(S1) + 2</td><td>Channel used by the local station</td><td>Set the channel used by the local station.
1 to 8 (channel)</td><td>1 to 8</td><td>User</td></tr>
<tr><td>(S1) + 3</td><td>Target station's CPU type (＊3)</td><td>Specify the CPU type on the target station.
<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>0000_H</td><td>Single CPU or CPU in the system directly connected to the local station (Same as "$03FF_H$")</td></tr>
<tr><td>$03D0_H$</td><td>Control system CPU (＊5)</td></tr>
<tr><td>$03D1_H$</td><td>Standby system CPU (＊5)</td></tr>
<tr><td>$03D2_H$</td><td>System A CPU</td></tr>
<tr><td>$03D3_H$</td><td>System B CPU</td></tr>
<tr><td>$03FF_H$</td><td>Single CPU or CPU in the system directly connected to the local station</td></tr>
</table></td><td>0000_H
$03D0_H$ to $03D3_H$
$03FF_H$</td><td>User</td></tr>
<tr><td>(S1) + 4</td><td>Target station network number</td><td>Designate the network number of the target station.
1 to 239: Network number
254 : When 254 is designated in Jn (The network designated by the valid module during other station access)</td><td>1 to 239, 254</td><td>User</td></tr>
</table>

(Continued to the next page)

Device	Item	Set data	Setting range	Set by (*1)
(S1) + 5	Target station number	Designate the target station. 1) Station number specification When local station is Universal model QCPU: 1 to 120 When local station is other than Universal model QCPUs: 1 to 64 2) Specific group 81_H to $A0_H$: All the station with the indicated group number (Can be set when the execution type designated in (S1) is "0: No arrival confirmation".) 3) All stations FF_H : All stations having the target network number (simultaneous broadcast): Excluding the local station (Can be set when the execution type designated in (S1) is "0: No arrival confirmation".)	1 to 120 81_H to $A0_H$ FF_H	User
(S1) + 6	—	(Fixed value)	—	—
(S1) + 7	Number of resend	Valid when the execution type designated in (S1) is "1: With arrival confirmation." 1) At instruction execution Set the number of resends when the instruction fails to complete within the monitoring time designated by (S1) + 8. 0 to 15 (Time) 2) At instruction completion Store the number of resends executed (result). 0 to 15 (Time)	0 to 15	User system
(S1) + 8	Arrival monitoring time	Valid when the execution type designated in (S1) is "1: With arrival confirmation." Set the monitoring time until the instruction completion equal to the TCP resend timer value or greater. When the instruction fails to complete within the monitoring time, it is resent for the number of resends designated in (S1) + 7. 0 to TCP resend timer value: The monitoring time is reset to the TCP resend timer value. (TCP resend timer value + 1) to 16383: Monitoring time (units: s).	0 to 16383	User
(S1) + 9	Write data length	Designate the number of write data in (S2) to (S2) + n. When writing to QCPU: 1 to 960 (Word) When writing to QnACPU: 1 to 480 (Word) (*6)	1 to 960	User
(S1) + 10	(Not used)	—	—	—
(S1) + 11	Clock set flag	Store the valid/invalid status of the clock data in (S1) + 12 to (S1) + 17. 0: Invalid 1: Valid	—	System
(S1) + 12	Clock data (set only when errors occur)	Higher 8 bits: month (01_H to 12_H), lower 8 bits : last 2 digits of year (00_H to 99_H)	—	System
(S1) + 13		Higher 8 bits: hour (00_H to 23_H), lower 8 bits : date (01_H to 31_H)		
(S1) + 14		Higher 8 bits: second (00_H to 59_H), lower 8 bits : minute (00_H to 59_H)		
(S1) + 15		Higher 8 bits: first 2 digits of year (00_H to 99_H), lower 8 bits : day of the week (00_H (Sunday) to 06_H (Saturday))		

(Continued to the next page)

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Device	Item	Set data	Setting range	Set by (*1)
(S1) + 16	Abnormal detection network number	Stores the network number of the station that detected an abnormality. (*4) 1 to 239 (Network number)	—	System
(S1) + 17	Abnormal detection station number	Stores the station number of the station that detected an abnormality. (*4) 1 to 120 (Station number)	—	

POINT

(1) The data written storage device (D1) requires a contiguous free area equal to or greater than the write data length ((S1) + 9) (maximum of 960 words).

(2) In order to increase the reliability of the function, it is recommended to execute the instruction by setting the execution type to "With arrival confirmation" when a number from one to 120 is designated for the target station number.
When 81H to A0H or FFH is designated for the target station number, the instruction should be executed by setting the execution type to "No arrival confirmation".

(3) When writing to a device of the same station from multiple stations, make sure that the timings of the write operations do not coincide.
If the communication itself is normally completed when the execution type is set to "No arrival confirmation," the send is considered normally completed on the write source station even if the contents of the send data are abnormal.
In addition, even if the contents of the send data are normal, when the instruction is executed to the same station from multiple stations, a timeout error (C083H) will occur on the write source station.

*1 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

*2 For a list of error codes, see Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

*3 It can be specified when the local station has an Ethernet module of function version D or later. (Not available for any other case. Access to the target CPU is required.)

*4 Nothing is stored if the execution source detects an error when receiving an instruction.

*5 When the WRITE instruction is executed to the redundant system with a control system or standby system CPU specified, the instruction may be unsuccessfully completed due to system switching occurred on the target station (error code: 4244H, 4248H).
If this has occurred, execute the WRITE instruction again.

*6 When data of more than 480 words is specified, a C084H error occurs on the local station.
Check the write data length (1 to 480 words) and execute the WRITE instruction.

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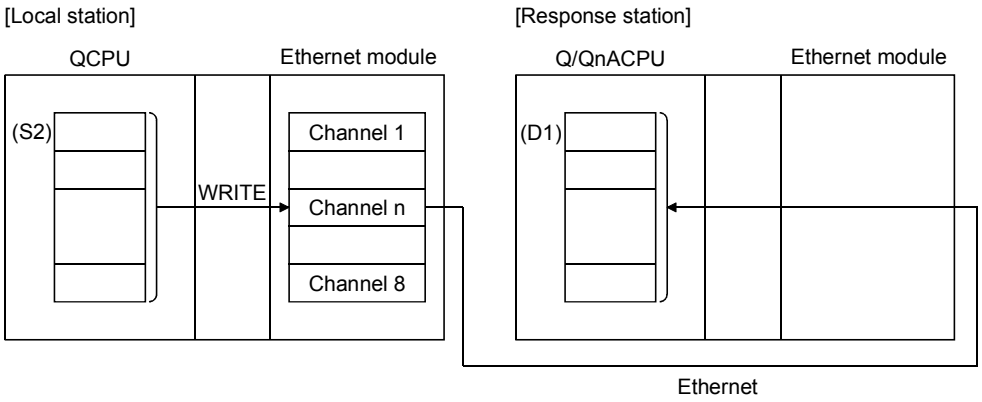
REMARKS

The allowable write data length ((S1)+9) of the WRITE instruction varies depending on the version. (See the User's Manual (Basic), Section 2.7.)
Specifying a length value outside the setting range will cause a 4101 error (OPERATION ERROR) on the local station.

Functions

(1) This instruction writes data for the device designated in (S2) of the local station and succeeding devices to the word devices of the station designated with the target station network number and target station number in the control data. The station must be connected to either a CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet network system.
When writing device data to other station number is completed, the completion device designated in (D2) turns on.



(2) Data can be written to stations connected to either the CC-Link IE controller network, MELSECNET/H, MELSECNET/10 or Ethernet networks having the designated numbers, in addition to stations connected to the local station's network.

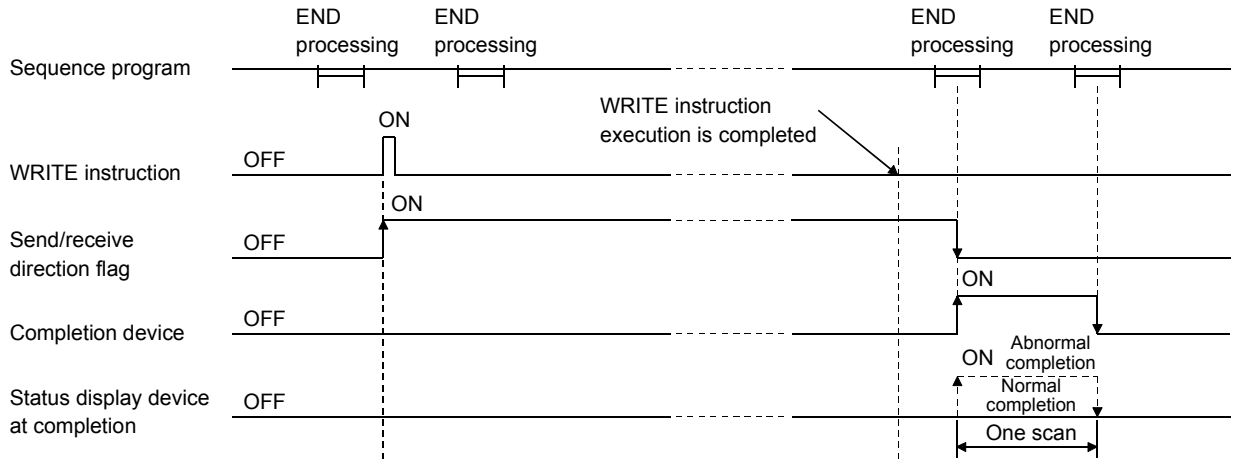
(3) The data link instruction and instructions for the Ethernet network system cannot be executed at two or more locations for the same channel.
If the execution conditions are met at two or more locations at the same time, instructions to be executed later have to wait until the channel becomes available because handshaking is automatically performed at the execution of the first instruction.

(4) Whether the WRITE instruction is being executed or has been completed normally or abnormally can be checked with the completion device (D2) or completion status display flag ((D2) + 1) designated in the set data.

(a) Completion device (D2)
Turns on at the END processing of the scan where the WRITE instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D2) + 1)
Turns on and off depending on the completion status of the WRITE instruction.
Normal completion : Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the WRITE instruction is completed, and turns off at the next END processing.

[Operation of the local station when the WRITE instruction is being executed]



(5) When the instruction is executed using J.WRITE/G.WRITE, the next write processing is executed in succession after one write processing is completed while the write command is on.
When the instruction is executed using JP.WRITE/GP.WRITE, the write processing is executed only once when the write command switches from off to on (at rise).

Errors

(1) When a dedicated instruction ends with an error, the abnormal completion signal (D2) + 1 turns on and the error code is stored in the completion status (S1) + 1.
See the following manuals regarding the error code, check the errors and take corrective actions.
<Error codes>
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)
C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

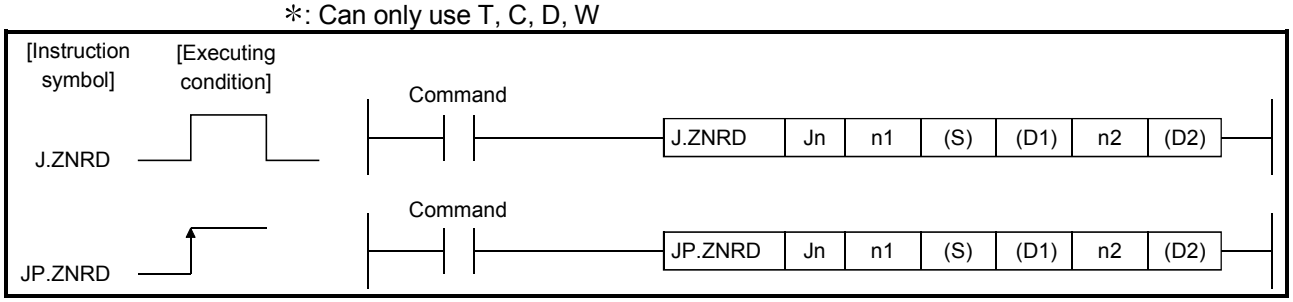
See the program example of the SWRITE instruction described in Section 6.11.
The SWRITE instruction only differs from the WRITE instruction on one point, namely that the write notification device (D3) is not designated at the end of arguments.

6.13 J(P).ZNRD

This instruction reads data from word devices of other stations (ACPU).

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H	Others
	Bit	Word		Bit	Word				
n1	—	○		—				○	—
(S)	—	○ (*)	—	—				—	—
(D1)	—	○		—				—	—
n2	○			—				○	—
(D2)	○			—				—	—

*: Can only use T, C, D, W



Setting data *1, *2

	Description	Setting range	Set by (*3)	Data type
Jn	Target station network number Designates the network number of the target station.	1 to 239	User	Binary 16 bits
n1	Target station number Designates the station number of the target station.	1 to 64 (Constant)		
(S)	Data read storage head device (target station) Designates the head device of the target station that stores data to be read.	—	—	Device name
(D1)	Data read storage head device (local station) Designates the head device of the local station that stores the data read.	—		

(Continued to the next page)

Setting data ∗1, ∗2

	Description	Setting range	Set by (∗3)	Data type
n2	Length of data read Designates the number of data (word count) to be read.	When reading from Q/QnA/AnUCPU 1 to 230 (Constant) When reading from programmable controller CPUs other than Q/QnA/AnUCPU 1 to 32 (Constant)	User	Binary 16 bits
(D2)	Read complete device (local station) Designate device that is turned on for one scan by the read completion (D2) off : Incomplete on: Complete (D2) + 1 off : Normal on: Abnormal	—	System	Bit

∗1 The local devices and the file register for each program cannot be used as the device used for the setting data.

∗2 In addition to the setting data, the ZNRD instruction is executed using the following fixed values.
Channel used by own station: Channel 1
Arrival monitoring time (monitoring time until instruction completion): 10 seconds
Number of resends for arrival monitoring timeout: 5 times

∗3 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

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POINT

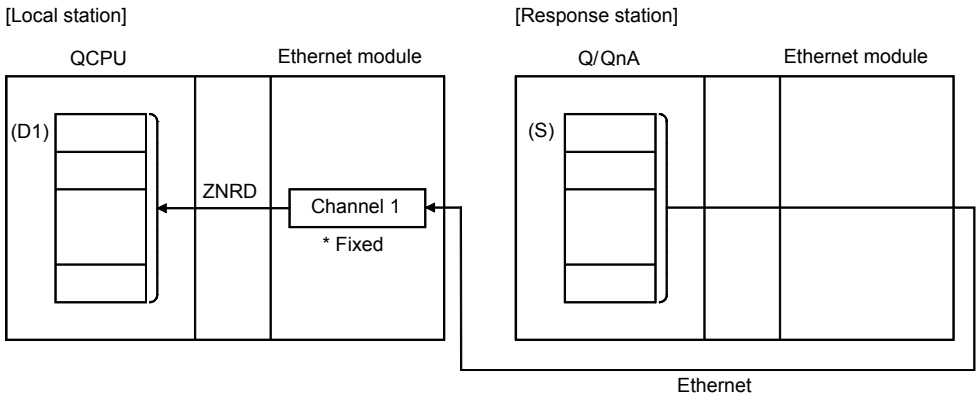
(1) The ZNRD instruction can be executed when the target station is a QCPU or QnACPU.
Access to an AnUCPU is available via MELSECNET/10.

(2) When reading data from the other station CPU module device with the ZNRD instruction, specify the device within the range applicable to the host station CPU module.
(Head device number to be read in other station CPU module (S)) + (number of read points -1)
< (last device number of host station CPU module ∗)
∗: Last device number in host station CPU module having the same device name as (S).

(3) The normal or abnormal read completion status is stored in the data link instruction execution result (ZNRD instruction) storage area (address: 207).
If the read completion device ((D2) + 1) is on due to abnormal end, read the error code stored in the area mentioned above and correct the error accordingly.

Functions

(1) This instruction reads n2 points of data from the word device of the connected station having the network number designated by Jn/n1 in the Ethernet network system.
When reading the device data is completed, the completion device designated in (D2) turns on



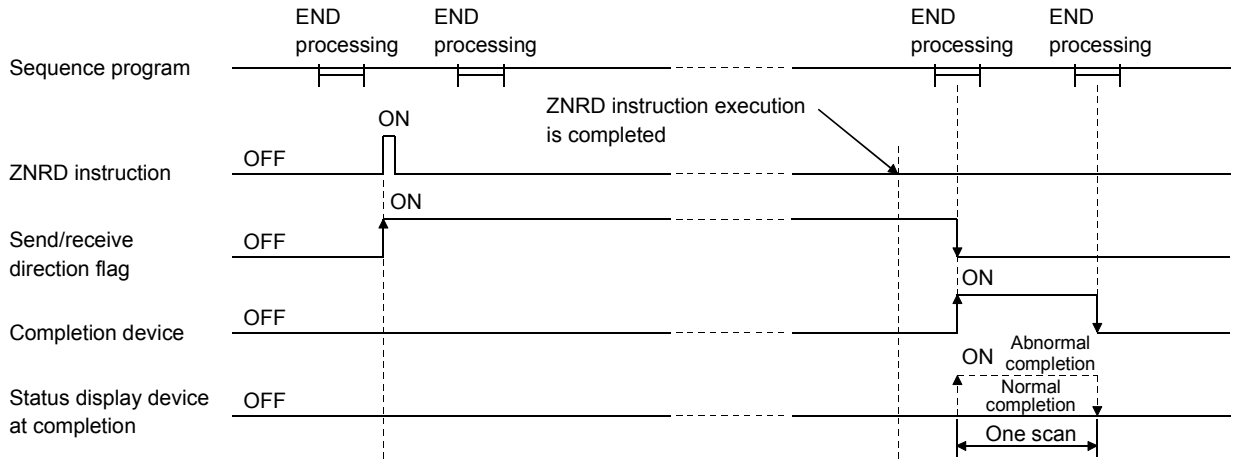
(2) The ZNRD instruction is executed using channel 1 (fixed).
The data link instructions and the Ethernet instructions cannot be executed from two or more stations at the same time on the same channel.
If the conditions of more than one instruction to be executed match at the same time, the instruction executed later is made to wait until the channel becomes available since handshaking is performed automatically.

(3) Whether the ZNRD instruction is currently being executed or has been completed normally or abnormally can be checked with the completion device (D2) designated in the set data.

(a) Completion device (D2)
Turns on at the END processing of the scan where the ZNRD instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D2) + 1)
Turns on and off depending on the completion status of the ZNRD instruction.
Normal completion : Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the ZNRD instruction is completed, and turns off at the next END processing.

[Operation of the local station when the ZNRD instruction is being executed]



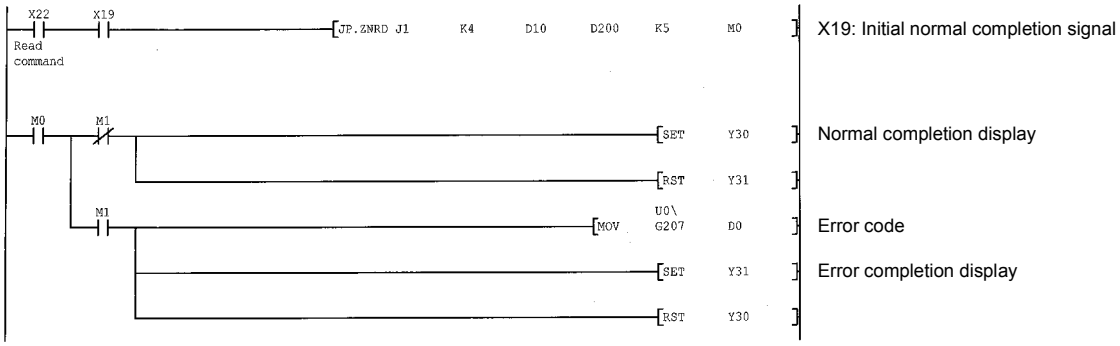
Errors

(1) When execution of a dedicated instruction ends with an error, the abnormal completion signal (D2)+1 turns ON and the result is stored in the data link instruction execution result (ZNRD instruction) storage area (address: 207) of the buffer memory.
See the following manuals regarding the error code, check the errors and take corrective actions.
<Error codes>
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)
C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

A program that reads the contents of D10 to 14 of station number 4 from D200 to 204 of station number 1.

When I/O signals of the Ethernet module are X/Y00 to X/Y1F

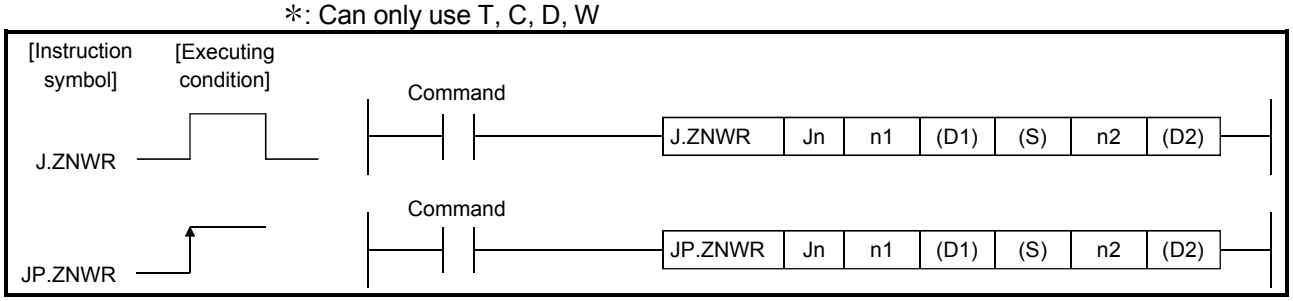


6.14 J(P).ZNWR

This instruction writes data to word devices of other stations (ACPU).

Set data	Applicable device								
	Internal device		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Zn	Constant K, H	Others
	Bit	Word		Bit	Word				
n1	—	○		—				○	—
(D1)	—	○ (*)	—	—				—	—
(S)	—	○		—				—	—
n2	○			—				○	—
(D2)	○			—				—	—

*: Can only use T, C, D, W



Setting data *1, *2

	Description	Setting range	Set by (*3)	Data type
Jn	Target station network number Designates the network number of the target station.	1 to 239	User	Binary 16 bits
n1	Target station number Designates the station number of the target station.	1 to 64 (Constant): The station with the corresponding station number 81_H to 89_H: All stations having the designated group number FF_H: All stations having the target network number		

(Continued to the next page)

Setting data ∗1, ∗2

	Description	Setting range	Set by (∗3)	Data type
(D1)	Data written storage head device (target station) Designate the head device of the target station to which data is written.	—	—	Device name
(S)	Data written storage head device (local station) Designate the head device of the local station that stores the data to be written.	—		
n2	Length of data written Designates the number of data (word count) to be written.	When writing to Q/QnA/AnUCPU 1 to 230 (Constant) When writing to programmable controller CPUs other than Q/QnA/AnUCPU 1 to 32 (Constant)	User	Binary 16 bits
(D2)	Write completion device (local station) Designate device that is turned on for one scan by the write completion. (D2) off : Incomplete on: Complete (D2) + 1 off : Normal on: Abnormal setting range	—	System	Bit

∗1 The local devices and the file register for each program cannot be used as the device used for the setting data.

∗2 In addition to the setting data, the ZNWR instruction is executed using the following fixed values.
Channel used by own station: Channel 2
Arrival monitoring time (monitoring time until instruction completion): 10 seconds
Number of resends for arrival monitoring timeout: 5 times

∗3 The "Set by" column indicates the following:
- User: Data is set by the user before executing a dedicated instruction.
- System: The programmable controller CPU stores the execution result of a dedicated instruction.

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POINT

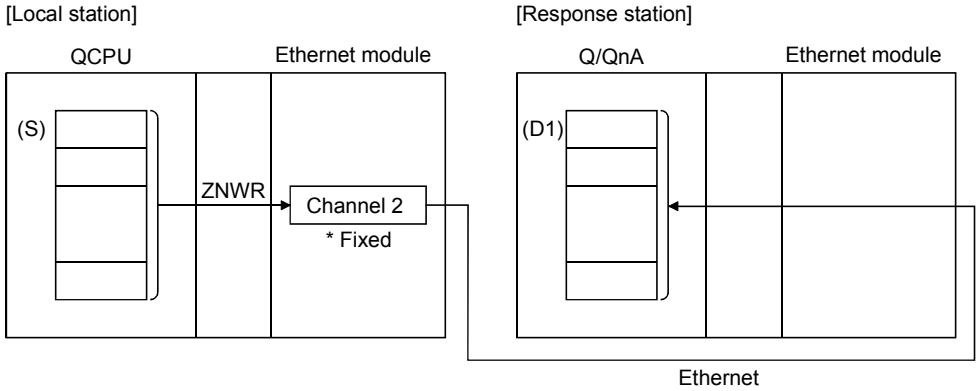
(1) The ZNWR instruction can be executed when the target station is a QCPU or QnACPU.
Access to an AnUCPU is available via MELSECNET/10.

(2) When writing data from the other station CPU module device with the ZNWR instruction, specify the device within the range applicable to the host station CPU module.
(Head device number to be write in other station CPU module (D1)) + (number of write points -1)
≤ (last device number of host station CPU module ∗)
∗: Last device number in host station CPU module having the same device name as (D1).

(3) The normal or abnormal write completion status is stored in the data link instruction execution result (ZNWR instruction) storage area (address: 209).
If the write completion device ((D2) + 1) is on due to abnormal end, read the error code stored in the area mentioned above and correct the error accordingly.

Functions

(1) This instruction write n2 points of data from the word device designated by (S) of the local station to the word device of the connected station having the network number designated by Jn/n1 in the Ethernet network system.
When writing the device data to the target station is completed, the completion device designated in (D2) turns on



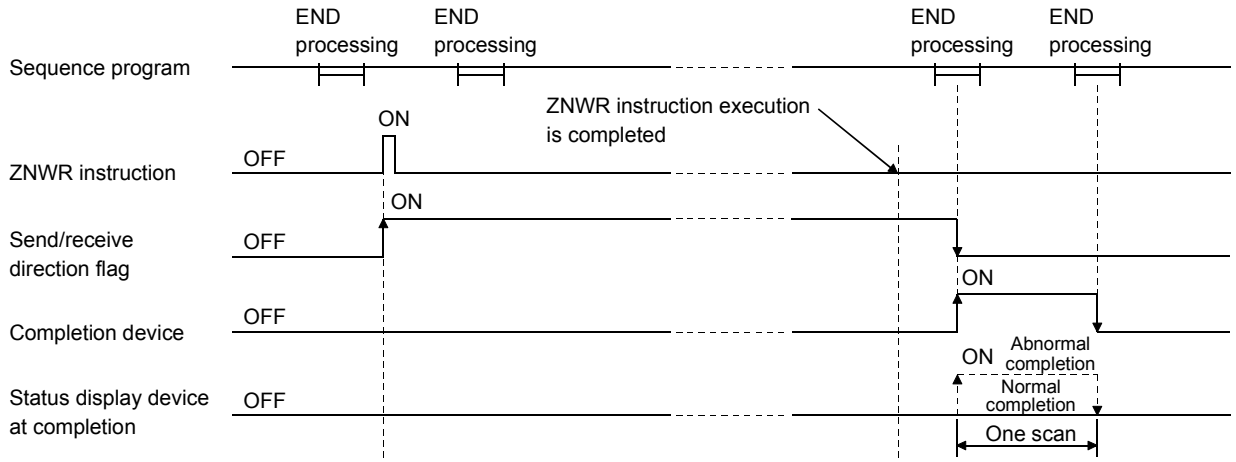
(2) The ZNWR instruction is executed using channel 2 (fixed).
The data link instructions and the Ethernet instructions cannot be executed from two or more stations at the same time on the same channel.
If the conditions of more than one instruction to be executed match at the same time, the instruction executed later is made to wait until the channel becomes available since handshaking is performed automatically.

(3) Whether the ZNWR instruction is currently being executed or has been completed normally or abnormally can be checked with the completion device (D2) designated in the set data.

(a) Completion device (D2)
Turns on at the END processing of the scan where the ZNWR instruction is completed, and turns off at the next END processing.

(b) Status display device at completion ((D2) + 1)
Turns on and off depending on the completion status of the ZNWR instruction.
Normal completion : Stays off and does not change.
Abnormal completion: Turns on at the END processing of the scan where the ZNWR instruction is completed, and turns off at the next END processing.

[Operation of the local station when the ZNWR instruction is being executed]



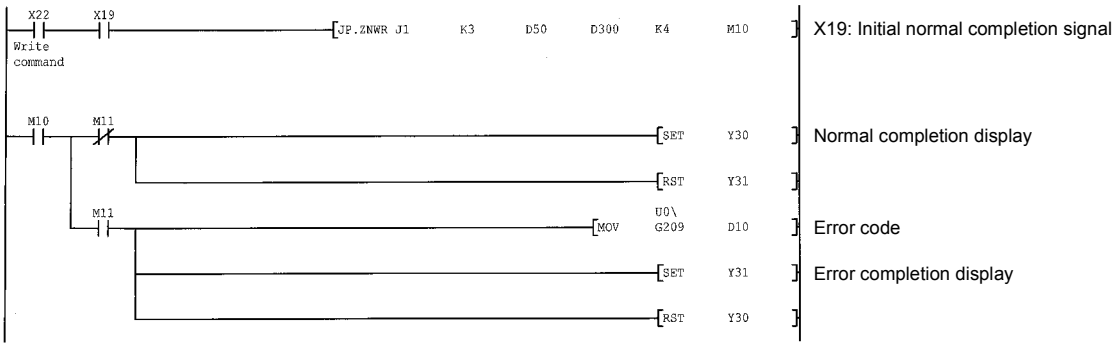
Errors

(1) When execution of a dedicated instruction ends with an error, the abnormal completion signal (D2)+1 turns ON and the result is stored in the data link instruction execution result (ZNWR instruction) storage area (address: 209) of the buffer memory.
See the following manuals regarding the error code, check the errors and take corrective actions.
<Error codes>
4FFF$_H$ or less : QCPU (Q Mode) User's Manual (Hardware Design, Maintenance and Inspection)
C000$_H$ or higher: Section 11.3.3 of the Q Corresponding Ethernet Interface Module User's Manual (Basic)

Program example

A program that writes the contents of D300 to 303 of station number 2 to D50 to 53 of station number 3.

When I/O signals of the Ethernet module are X/Y00 to X/Y1F



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WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.
However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not , compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

(1) In using the Mitsubishi MELSEC programmable 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 controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
(2) The Mitsubishi programmable 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 Public service purposes shall be excluded from the programmable controller applications.
In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.
However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

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SH(NA)-080010-L

Q Corresponding Ethernet Interface Module

User's Manual (Application)

MODEL	QJ71E71-U-OU-E
MODEL CODE	13JL89
SH(NA)-080010-L(0810)MEE	

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